**Tivoli** Netcool/Proviso

Document Revision R2E2

IBM

Cisco IP Telephony 2.4.0.0 Technology Pack

User Guide

Note

Before using this information and the product it supports, read the information in Notices on page 95.

Contents

       IBM Tivoli Netcool/Proviso Cisco IP Telephony 2.4.0.0 Technology Pack

Chapter 1: Introduction

This manual describes the IBM® Tivoli® Netcool®/Proviso® Cisco IP Telephony Technology Pack. Specifically, the manual describes the reports that display information about the devices and technologies that operate in the Cisco IP Telephony environment.

> **Note:** *This technology pack supports the Cisco CallManager (CCM) environment and its new implementation, the Cisco Unified Communications Manager (CUCM) environment. Where this guide refers to CCM, the text also applies to CUCM, unless an explicit distinction is made.*

Audience

The audiences for this manual are the network administration engineers at IBM customer sites who will install, configure, and use the Cisco IP Telephony Technology Pack as part of their Tivoli Netcool/Proviso installation. IBM Professional Services engineers may also find this manual useful.

To install and use the Cisco IP Telephony Technology Pack, you should have a working knowledge of the following subjects:

- Tivoli Netcool/Proviso DataMart
- TCP/IP networks
- Telecommunications network management
- Administration of the operating system

The audiences should also be familiar with the specific technology that the Cisco IP Telephony Technology Pack deals with, in this case Cisco IP Telephony.

Organization

This guide is organized as follows:

- Chapter 1, *Introduction*

  Provides a general introduction to the Tivoli Netcool/Proviso product suite.

- Chapter 2, *Devices and Services*

  Provides an overview of the device technology supported by the technology pack.

- Chapter 3, *Supported Reports and KPIs*

  Provides information about the reporter sets and key performance indicators (KPIs) that the Cisco IP Telephony Technology Pack provides for each device operating in the Cisco IP Telephony environment.

- Chapter 4, *Configuring the technology pack*

  Describes how to configure the Cisco IP Telephony Technology Pack.

- Appendix A, *UBA parameters (Tivoli Netcool/Proviso v4.4.3 and later)*

  Provides UNIX® reference pages for each of the pack-specific UBA parameters supplied with the XSD file for the Cisco IP Telephony Technology Pack.

- Appendix B, *Template file (Tivoli Netcool/Proviso pre-v4.4.3 only)*

  Explains the edits that must be made to the pack-specific UBA parameters delivered in the pack template file.

The Tivoli Netcool/Proviso product suite

Tivoli Netcool/Proviso is made up of the following components:

- **Tivoli Netcool/Proviso DataMart** is a set of management, configuration and troubleshooting GUIs that the Tivoli Netcool/Proviso system administrator uses to define policies and configuration, as well as to verify and troubleshoot operations.

- **Tivoli Netcool/Proviso DataLoad** provides flexible, distributed data collection and data import of SNMP and non-SNMP data to a centralized database.

- **Tivoli Netcool/Proviso DataChannel** aggregates the data collected through Tivoli Netcool/Proviso DataLoad for use by the Tivoli Netcool/Proviso DataView reporting functions. It also processes on-line calculations and detects real-time threshold violations.

- **Tivoli Netcool/Proviso DataView** is a reliable application server for on-demand, web-based network reports.

- **Tivoli Netcool/Proviso Technology Packs** extend the Tivoli Netcool/Proviso system with service-ready reports for network operations, business development, and customer viewing.

Figure 1 shows the different Tivoli Netcool/Proviso modules.

Figure 1: Tivoli Netcool/Proviso modules
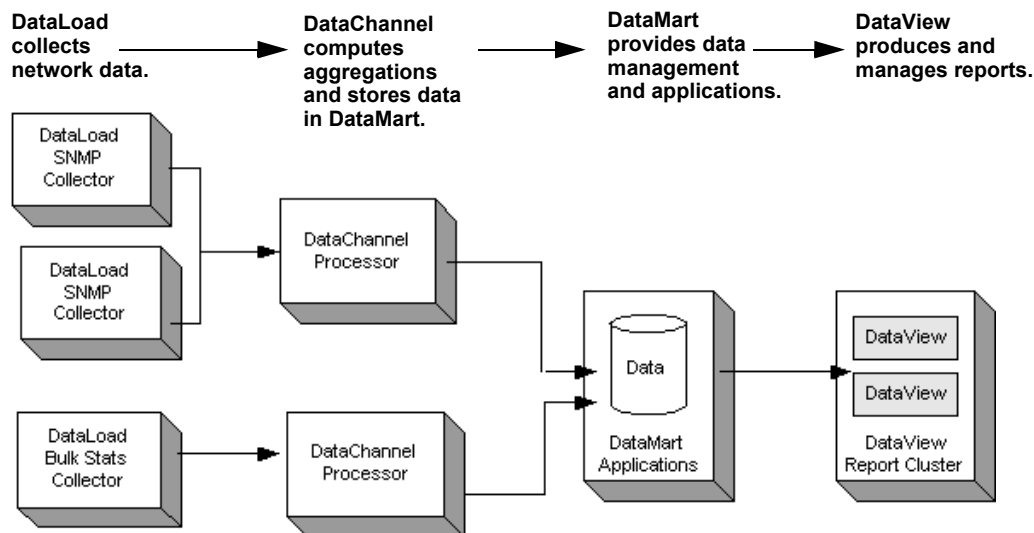
Tivoli Netcool/Proviso documentation

IBM provides the following Tivoli Netcool/Proviso documentation:

- Release notes
- Configuration recommendations
- User guides
- References
- Technical notes
- Online help

Chapter 2: Devices and Services

This chapter discusses the following topics:

Topic	Page
Overview	3
Summary of Device Technology	3
Sources of Collected Data	5
Prerequisites	8
Supported MIBs	9

Overview

This chapter provides a summary of Cisco IP Telephony device technology that the Cisco IP Telephony Technology Pack is designed to support.

> **Note:** *This technology pack supports the Cisco CallManager (CCM) environment and its new implementation, the Cisco Unified Communications Manager (CUCM) environment. Where this guide refers to CCM, the text also applies to CUCM, unless an explicit distinction is made.*

Summary of Device Technology

The Tivoli Netcool/Proviso Cisco IP Telephony Technology Pack collects and reports performance metrics in an Architecture for Voice, Video and Integrated Data (AVVID) environment where Cisco CallManager (CCM) IP-PBXs are deployed.

The technology pack manages the IP telephony application by focusing on an end-to-end voice path. It uses advanced data consolidation, with data coming from the end user (the phone extension itself), as well as data coming from network infrastructure devices.

The Cisco IP Telephony Technology Pack operates with the following Cisco versions:

- Cisco CallManager version 4
- Cisco Unified Communications Manager version 5
- Cisco Unified Communications Manager version 6
- Cisco Unified Communications Manager version 7

Categories of Service Reporting

The technology pack provides the following categories of service reporting:

- **Voice Quality Management** — Latency, jitter, packet loss, network bandwidth, Class-Based QoS, and element availability.

- **Call Signaling Management** — Call setup and termination metrics, based on data from Call Detail Records (CDRs).

- **Converged Network Infrastructure Management** — Network and system devices in charge of the Service and Voice Data Packets Delivery.

Services and Devices Monitored

The Tivoli Netcool/Proviso Cisco IP Telephony Technology Pack creates automatic, on-demand, historical, and real-time reports showing performance and trend analysis for the following services and devices:

- **Voice Quality** — Jitter, latency, packet drops, mean opinion score, per cluster, per location, per business department, and even for each extension number.

- **CallManager System & Application** — Server availability, performance, CPU load, memory, service availability, disk usage, and registered devices.

- **PSTN Gateway Devices** — Catalyst6500, Cisco AS5x00 series, Cisco 2600 & 3600 series, E1 & T1 Serial Links, DS0 Channel availability and utilization, DSP availability and utilization, capacity planning, bandwidth, errors. Also, total number of calls per gateway, total duration per gateway.

- **Gatekeeper Devices** — Number of successful / unsuccessful requests (routing, location, admission), registered endpoints, errors.

- **Telephony Usage** — Total number of calls, total duration of calls, total number of packets, per location, per business department, per extension number, top10 clusters (or sites, offices, extensions, departments). Number of outbound and inbound calls. Total accumulated hours of traffic per hour, day, week, month.

- **Call Completion** — Percentage of outgoing and incoming successful/unsuccessful calls, what are the main errors (phones, LAN, WAN, PSTN network, congestions, no resource available).

- **Call Distribution** — On-net vs. off-net ratio (number of IP routed calls vs. calls routed toward PSTN), number of internal (private extension to private extension) calls, local calls, long distance calls, international calls. Capability to provide statistics on number of calls to mobile networks (supported in some countries only).

- **Site to Site Path Analysis** — End-to-end measurement between customer offices. Voice quality, call distribution, call completion, IP telephony usage, TopN sites for errors, number of calls, duration and voice quality.

Sources of Collected Data

The Tivoli Netcool/Proviso Cisco IP Telephony Technology Pack uses both SNMP and bulk data collection. The technology pack collects performance data from the following sources:

Source of Collected Data	Collection Type
PSTN gateway, media gateway	SNMP
Gatekeeper	SNMP
Cisco CallManager Server Each server in the cluster has an SNMP agent	SNMP
Call Detail Records (CDR) Accounting data	Bulk
Call Maintenance Records (CMR) Voice quality data	Bulk
Microsoft® performance counter metrics (Perfmon)	Bulk

CDR and CMR data is collected in Cisco CallManager (CCM) environments and Cisco Unified Communications Manager (CUCM) environments. The technology pack accesses CDR and CMR data differently in each environment.

The following sections provide an overview of how the technology pack accesses CDR and CMR data in these different environments. A basic understanding of the different access methods will help you when you configure the technology pack.

> **Note:** *Perfmon is not supported for Cisco CallManager version 4.x.*

Collecting CDR and CMR Data with Cisco CallManager

With Cisco CallManager (CCM), the technology pack collects CDR and CMR data through SQL requests to the CallManager Publisher SQL database.

The following figure illustrates the technology pack's data collection architecture in a CCM environment:
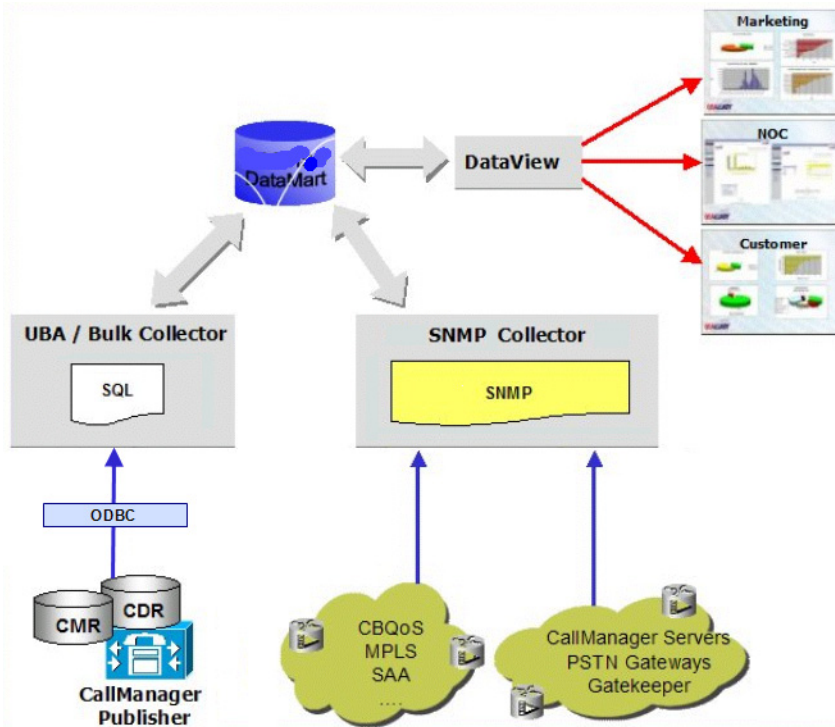
Port for SQL Access

CallManager Publisher runs on a Microsoft SQL Server 2000 server. To collect SQL data from the CallManager Publisher, an SQL bridge must be set up on the machine where Tivoli Netcool/Proviso DataLoad resides. This bridge is provided as part of the Tivoli Netcool/Proviso Cisco IP Telephony Technology Pack.

The connection between the Data Direct SQL server bridge and the SQL Server 2000 server is made through TCP port number 1433 or 1370, according to the Cisco CallManager Publisher configuration.

Troubleshooting Note for SQL Requests

If you have problems issuing SQL queries to the Cisco CallManager (CCM) Publisher, check the following list:

- Ensure that `tempdb` has been set to an adequate size (at least 100Mb) in order to correctly receive the SQL result set, as recommended in the Cisco *CallManager Installation Guide*.

- Check the log file (`proviso.log` by default) for any SQL error messages. By default, the log file is in the `$DC_HOME/log` directory — for example, `/opt/datachannel/log`.

- With pre-4.4.3 Tivoli Netcool/Proviso versions, ensure that the `dc.cfg` file contains a URI for each CCM Publisher bulk adaptor, and that the URI matches the URI of the associated data source in the `odbc.ini` file.

Collecting CDR, CMR, and Perfmon Data with Cisco Unified Communications Manager

With Cisco Unified Communications Manager (CUCM), the technology pack collects CDR, CMR, and Perfmon data files in either of the following ways:

- Through SOAP requests to the CUCM server and PerfmonPorts API.

- Through a schedule for pushing the data files back to the DataChannel server. The schedule is specified by CUCM Web administration configuration settings.

In both cases, the CUCM pushes the data back to the technology pack via FTP.

The technology pack includes a Java™ application called ProvisoCUCM. This application is responsible for sending the SOAP requests to the CUCM, and for producing the CSV files for the UBA from the data files pushed back to the DataChannel server by the CUCM server.

The ProvisoCUCM finds the address of the CUCM server, authentication information, and other configuration details in the file `cucm.properties`. You install and edit this file when you configure the technology pack, as described in Chapter 4, *Configuring the technology pack*.

The following figure illustrates the technology pack's data collection architecture in a CUCM environment:
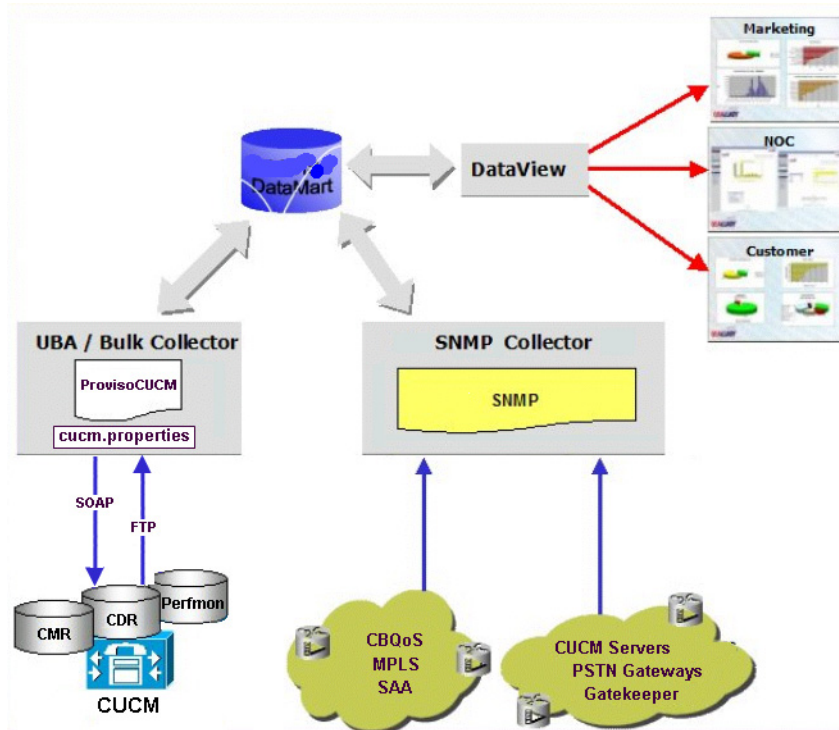
Prerequisites

This section describes the prerequisites for the Tivoli Netcool/Proviso Cisco IP Telephony Technology Pack.

SNMP Access

The Tivoli Netcool/Proviso Cisco IP Telephony Technology Pack needs read access to SNMP agents of PSTN gateway, gatekeeper, and CallManager Server devices. Customers must provide a valid IP address and community name to access these devices.

UDP Port number 161 needs to be open in the remote firewalls.

CallManager servers, as well as Unity servers and other Cisco media servers running under the Microsoft SQL Server 2000 environment, can be configured with the following standard SNMP Extensions:

- HOST-MIB

- PERFMON-MIB (optional – perfmon counters)

- SQL-MIB (optional – SQL Server and Database metrics)

- EXCHANGE-MIB (optional – MS Exchange metrics)

- DHCP-MIB (optional – Dhcp server metrics)

- HTTP-MIB (optional – Http server metrics)

Cisco CallManager Configuration

To enable CDR and CMR collection from CCM and CUCM environments, some configuration parameters must be set using the CCM System Administrator. Configuration settings must be defined separately on every server in a cluster.

The following configuration service parameters control the generation of CDR records:

- **cdrEnabled —** Determines whether CDR records are generated. Default value: `false`.

- **CdrLogCallsWithZeroDurationFlag** — Enables logging of CDR records for calls that were never connected, or which lasted less than one second. This parameter must be enabled to allow data to be collected on short connections.

- **CallDiagnosticsEnabled** — Determines whether CMR records are generated. Only IP phones and MGCP gateways support CMR records. Default value: `false`.

- **MaxCdrRecords** — Controls the maximum number of CDRs on the system. When this limit is exceeded, the oldest CDRs are automatically removed once a day, along with the related CMR records. Default value: 1.5 million records.

  The Tivoli Netcool/Proviso Cisco IP Telephony Technology Pack never deletes records. IBM recommends retrieving CDRs every hour or every four hours. This polling interval permits the system administrator to decrease the maximum number of CDRs on the CallManager and to improve performance.

In addition, the following enterprise parameters must be set:

- **LocalCDRPath** — A directory for local CDR files written by Cisco CallManager. If this value is empty or invalid, the CDR files will not be moved.

- **PrimaryCDRUNCPath** — A central collection point for CDR files. If this value is empty or invalid, the CDR files will not be moved. The installation procedure sets this parameter.

- **CDRFormat** — A parameter that determines whether the files are written to the database. The value specifies either `FLAT` or `DB`. Default value: `DB`.

  For performance reasons, the Tivoli Netcool/Proviso Cisco IP Telephony Technology Pack collects CDRs using SQL requests, not flat files. Tivoli Netcool/Proviso does not support `FLAT` for CDR collection.

- **PrimaryCDRDSN** — An optional parameter that references the primary CDR server on which to insert CDRs. The referenced system does not need Cisco CallManager installed, but does need SQL server and a CDR database.

  This parameter allows movement of the CDRs off of the Cisco CallManager cluster. If this parameter is missing, CDRs are written locally to the `PrimaryCDRUNCPath`.

- **CDRFlatFileInterval** — A parameter that determines the amount of time, in minutes, that a CDR file can be written to before Cisco CallManager closes the CDR file and opens a new one.

Supported MIBs

This technology pack uses the following MIB files:

- cisco-10-mib
- CISCO-CCM-MIB.my
- CISCO-CDP-MIB.my
- CISCO-DSP-MGMT-MIB.my
- CISCO-GATEKEEPER-MIB.my
- CISCO-POP-MGMT-MIB.my
- MSSQL-MIB.my
- rfc1213-MIB-II
- rfc1514-HOSTRESOURCES
- rfc1907-SNMPv2-MIB
- rfc2127-ISDN-MIB
- rfc2233-IF-MIB

Bulk input file formats

The Cisco IP Telephony devices gather performance data and other statistics from multiple network elements. This data is referred to collectively as *network health metrics*. Each Cisco IP Telephony device produces, on an hourly basis, a *bulk input file* that contains the network health metrics and other information.

The Cisco IP Telephony Technology Pack supports multiple input files, where each input file contains data for one polling period only.

The syntax for these bulk input files is discussed in *Bulk input file name* on page 10.

The Cisco IP Telephony Technology Pack provides a file that interprets these bulk input files. See *Bulk adaptor design files* on page 11 for more information.

Bulk input file name

Cisco IP Telephony devices produce Comma-Separated Values (CSV) files that are named using the following syntax:

> *DataType_ClusterName_Date_SerialNumber*`.csv`

where:

- *DataType* specifies the type of data collected: `cdr`, `cmr`, `cdrcmr`, or `perfmon`.

- *ClusterName* specifies the name of the cluster from which the data was collected.

- *Date* specifies the date on which the data was collected. The date format is as follows:

  > *yyyyMMddHHmm*

  where:

  — *yyyy* specifies a four-digit integer (for example, 2010) that identifies the year in which the Cisco IP Telephony produced the CSV file.

  — *MM* specifies a two-digit integer (for example, 05) that identifies the month in which the Cisco IP Telephony produced the CSV file.

  — *dd* specifies a two-digit integer (for example, 15) that identifies the day in which the Cisco IP Telephony produced the CSV file.

  — *HH* specifies a two-digit integer (for example, 08) that identifies the metric hour in which the Cisco IP Telephony produced the CSV file.

  — *mm* specifies a two-digit integer (for example, 35) that identifies the minutes after the metric hour in which the Cisco IP Telephony produced the CSV file.

- *SerialNumber* specifies the serial number of the file, in case there are multiple files for a single period.

Example:

```
cdrcmr_cluster_01_201005150835_10001.csv
```

Bulk input file schema

For Cisco CallManager version 4.x, CDR data is stored in a Microsoft SQL Server 2000 database. The Cisco IP Telephony Technology Pack connects directly to the database and uses an SQL query to retrieve the data. Perfmon is not supported for Cisco CallManager version 4.x.

For Cisco Unified Communications Manager versions 5.x and higher, the ProvisoCUCM Java application uses the AXL/SOAP API delivered by the device to collect both CDR and Perfmon data. For CDR, a SOAP query to the CUCM server requests all CDR data for a certain time period. The CUCM server uses FTP to send the data back to a specified host. The data is delivered in two formats, CDR and CMR, which are concatenated to produce a CSV format for the UBA. Perfmon data is delivered in-band as a response to the SOAP request, and is also written into a CSV format for the UBA.

Example CDR CSV file:

```
1,1,6177065,5362499,1273883641,1,0,760260612,"6076","termine",0,1,4,0,0,57,0,0,0
,0,0,0,0,"0","0",19835742,0,0,0,"6096","6096","",0,0,4,0,0,0,0,0,0,0,0,0,0,"0","
0",0,1273883673,"6001","593fa05e-bc1d-4dc5-9cca-
6c25184e7e98","","Phones","","",69,"SEP00155832DDD1","",13,0,0,0,0,0,0,"StandAlo
```

```
neCluster",0,"","",0,"",3,0,0,1,"6076",5362499,1273883641,541,2954,487,2849,6,96
,144,"03d4df7b-78ff-460e-a0bb-
43ccee36cc5f","Phones","StandAloneCluster","SEP00155832DDD5","MLQK=3.2000;MLQKav
=3.3000;MLQKmn=1.4000;MLQKmx=3.9000;ICR=0.8200;CCR=0.7600;ICRmx=0.9800;CS=9;SCS=
2;MLQKvr=;z="
```

```
1,1,8590499,10263919,1273883642,1,0,760260611,"6058","termine",0,1,4,0,0,51,0,0,
0,0,0,0,0,"0","0",19835742,0,0,0,"6017","6017","",0,0,4,0,0,0,0,0,0,0,0,0,0,"0",
"0",0,1273883642,"6001","593fa05e-bc1d-4dc5-9cca-
6c25184e7e98","","Phones","","",197,"SEP00155832DDD6","",13,0,0,0,0,0,0,"StandAl
oneCluster",0,"","",0,"",3,0,0,1,"6058",10263919,1273883642,128,313,1784,1107,11
,176,62,"03d4df7b-78ff-460e-a0bb-
43ccee36cc5f","Phones","StandAloneCluster","SEP00155832DDD5","MLQK=3.2000;MLQKav
=3.3000;MLQKmn=1.4000;MLQKmx=3.9000;ICR=0.8200;CCR=0.7600;ICRmx=0.9800;CS=9;SCS=
2;MLQKvr=;z="
```

This example contains both the CDR and CMR data, with the CMR data concatenated to the end of the CDR line. This example is taken from the output file after the Cisco IP Telephony Technology Pack has processed the two inputs and created the CSV file for the UBA.

Bulk adaptor design files

Tivoli Netcool/Proviso supports several data formats for bulk input files, including CSV, XML, and binary. Each UBA technology pack provides a *Bulk Adaptor Design File* to define the data format supported by that technology pack. The Bulk Adaptor Design File, which is a JavaScript file, processes both inventory and statistics data from the same bulk input file. The Bulk Adaptor Design File provides a function that creates the bulk collection formula names. Some technology packs provide several Bulk Adaptor Design Files, each of which handles a specific bulk input file format.

The Cisco IP Telephony Technology Pack provides the following Bulk Adaptor Design Files:

- `CCMAdaptor.js`
- `CCMConfig.js`
- `CCMSupport.js`
- `CUCMAdaptor.js`
- `CUCMConfig.js`
- `CUCMPerfmonAdaptor.js`
- `CUCMSupport.js`

NOTES

Chapter 3: Supported Reports and KPIs

This chapter discusses the following topics:

Overview

The Cisco IP Telephony Technology Pack supplies a set of reports to display information about the devices and activity associated with the Cisco IP Telephony environment.

The reports contain metrics that are generated by the formulas that this technology pack provides. The metric names are the same as the names of the formulas that generate them. For information about a metric that is listed for a particular report, see the description of the associated formula in the Collection Formulas section of the *IBM Tivoli Netcool/Proviso Cisco IP Telephony 2.4.0.0 Technology Pack Reference.*

For information about how to navigate to a particular report on the DataView portal, see the NOC Reporting tree in the Subelement Groups section of the *IBM Tivoli Netcool/Proviso Cisco IP Telephony 2.4.0.0 Technology Pack Reference.* This chapter provides information about deployed reports only.

For information about understanding report types, creating reports, configuring reports, viewing and working with reports, and deploying reports, see the *Netcool/Proviso DataView User's Guide.* This Technology Pack User Guide assumes an understanding of the report-related topics discussed in the *Netcool/Proviso DataView User's Guide.*

Reporter sets

A reporter set contains a group of reporters that together provide information about a specific technology or vendor device. Technology pack developers use the Reporter Set Wizard to choose the type of template on which to base the reporter set. Technology packs use reporter sets as the framework for defining reports.

The Cisco IP Telephony Technology Pack reports display, on a Web portal, the collected information about the devices and technologies that operate in the Cisco IP Telephony environment.

Table 1 shows a summary of the reports in each reporter set provided by the Cisco IP Telephony Technology Pack.

Table 1: Reporter set summary

Reporter set	Dashboard	Group	Resource	Detail	Threshold
CallManager Server	0	1	2	0	0
Cluster	1	4	5	0	0
Codec	0	0	1	0	0
DSP Card	0	0	1	0	0
Device	0	0	2	0	0
Device	2	0	2	0	0
Extension	0	3	4	0	0
Global Customer Reports	0	0	1	0	0
Interface	0	0	2	0	0
Interface	2	0	2	0	0
K-Factor	0	1	1	0	0
Media Devices	0	1	1	0	0
Perfmon	0	4	4	0	0
TOTALS	**5**	**14**	**28**	**0**	**0**

See the *Netcool/Proviso DataView User's Guide* for more information about reporter sets and the Reporter Set Wizard.

Reporter set tree

The Cisco IP Telephony Technology Pack provides the following reporter sets, which are listed as they appear in the DataView Navigator tree structure:

```
AP Cisco VOIP Pack
    Global Customer Reports
    Call Detail Record
        Cluster
        Extension
        K-Factor
        Codec
    Infrastructure
        CallManager Server
        PSTN Gateway
            Interface
            Device
            DSP Card
        Media Devices
        Gatekeeper
            Device
            Interface
        Perfmon
```

Reporter set contents

This section describes the contents of the reporter sets provided in the Cisco IP Telephony Technology Pack, including the key performance indicators (KPIs) for each report.

> *Note:* *If any fields are omitted from the CDR or CMR data, the corresponding metric fields in the reports have dashes instead of zeroes.*

Global Customer Reports

Global VOIP

KPIs

- ClusterOffNetCall
- PSTN Gateway Active DS0 Channels (Nb)
- Cluster Total Number of Normal Call Clearing
- ClusterJitter
- CCM CPU Utilization (percent) (avg last 5 mn)
- ClusterDropCall
- ClusterOnNetCall
- Cluster Percentage of Packet Lost (percent)
- ClusterSuccessfulCall
- PSTN Gateway Network Errors (percent)
- ClusterUnsuccessfulCall
- Interface Bandwidth Utilization Out (percent)
- PSTN Gateway Active DS0 Channels (Nb) (Gauge)

Charts

Call Detail Record

Cluster

Cluster Utilization Resource

KPIs

- Cluster Total Number of Outgoing External Calls (Nb)
- ClusterTollBypassCall
- Cluster Total Number of External Calls (Nb)
- Cluster Total Number of Company Calls (Nb)
- Cluster Erlang
- ClusterNbPacketsReceived

- Cluster Total Hours of Traffic
- ClusterNbPacketsSent
- ClusterTotalCall

Charts

- TollBypass vs Normal Ougoing PSTN Calls
- Company vs External Calls

Cluster Quality Resource

KPIs

- ClusterNbPacketsLost
- MLQK
- ClusterLatency
- ClusterJitter
- Cluster Total Number of Normal Call Clearing
- ClusterDropCall
- ClusterSuccessfulCall
- ClusterUnsuccessfulCall

Charts

- Successful vs Unsuccessful Calls
- Drop calls vs Normal call clearing

Cluster Call Distribution Resource

KPIs

- Cluster Total Number of Outgoing External Calls (Nb)
- ClusterLongDistanceCall
- ClusterInternationalCall
- ClusterLocalCall
- Cluster Total Number of External Calls (Nb)
- ClusterInternalCall
- ClusterIncomingCall

Charts

- Types of Calls Distribution
- Incoming vs Outgoing Calls Ratio

Cluster Call Distribution Group

KPIs

- Cluster Total Number of Outgoing External Calls (Nb)
- ClusterLongDistanceCall

IBM Tivoli Netcool/Proviso Cisco IP Telephony 2.4.0.0 Technology Pack

17

- ClusterInternationalCall
- ClusterLocalCall
- ClusterInternalCall
- ClusterIncomingCall

Charts

- Incoming vs Outgoing Calls Ratio
- Types of Calls Distribution

Top 10 Cluster Call Completion

KPIs

- Cluster Percentage of Successful Calls (percent)
- Cluster Percentage of Drop Calls (percent)
- Cluster Percentage of Normal Call Clearing (percent)

Cluster Quality Group

KPIs

- ClusterMOS
- Cluster Percentage of Drop Calls (percent)
- MLQK
- ClusterLatency
- ClusterJitter
- Cluster Percentage of Packet Lost (percent)
- Cluster Percentage of Successful Calls (percent)

Charts

- Successful Calls Percent Distribution Chart
- Mean Opinion Score

Cluster Utilization Group

KPIs

- Cluster Percentage of Company Calls (percent)
- ClusterIntersiteIPCall
- Cluster Percentage of TollBypass Calls (percent)
- Cluster Erlang
- ClusterNbPacketsReceived
- Cluster Total Hours of Traffic
- ClusterNbPacketsSent
- ClusterTotalCall

Charts

- TollBypass Calls Distribution Chart
- Comapny Calls Percent Distribution Chart

Top 10 Cluster Number of Calls

KPIs

- ClusterTotalCall
- ClusterOnNetCall
- ClusterIncomingCall
- Cluster Total Number of Outgoing External Calls (Nb)
- ClusterOffNetCall

Top 10 Cluster Number of Errors

KPIs

- Cluster Percentage of Successful Calls (percent)
- ClusterShortCall
- Cluster Percentage of Packet Lost (percent)
- Cluster Percentage of Drop Calls (percent)

Cluster VoiceMail Usage Resource

KPIs

- ClusterVoicemailPackets
- ClusterForwardToVoiceMail
- ClusterVoicemailCallDuration
- ClusterVoiceMailCall
- Cluster Number of Direct VoiceMail Calls (Nb)

Charts

- Direct vs Forward Calls ratio

Cluster IP vs Legacy Resource

KPIs

- ClusterTollBypassCall
- Cluster Total Number of External Calls (Nb)
- Cluster Total Number of Company Calls (Nb)
- Cluster Total Number of Company LegacyPBX Calls (Nb)
- Cluster Total Number of Company IP Calls (Nb)

Charts

- External vs Company Calls Ratio
- IP vs LegacyPBX Calls Ratio

Cluster Utilization MLH Resource

KPIs

- ClusterTollBypassCall
- ClusterNbPacketsLost
- Cluster Total Number of Company Calls (Nb)
- Cluster Total Hours of Traffic
- ClusterNbPacketsReceived
- ClusterSuccessfulCall
- ClusterTotalCall
- ClusterNbPacketsSent
- ClusterUnsuccessfulCall

Charts

Cluster Erlang-B Group

KPIs

- Cluster Erlang
- Cluster Total Hours of Traffic
- ClusterBlocking
- ClusterLines
- ClusterErlangB

Extension

CDR Utilization Resource

KPIs

- Percentage of Drop Calls (percent) CME(Bulk) VOIP Cisco
- Total Number of Calls (Nb) CME(Bulk) VOIP Cisco
- NbPacketsReceived
- NbPacketsLost
- CallDuration
- Percentage of Successful Calls (Nb) CME(Bulk) VOIP Cisco
- NbPacketsSent

Charts

- Percentage of Successful calls Distribution Chart
- Drop Calls Distribution Chart

CDR Quality Resource

KPIs

- UnsuccessfulCall

- Percentage of Drop Calls (percent) CME(Bulk) VOIP Cisco
- SuccessfulCall
- Latency
- MOS
- Jitter
- Percentage of Packet Lost (percent) CME(Bulk) VOIP Cisco
- Percentage of Successful Calls (Nb) CME(Bulk) VOIP Cisco

Charts

- Drop Calls Distribution Chart
- Percentage of Successful calls Distribution Chart

CDR Call Distribution Resource

KPIs

- Local
- Incoming
- LongDistance
- International
- Total Number of Outgoing External Calls (Nb)
- Internal

Charts

- Incoming vs Outgoing Calls Ratio
- Types of Calls Distribution

Top 10 CDR Number of Calls

KPIs

- Total Number of Outgoing External Calls (Nb)
- Total Number of Calls (Nb) CME(Bulk) VOIP Cisco
- TollBypassCall
- Incoming

Top 10 CDR Number of Errors

KPIs

- Percentage of Packet Lost (percent) CME(Bulk) VOIP Cisco
- Percentage of Successful Calls (Nb) CME(Bulk) VOIP Cisco
- Percentage of Drop Calls (percent) CME(Bulk) VOIP Cisco
- ShortCall

CDR VoiceMail Usage Resource

KPIs

- VoicemailPackets
- VoicemailCallDuration
- VoiceMailCall
- Total Number of VoiceMail Direct Calls (Nb) CME(Bulk) VOIP Cisco
- ForwardToVoiceMail

Charts

- Direct vs Forward Calls ratio

Top 10 CDR Call Completion

KPIs

- Percentage of Successful Calls (Nb) CME(Bulk) VOIP Cisco
- Percentage of Drop Calls (percent) CME(Bulk) VOIP Cisco

Top 10 CDR Call Duration

KPIs

- TollbypassCallDuration
- CallDuration

CDR Quality Group

KPIs

- Percentage of Drop Calls (percent) CME(Bulk) VOIP Cisco
- MOS
- Latency
- Jitter
- Percentage of Packet Lost (percent) CME(Bulk) VOIP Cisco
- Percentage of Successful Calls (Nb) CME(Bulk) VOIP Cisco

Charts

- Mean Opinion Score
- Successful Calls Percent Distribution Chart

CDR Utilization Group

KPIs

- Total Number of Calls (Nb) CME(Bulk) VOIP Cisco
- Percentage of TollBypass Calls (percent) CME(Bulk) VOIP Cisco
- NbPacketsReceived
- Percentage of Company Calls (percent) CME(Bulk) VOIP Cisco
- NbPacketsLost

- CallDuration
- NbPacketsSent

Charts

- Company Calls Percent Distribution Chart
- TollBypass Calls Distribution Chart

CDR Call Distribution Group

KPIs

- Local
- Incoming
- LongDistance
- International
- Total Number of Outgoing External Calls (Nb)
- Internal

Charts

- Incoming vs Outgoing Calls Ratio
- Types of Calls Distribution

K-Factor

K-Factor Resource

KPIs

- MLQKmx
- MLQKmn
- MLQK
- MLQKav
- ICRmx
- ICR
- SCS
- CS
- CCR

K-Factor Group

KPIs

- MLQKmn
- MLQK
- MLQKav
- ICRmx
- ICR

- SCS
- CS
- CCR

Charts

- Mean Opinion Score

Top 10 CDR K-Factor

KPIs

- CCR
- ICR
- CS
- SCS
- MLQK

Codec

Errors on Cluster by Codec

KPIs

- CauseTemporaryFailure
- CauseNetworkOutOfOrder
- CauseChannelUnacceptable
- CauseUserBusy
- CauseDestinationOutOfOrder
- CauseNoRouteTransitNetwork
- CauseUnassignedNumber
- CauseNumberChanged
- CauseNoChannelAvailable
- CauseMisdialedTrunkPrefix
- CauseNoRouteToDestination
- CauseInvalidNumberFormat
- CauseNoAnswerFromUser
- CauseOther
- CauseNoUserResponding
- CauseResourceUnavailable
- CauseCallRejected
- CauseSubscriberAbsent
- CauseSwitchCongestion

Infrastructure

CallManager Server

CCM Server Quality Resource

KPIs

- CCM Rejected Devices (Nb) (Gauge)
- CCM Physical Memory Utilization (percent)
- CCM Registered Devices (Nb) (Gauge)
- CCM CPU Utilization (percent) (avg last 5 mn)

Charts

- Managed Devices
- CPU Utilization Distribution Chart

CCM Sql Server Resource

KPIs

- CCM SQL Server number of locks
- CCM SQL Server free buffers (Nb)
- CCM SQL Server Cache Hit ratio (percent)
- CCM SQL Server number active user connections
- CCM SQL Server Availability percentage
- CCM SQL Server number of pending rw
- CCM SQL Server Total number of Pages
- CCM SQL Server number of blocked users

Charts

- Cache Hit Ratio percentage
- Server Availability

CCM Sql Server Group

KPIs

- CCM SQL Server number of locks
- CCM SQL Server free buffers (Nb)
- CCM SQL Server number active user connections
- CCM CPU Utilization (percent) (avg last 5 mn)
- CCM SQL Server number of pending rw
- CCM SQL Server Total number of Pages
- CCM SQL Server number of blocked users

Charts

- CPU Utilization Distribution Chart
- SQL Server Number of Locks Distribution Chart

PSTN Gateway

Interface

Top 10 E1/T1 Utilization Resource

KPIs

- PSTN Gateway DS1 Active DS0 Channels (Nb)
- Interface Bandwidth Utilization In (percent)
- Interface Bandwidth Utilization Out (percent)
- Interface Throughput In (kbps)
- Interface Throughput Out (kbps)

PSTN Gateway E1/T1Availability Resource

KPIs

- Interface Availability (percent)
- Interface Packet Loss (percent)

Charts

- Availability Distribution Chart

PSTN Gateway E1/T1 Interface Utilization Resource

KPIs

- Interface Throughput Out (kbps)
- Interface Bandwidth Utilization In (percent)
- PSTN Gateway DS1 Active DS0 Channels (Nb)
- Interface Throughput In (kbps)
- Interface Bandwidth Utilization Out (percent)

Charts

- Inbound Utilization Distribution Chart
- Outbound Utilization Distribution Chart

Device

PSTN Gateway Device Quality Resource

KPIs

- PSTN Gateway Packet Discards
- PSTN Gateway Active DS0 Channels (Nb)

- SNMP Response Time (ms) (avg last hour)
- PSTN Gateway Network Errors (percent)
- PSTN Gateway Total Packets per Second

Charts

- Network Errors percentage
- Number of Active DS0 Channels

PSTN Gateway Availability Resource

KPIs

- PSTN Gateway ICMP Outbound Errors (percent)
- PSTN Gateway ICMP Inbound Errors (percent)
- SNMP Response Time (ms) (avg last hour)
- SNMP Availability (percent) (avg last hour)

Charts

- SNMP Responce Time Distribution Chart
- SNMP Availability Distribution Chart

DSP Card

PSTN Gateway DSP Card Resource

KPIs

- DSP Card Resource Utilization (percent)
- DSP Card Availability (percent)

Charts

- AP.global.Availability
- DSP Card Utilization

Media Devices

Media Device Resource

KPIs

- CCM Media Device Registration Availability (percent)

Charts

- Registration Availability Distribution Chart

Media Device Group

KPIs

- CCM Media Device Registration Availability (percent)

Charts

- Media Device Registration Distribution Chart

Gatekeeper

Device

Gatekeeper Device Quality Resource Detail Chart

KPIs

- Gatekeeper Total Number of Concurrent Calls (Nb) (Gauge)
- Gatekeeper Packet Errors (Nb)
- Gatekeeper Total Number of Admission Requests (Nb)
- Gatekeeper Buffer Utilization (percent)
- Gatekeeper Total Number of Location Rejects (Nb)
- Gatekeeper Total Number of Admission Rejects (Nb)
- Gatekeeper Total Packets (Nb)
- Gatekeeper Call Setup Quality (percent)
- Gatekeeper Total Number of Location Requests (Nb)
- Gatekeeper CPU Utilization (percent) (avg last 5 mn)

Charts

- Total Number of Packets
- Admission vs Location Rejects (avg)
- CPU Utilization (percent)
- Call Setup Quality (percent)
- Buffer Utilization (percent)
- Packet Errors (Nb)
- Admission vs Location Requests (avg)
- Active Calls (Nb)

Gatekeeper Device Quality Resource

KPIs

- Gatekeeper Total Number of Concurrent Calls (Nb) (Gauge)
- Gatekeeper Packet Errors (Nb)
- Gatekeeper Total Packets (Nb)
- Gatekeeper Call Setup Quality (percent)
- Gatekeeper CPU Utilization (percent) (avg last 5 mn)
- Gatekeeper Total Number of Registered EndPoints (Nb)

Charts

- CPU Utilization (percent)

- Call Setup Quality

Gatekeeper Availability Resource Detail Chart

KPIs

- Gatekeeper ICMP Inbound Errors (percent)
- SNMP Unavailable (percent) (avg last hour)
- SNMP Availability (percent) (avg last hour)
- Gatekeeper ICMP Outbound Errors (percent)
- SNMP Response Time (ms) (avg last hour)
- SNMP Availability (percent) (avg last hour)

Charts

- SNMP Availability (percent) (avg last hour)
- Outbound ICMP Errors (percent)
- Availability vs Unavailable - SNMP
- Inbound ICMP Errors (percent)
- SNMP Response Time (ms) (avg last hour)

Gatekeeper Availability Resource

KPIs

- Gatekeeper ICMP Inbound Errors (percent)
- Gatekeeper ICMP Outbound Errors (percent)
- SNMP Availability (percent) (avg last hour)
- SNMP Response Time (ms) (avg last hour)
- SNMP Response Time (ms) (avg last hour)

Charts

- SNMP Responce Time Distribution Chart
- SNMP Availability Distribution Chart

Interface

Gatekeeper Interface Availability Resource Detail Chart

KPIs

- Interface Packet Loss (percent)
- Interface Availability (percent)

Charts

- Availability vs Unavailable
- AP.global.Availability_(percent)
- Inbound and Outbound Packet Loss (percent)

Gatekeeper Interface Availability Resource

KPIs

- Interface Availability (percent)
- Inbound Loss (percent)
- Outbound Loss (percent)

Gatekeeper Interface Utilization Resource Detail Chart

KPIs

- Interface Bandwidth Utilization Out (percent)
- Interface Bandwidth Utilization In (percent)
- Interface Throughput Out (kbps)
- Interface Throughput In (kbps)

Charts

- Inbound vs Outbound Utilization (avg)
- AP.global.Outbound_Utilization_(percent)
- Inbound vs Outbound Throughput (avg)
- AP.global.Inbound_Utilization_(percent)
- Outbound Throughput (kbps)
- Inbound Throughput (kbps)

Gatekeeper Interface Utilization Resource

KPIs

- Interface Bandwidth Utilization Out (percent)
- Interface Bandwidth Utilization In (percent)
- Interface Throughput Out (kbps)
- Interface Throughput In (kbps)

Charts

- Inbound Utilization Distribution Chart
- Outbound Utilization Distribution Chart

Perfmon

Perfmon Active Calls Resource

KPIs

- CallsActive
- CallsInProgress
- HuntlistCallsInProgress
- HuntlistCallsActive
- SIPCallsInProgress
- H323CallsInProgress

IBM Tivoli Netcool/Proviso Cisco IP Telephony 2.4.0.0 Technology Pack

- GatewayCallsActive
- SIPCallsActive
- H323CallsActive

Perfmon Active Calls Group

KPIs

- CallsActive
- CallsInProgress
- HuntlistCallsInProgress
- HuntlistCallsActive
- SIPCallsInProgress
- H323CallsInProgress
- GatewayCallsActive
- SIPCallsActive
- H323CallsActive

Perfmon Security Group

KPIs

- EncryptedCallsActive
- AuthenticatedPartiallyRegisteredPhone
- AuthenticatedCallsActive
- CallsActive
- AuthenticatedRegisteredPhones
- EncryptedRegisteredPhones
- EncryptedPartiallyRegisteredPhones
- AttendantConsoleClientsRegistered
- AttendantConsoleClientsOnline

Perfmon Security Resource

KPIs

- EncryptedCallsActive
- AuthenticatedPartiallyRegisteredPhone
- AuthenticatedCallsActive
- CallsActive
- AuthenticatedRegisteredPhones
- EncryptedRegisteredPhones
- EncryptedPartiallyRegisteredPhones
- AttendantConsoleClientsRegistered
- AttendantConsoleClientsOnline

Perfmon PSTN Resource

KPIs

- T1SpansInService
- T1ChannelsActive
- FXSPortsInService
- FXOPortsActive
- BRIChannelsActive
- FXSPortsActive
- FXOPortsInService
- BRISpansInService

Perfmon PSTN Group

KPIs

- T1SpansInService
- T1ChannelsActive
- FXSPortsInService
- FXOPortsActive
- BRIChannelsActive
- FXSPortsActive
- FXOPortsInService
- BRISpansInService

Perfmon MOH Resource

KPIs

- MOHUnicastResourceActive
- MOHTotalUnicastResources
- MOHUnicastResourceAvailable
- MOHMulticastResourceActive
- MOHTotalMulticastResources
- MOHMulticastResourceAvailable

Perfmon MOH Group

KPIs

- MOHUnicastResourceActive
- MOHTotalUnicastResources
- MOHUnicastResourceAvailable
- MOHMulticastResourceActive
- MOHTotalMulticastResources
- MOHMulticastResourceAvailable

IBM Tivoli Netcool/Proviso Cisco IP Telephony 2.4.0.0 Technology Pack

Key performance indicators

Table 2 lists all of the key performance indicators (KPIs) supported by the Cisco IP Telephony Technology Pack.

Table 2: Key performance indicators

KPI	Comment
AttendantConsoleClientsOnline	Total number of attendant console clients currently online
AttendantConsoleClientsRegistered	Total number of attendant console clients registered to the device
AuthenticatedCallsActive	Total number of active authenticated calls
AuthenticatedPartiallyRegisteredPhone	Total number of active authenticated extensions which have not completed the registration process
AuthenticatedRegisteredPhones	Total number of active authenticated and fully registered extensions
BRIChannelsActive	Total number of BRI channels currently in use in the target device
BRISpansInService	Total number of BRI spans available in the target device
CCM CPU Utilization (percent) (avg last 5 mn)	The average, over the last minute, of the percentage of time that this processor was not idle
CCM Media Device Registration Availability (percent)	Percentage availability that media devices could register with a CCM server
CCM Physical Memory Utilization (percent)	In order to know the percentage of memory utilization, we have to sum the amount of real system memory allocated to each process, and then divide this value with the amount of physical memory contained by the host
CCM Registered CTI Devices (Nb) (Gauge)	Total number of CTI devices which are registered to the CCM
CCM Registered Devices (Nb) (Gauge)	Number of devices currently registered to the CCM device
CCM Registered Gateways (Nb) (Gauge)	Total number of media gateways registered to a CCM device
CCM Registered Media Devices (Nb) (Gauge)	Total number of media devices registered to a CCM server
CCM Registered Phones (Nb) (Gauge)	Total number of IP phones registered to a CCM device
CCM Registered VoiceMail Devices (Nb) (Gauge)	Total number of registered voicemail devices
CCM Rejected Devices (Nb) (Gauge)	Total number of rejected devices
CCM SQL Server Availability percentage	CCM SQL server availability percentage
CCM SQL Server Cache Hit ratio (percent)	Buffer cache hit ratio. Percentage of time that a requested data page was found in the data cache (instead of being read from disk).
CCM SQL Server Total number of Pages	Total number of pages read and write
CCM SQL Server free buffers (Nb)	Total number of data cache buffers currently in the free pool.
CCM SQL Server number active user connections	Total number of open user connections
CCM SQL Server number of blocked users	Total Number of users blocked by other users
CCM SQL Server number of locks	Total number of locks being used by SQL Server

Table 2: Key performance indicators

KPI	Comment
CCM SQL Server number of locks blocking processes	Total number of locks blocking other processes.
CCM SQL Server number of pending rw	Total number of reads and writes pending
CCR	Cumulative conceal ratio. Cumulative concealment ratio during a call represented as concealment time / speech time
CS	Conceal seconds. The number of seconds of concealment during a call
CallDuration	Time value in seconds of the call duration.
CallsActive	Total number of currently active calls for the resource or resources specified
CallsInProgress	Total number of calls being established at the time of sampling
CauseCallRejected	Call was rejected by the far end
CauseChannelUnacceptable	Call failure due to lack of acceptable TDM channel
CauseDestinationOutOfOrder	Called destination is not in service
CauseInvalidNumberFormat	Call failure due to invalid number format
CauseMisdialedTrunkPrefix	Call failed due to a misdialed trunk prefix
CauseNetworkOutOfOrder	Call failed because the network was out of order
CauseNoAnswerFromUser	Call failed because there was no answer at the destination end
CauseNoChannelAvailable	Call failed due to lack of available channel
CauseNoRouteToDestination	Call failure due to lack of route to destination
CauseNoRouteTransitNetwork	Call failued due to lack of available route in the transit network
CauseNoUserResponding	Call failed because receiving end sent no RTP data
CauseNumberChanged	Recipient number has changed
CauseOther	Call failure code is 'other'
CauseResourceUnavailable	Call failed due to lack of resources
CauseSubscriberAbsent	Call failed because the subscriber called is tagged as absent
CauseSwitchCongestion	Call failed due to switch congestion
CauseTemporaryFailure	Generic temporary call failure
CauseUnassignedNumber	Call failed due to unassigned destination number
CauseUserBusy	Call failed due to busy received from destination
Cluster Erlang	Cluster Erlang measured in minutes: ClusterCallDuration / 60
Cluster Number of Direct VoiceMail Calls (Nb)	Total number of VoiceMail Calls that are Direct call to VoiceMail. This is the case when a user dials directly his VoiceMail. This metric is the opposite of ForwardToVoiceMail.

Table 2: Key performance indicators

KPI	Comment
Cluster Percentage of Company Calls (percent)	Ratio between Company calls and Total number of Calls
Cluster Percentage of Drop Calls (percent)	Ratio between DropCalls and Total number of Calls
Cluster Percentage of Normal Call Clearing (percent)	Ratio between Calls that have normal termination code and Total number of Calls. This metric is the opposite of the Percentage of Drop Calls metric.
Cluster Percentage of Packet Lost (percent)	Ratio between Packets Lost and Total number of Packets sent and received.
Cluster Percentage of Successful Calls (percent)	Ratio between Successful Calls and Total number of Calls
Cluster Percentage of TollBypass Calls (percent)	Ratio between Toll Bypass Calls and Total number of Calls
Cluster Total Hours of Traffic	This formula will be useful for future Erlang calculation. This is the Total call duration in hours.
Cluster Total Number of Company Calls (Nb)	Total number of Company Calls. A company call is define as: - An Intrasite IP Call - An Intersite IP Call - An Intrasite Legacy PBX Call - An Intersite Legacy PBX Call Any call with caller and callee that is part of the Internal dial plan is a Company Call.
Cluster Total Number of Company IP Calls (Nb)	Total number of internal VoIP company calls
Cluster Total Number of Company LegacyPBX Calls (Nb)	Total number of Company Legacy PBX Calls. A Legacy PBX Call is defined as: - An intrasite Legacy PBX Call - An intersite Legacy PBX Call
Cluster Total Number of External Calls (Nb)	Any call FROM / TO the PSTN. This is the opposite of a Company Call. An External Call is defined as: - A Local Call - A Long Distance Call - An International Call - An Incoming Call An External Call is like Outgoing External Call + Incoming Call
Cluster Total Number of Normal Call Clearing	Total number of calls which cleared normally for a given cluster
Cluster Total Number of Outgoing External Calls (Nb)	Any Outbound call going to the PSTN. This metric is a subset of the Cluster Total Number of External Calls. An Outgoing External call is define as: - A Local Call - A Long Distance Call - An International Call
ClusterBlocking	Total number of times call blocking occurred. This can be due to lack of channel availability, or switch congestion. Error codes 34 and 42 are used in the calculation.
ClusterDropCall	Identifies a call successfully established, but with a specific event during the communication between the 2 parties: the call has been dropped accidentally during the communication. A Drop call is also: - A Successful call - Any Inbound, Outbound, or other type of call described above.
ClusterErlangB	Probability that a new arriving call will be rejected because circuits are busy
ClusterForwardToVoiceMail	Identifies a call forwarded to another destination by the original callee. In this case, the destination is one of the VoiceMail extension number, defined in the VoiceMailExtensionRange variable from the UBA.xml adaptor configuration file.

Table 2: Key performance indicators

KPI	Comment
ClusterIncomingCall	Identifies a call where caller is not an internal extension. An Incoming call is also: - An Inbound call - An Off-net call, coming from the PSTN
ClusterInternalCall	An Internal Call is a call between 2 internal extensions, managed by one or more CallManager Clusters, where the 2 Extension numbers (caller and callee) are short internal numbers. An Internal call, or Company call can be: - An Outbound or Inbound call, - A call between 2 IP phones from the same site, - A call between 2 IP phones from different sites, - A call between 1 IP phone and 1 legacy phone from the same site, - A call between 1 IP phone and 1 legacy phone from different sites7 Internal = IntrasiteIP OR IntersiteIP OR IntrasiteLegacyPBX OR IntersiteLegacyPBX7 - An On-net call (pure IP Network transit) - An Off-net call (IP to PSTN Gateway call). An Internal call can never be: - A call between an Internal Extension and any External PSTN Number. Note: Internal extensions are managed through the UBA.xml adaptor configuration file, where the variable ExtensionRange has to be defined.
ClusterInternationalCall	Identifies a call where the caller is an internal extension and where the callee is an International External PSTN number, according to the Numbering Plan (NANP or Other prefixes). An International call is also: - An Outbound call- An Off-net call, routed towards the PSTN - Can be a TollBypassCall if a remote PSTN Gateway is involved in the Voice path
ClusterIntersiteIPCall	Identifies a specific Internal Call where caller and callee are from different location (site) and using a pure IP Network transit path (No PSTN Gateway is involved in the voice Path).
ClusterJitter	Provides an estimate of the statistical variance of the RTP data packet interarrival time; measured in milliseconds.This metric comes from the CMR table. Its set only once the call is established. This metric is only available for IP Phones.
ClusterLatency	Designates value that is an estimate of the network latency, expressed in milliseconds. This value represents the average value of the difference between the NTP timestamp indicated by the RTP Control Protocol (RTCP) messages and theNTP timestamp of the receivers, measured when these messages are received.Cisco CallManager obtains the average by summing all the estimates then dividing by the number of RTCP messages that have been received. Value of the Latency in milli-seconds. This metric comes from the CMR table. Its set only once the call is established. This metric is only available for IP Phones.
ClusterLines	Total number of type 18 interfaces lines

Table 2: Key performance indicators

KPI	Comment
ClusterLocalCall	Identifies a call where the caller is an internal extension and where the callee is a Local External PSTN number, according to the Numbering Plan (NANP or Other prefixes). A Local call is also:- An Outbound call - An Off-net call, routed towards the PSTN - Can be a TollBypassCall if a remote PSTN Gateway is involved in the Voice path Note: Internal extensions are managed through the UBA.xml adaptor configuration file, where the variable ExtensionRange is defined. In order to be able to know whether or not a call will be charged as a Local call, an additional variable needs to be set in the UBA.xml adaptor configuration file. If the first N digits match for this particular site with one of the number configured in this list, then the call is tagged as Local
ClusterLongDistanceCall	Identifies a call where the caller is an internal extension and where the callee is a LongDistance External PSTN number, according to the Numbering Plan (NANP or Other prefixes). A Long Distance cal call is also: - An Outbound call - An Off-net call, routed towards the PSTN - Can be a TollBypassCall if a remote PSTN Gateway is involved in the Voice path
ClusterMOS	Mean Opinion Score. This is an high level metric. Note: There is no algorithm for Mean Opinion Score calculations. This is a subjective metric from the end user point of view. In voice communications, particularly Internet telephony, the mean opinion score (MOS) provides a numerical measure of the quality of human speech at the destination end of the circuit. The scheme uses subjective tests (opinionated scores) that are mathematically averaged to obtain a quantitative indicator of the system performance. To determine MOS, a number of listeners rate the quality of test sentences read aloud over the communications circuit by male and female speakers. A listener gives each sentence a rating as follows: - 1 bad; - 2 poor; - 3 fair; - 4 good; - 5 excellent. The MOS is the arithmetic mean of all the individual scores, and can range from 1 (worst) to 5 (best). In our context, our MOS calculation is based on the consolidation of Jitter, Latency and Packets Lost values which give us a good overview of the real MOS value.
ClusterNbPacketsLost	Number of Packets Lost by the subelement during a call. This metric comes from the CMR table. Its set only once the call is established. This metric is only available for IP Phones.
ClusterNbPacketsReceived	Number of Packets Received by the subelement during a call. This metric comes from the CMR table. Its set only once the call is established. This metric is only available for IP Phones.
ClusterNbPacketsSent	Number of Packets Sent by the subelement during a call. This metric comes from the CMR table. Its set only once the call is established. This metric is only available for IP Phones.
ClusterOffNetCall	Identifies a call where at least one PSTN Gateway is involved in the Voice path, with the following criteria: - Inbound or Outbound call - Internal or call to/from PSTN number - Intersite or Intrasite Legacy PBX Call
ClusterOnNetCall	Identifies a call where the caller is an internal extension and where the callee is also an internal extension, from the same site or different sites, with the following criteria: - Outbound call - Internal call - Intersite or Intrasite IP Call - No PSTN Gateway is involved in the Voice path - This is a pure IP to IP call

Table 2: Key performance indicators

KPI	Comment
ClusterShortCall	Identifies a call successfully established, but with a call duration less than 1 second. In this case, the CallManager set the CallDuration value to 0 in the CDR table. A ShortCall call is also: - A Successful call - Any Inbound, Outbound, or other type of call described above.
ClusterSuccessfulCall	Identifies a call successfully established. Once the call is established, the communication starts between the 2 parties. A successful call can be an Inbound, Outbound, or any type of call described above.
ClusterTollBypassCall	Identifies a call where the caller is an internal extension, managed by the CallManager and where the callee can be an internal extension or any external PSTN Number, with one or more following criteria: - Outbound call - Off-net call - The call is going through a PSTN Gateway and caller site and PSTN Gateway site are different - An intersiteLegacyPBXCall can be also a TollBypassCall, if the PSTN Gateway site is different from the caller site. - TollBypass calls are interesting to save money for long distance or international calls using a remote PSTN Gateway with local fees7 Example: A caller in Boston makes a call to an external PSTN number base in London. Because there is an IP-VPN between the Boston office and the London office with a PSTN Gateway in London, the call goes through the IP network until the Londons PSTN Gateway.
ClusterTotalCall	Total Number of Calls (including call attempts) for the complete Cluster.
ClusterUnsuccessfulCall	Identifies a call which has not been successfully established. In this case, the call setup has been rejected and the communication never started between the 2 parties. An Unsuccessful call can be an Inbound, Outbound, or any type of call described above.
ClusterVoiceMailCall	Identifies a call where the final destination (callee) is a VoiceMail. The VoiceMail application is managed through a specific range of extensions number, defined site by site, using the global variable VoiceMailExtensionRange.
ClusterVoicemailCallDuration	Time value in Seconds of any call duration with the VoiceMail application.
ClusterVoicemailPackets	Number of Packets Sent + Received by the subelement during a call with the VoiceMail. This metric comes from the CMR table. Its set only once the call is established with one of the VoiceMail extension.
DSP Card Availability (percent)	DSP card availability percentage
DSP Card Resource Utilization (percent)	Total percentage of DSPs in used for a DSP card
EncryptedCallsActive	Total number of currently active encrypted calls
EncryptedPartiallyRegisteredPhones	Total number of encrypted extensions which have not completed the registration process
EncryptedRegisteredPhones	Total number of active authenticated calls
FXOPortsActive	Total number of FXO ports currently in use in the target device
FXOPortsInService	Total number of FXO ports available in the target device
FXSPortsActive	Total number of FXS ports currently in use in the target device
FXSPortsInService	Total number of FXS ports available in the target device

Table 2: Key performance indicators

KPI	Comment
ForwardToVoiceMail	Identifies a call forwarded to another destination by the original callee. In this case, the destination is one of the VoiceMail extension number, defined in the VoiceMailExtensionRange variable from the UBA.xml adaptor configuration file.
Gatekeeper Buffer Utilization (percent)	Percentage of a gatekeeper device's buffer space in use
Gatekeeper CPU Utilization (percent) (avg last 5 mn)	CPU utilization percentage over the last 5 minutes measured
Gatekeeper Call Setup Quality (percent)	Percentage of calls that have been set up successfully
Gatekeeper ICMP Inbound Errors (percent)	Percentage of inbound ICMP packets which triggered errors
Gatekeeper ICMP Outbound Errors (percent)	Percentage of outbound ICMP packets which triggered errors
Gatekeeper Packet Errors (Nb)	Total number of packet errors for a gatekeeper device
Gatekeeper Total Number of Admission Rejects (Nb)	Total number of admission rejections
Gatekeeper Total Number of Admission Requests (Nb)	Total number of gatekeeper admission requests
Gatekeeper Total Number of Concurrent Calls (Nb) (Gauge)	Total number of concurrent calls for a gatekeeper device
Gatekeeper Total Number of Location Rejects (Nb)	Total number of location reject messages sent and received by a gatekeeper device
Gatekeeper Total Number of Location Requests (Nb)	Total number of location requests sent and received by a gatekeeper device
Gatekeeper Total Number of Registered EndPoints (Nb)	Total number of endpoints registered to a Cisco gatekeeper
Gatekeeper Total Packets (Nb)	Total number of packets sent and received by this gatekeeper device
GatewayCallsActive	Total number of currently active calls for the gateway resource or resources specified
H323CallsActive	Total number of currently active H.323 calls for the resource or resources specified
H323CallsInProgress	Total number of H.323 calls being established at the time of sampling
HuntlistCallsActive	Total number of currently active huntlist calls
HuntlistCallsInProgress	Total number of currently active huntlist calls
ICR	Interval Conceal Ratio. The average concealment rate measured during the last three seconds of speech
ICRmx	Maximum conceal ratio during a call

Table 2: Key performance indicators

KPI	Comment
Inbound Loss (percent)	Out of all inbound traffic received by this entity, the percentage of PDUs that: (a) contained defects which prevented them from being deliverable to a higher-layer protocol (bad checksums, bad length, etc.), (b) were discarded even though no errors are detected (i.e. due to congestion, policing, or resource limitations), or (c) were discarded because they were of an unknown or unsupported protocol.
Incoming	Identifies a call where caller is not an internal extension. An Incoming call is also: - An Inbound call - An Off-net call, coming from the PSTN
Interface Availability (percent)	Interface availability percentage for a Cisco gatekeeper
Interface Bandwidth Utilization In (percent)	Inbound bandwidth utilization percentage for a PSTN gateway interface
Interface Bandwidth Utilization Out (percent)	Outbound bandwidth utilization percentage for a PSTN gateway interface
Interface Packet Loss (percent)	Total percentage of packets lost for a gatekeeper interface
Interface Throughput In (kbps)	Inbound interface throughput measured in kilobits per second
Interface Throughput Out (kbps)	Outbound interface throughput measured in kilobits per second
Internal	An Internal Call is a call between 2 internal extensions, managed by one or more CallManager Clusters, where the 2 Extension numbers (caller and callee) are short internal numbers. An Internal call, or Company call can be: - An Outbound or Inbound call, - A call between 2 IP phones from the same site, - A call between 2 IP phones from different sites, - A call between 1 IP phone and 1 legacy phone from the same site, - A call between 1 IP phone and 1 legacy phone from different sites7 Internal = IntrasiteIP OR IntersiteIP OR IntrasiteLegacyPBX OR IntersiteLegacyPBX7 - An On-net call (pure IP Network transit) - An Off-net call (IP to PSTN Gateway call). An Internal call can never be: - A call between an Internal Extension and any External PSTN Number. Note: Internal extensions are managed through the UBA.xml adaptor configuration file, where the variable ExtensionRange has to be defined.
International	Identifies a call where the caller is an internal extension and where the callee is an International External PSTN number, according to the Numbering Plan (NANP or Other prefixes). An International call is also: - An Outbound call- An Off-net call, routed towards the PSTN - Can be a TollBypassCall if a remote PSTN Gateway is involved in the Voice path
Jitter	Provides an estimate of the statistical variance of the RTP data packet interarrival time; measured in milliseconds.This metric comes from the CMR table. Its set only once the call is established. This metric is only available for IP Phones.

IBM Tivoli Netcool/Proviso Cisco IP Telephony 2.4.0.0 Technology Pack

Table 2: Key performance indicators

KPI	Comment
Latency	Designates value that is an estimate of the network latency, expressed in milliseconds. This value represents the average value of the difference between the NTP timestamp indicated by the RTP Control Protocol (RTCP) messages and theNTP timestamp of the receivers, measured when these messages are received.Cisco CallManager obtains the average by summing all the estimates then dividing by the number of RTCP messages that have been received. Value of the Latency in milli-seconds. This metric comes from the CMR table. Its set only once the call is established. This metric is only available for IP Phones.
Local	Identifies a call where the caller is an internal extension and where the callee is a Local External PSTN number, according to the Numbering Plan (NANP or Other prefixes). A Local call is also:- An Outbound call - An Off-net call, routed towards the PSTN - Can be a TollBypassCall if a remote PSTN Gateway is involved in the Voice path Note: Internal extensions are managed through the UBA.xml adaptor configuration file, where the variable ExtensionRange is defined. In order to be able to know whether or not a call will be charged as a Local call, an additional variable needs to be set in the UBA.xml adaptor configuration file. If the first N digits match for this particular site with one of the number configured in this list, then the call is tagged as Local
LongDistance	Identifies a call where the caller is an internal extension and where the callee is a LongDistance External PSTN number, according to the Numbering Plan (NANP or Other prefixes). A Long Distance call is also: - An Outbound call - An Off-net call, routed towards the PSTN - Can be a TollBypassCall if a remote PSTN Gateway is involved in the Voice path
MLQK	MOS Listening Quality K-factor. This is an estimate of the MOS score of the last eight seconds of speech measured on the receiving end.
MLQKav	Average MOS Listening Quality K-factor for a call
MLQKmn	Minimum MOS Listening Quality K-factor for the worst sounding eight seconds
MLQKmx	Maximum MOS Listening Quality K-factor for the best sounding eight seconds
MOHMulticastResourceActive	Total number of currently active message-on-hold multicast resources
MOHMulticastResourceAvailable	Total number of available message-on-hold multicast resources
MOHTotalMulticastResources	Total number of active and inactive message-on-hold multicast resources
MOHTotalUnicastResources	Total number of active and inactive message-on-hold unicast resources
MOHUnicastResourceActive	Total number of currently active message-on-hold unicast resources
MOHUnicastResourceAvailable	Total number of available message-on-hold unicast resources

Table 2: Key performance indicators

KPI	Comment
MOS	Mean Opinion Score. This is an high level metric. Note: There is no algorithm for Mean Opinion Score calculations. This is a subjective metric from the end user point of view. In voice communications, particularly Internet telephony, the mean opinion score (MOS) provides a numerical measure of the quality of human speech at the destination end of the circuit. The scheme uses subjective tests (opinionated scores) that are mathematically averaged to obtain a quantitative indicator of the system performance. To determine MOS, a number of listeners rate the quality of test sentences read aloud over the communications circuit by male and female speakers. A listener gives each sentence a rating as follows: - 1 bad; - 2 poor; - 3 fair; - 4 good; - 5 excellent. The MOS is the arithmetic mean of all the individual scores, and can range from 1 (worst) to 5 (best). In our context, our MOS calculation is based on the consolidation of Jitter, Latency and Packets Lost values which give us a good overview of the real MOS value.
NbPacketsLost	Number of Packets Lost by the subelement during a call. This metric comes from the CMR table. Its set only once the call is established. This metric is only available for IP Phones.
NbPacketsReceived	Number of Packets Received by the subelement during a call. This metric comes from the CMR table. Its set only once the call is established. This metric is only available for IP Phones.
NbPacketsSent	Number of Packets Sent by the subelement during a call. This metric comes from the CMR table. Its set only once the call is established. This metric is only available for IP Phones.
OffNet	Identifies a call where at least one PSTN Gateway is involved in the Voice path, with the following criteria: - Inbound or Outbound call - Internal or call to/from PSTN number - Intersite or Intrasite Legacy PBX Call
OnNet	Identifies a call where the caller is an internal extension and where the callee is also an internal extension, from the same site or different sites, with the following criteria: - Outbound call - Internal call - Intersite or Intrasite IP Call - No PSTN Gateway is involved in the Voice path - This is a pure IP to IP call
Outbound Loss (percent)	Out of all outbound traffic to be sent by this entity, the percentage of PDUs that: (a) contained defects which prevented them from being transferable, or (b) were discarded even though no errors are detected (i.e. due to congestion or resource limitations).
PSTN Gateway Active DS0 Channels (Nb)	Total number of active DS0 channels for all of the enabled PRIs in a PSTN device
PSTN Gateway Active DS0 Channels (Nb) (Gauge)	Total number of currently active DS0 channels for a PSTN gateway
PSTN Gateway Call Setup Quality (percent) (Successful / Total)	Percentage of successful call setups for a PSTN gateway device
PSTN Gateway DS1 Active DS0 Channels (Nb)	Number of Active DS0s Channel that are active for a specific Serial E1/T1 Interface. Because there is no specific OID for thisin the MIB we assume that: 1 Call = 1 DS0 Channel = 64 kbpsThenThroughput (in or out) / 64000 = Active Channels

Table 2: Key performance indicators

KPI	Comment
PSTN Gateway ICMP Inbound Errors (percent)	Percentage of inbound ICMP errors
PSTN Gateway ICMP Outbound Errors (percent)	Percentage of outbound SNMP errors
PSTN Gateway Network Errors (percent)	Percentage of network errors observed by a PSTN gateway
PSTN Gateway Packet Discards	Percentage of PSTN gateway packets discarded
PSTN Gateway Total Number of Calls (Nb)	Total number of calls for a PSTN device
PSTN Gateway Total Number of Calls per mn (Calls/mn)	Total number of calls per minute for a PSTN device
PSTN Gateway Total Number of Successful Calls (Nb)	Total number of successful calls for a PSTN gateway device
PSTN Gateway Total Number of Unsuccessful Calls (Nb)	Total number of unsuccessful calls for a PSTN gateway device
PSTN Gateway Total Packets per Second	Total number of packets per second for a PSTN gateway device
Percentage of Company Calls (percent) CME(Bulk) VOIP Cisco	Percentage of all calls which were intra-company calls
Percentage of Drop Calls (percent) CME(Bulk) VOIP Cisco	Ratio between DropCalls and Total number of Calls
Percentage of Packet Lost (percent) CME(Bulk) VOIP Cisco	Ratio between Packets Lost and Total number of Packets sent and received.
Percentage of Successful Calls (Nb) CME(Bulk) VOIP Cisco	Percentage of calls which completed successfully
Percentage of TollBypass Calls (percent) CME(Bulk) VOIP Cisco	Ratio between Toll Bypass Calls and Total number of Calls
SCS	Severely concealed seconds. Concealment lasting longer than fifty milliseconds or five percent of the voice traffic
SIPCallsActive	Total number of currently active SIP calls for the resource or resources specified
SIPCallsInProgress	Total number of SIP calls being established at the time of sampling
SNMP Availability (percent) (avg last hour)	PROVISO Performance Metric; works with PVL 1.2 or better
SNMP Response Time (ms) (avg last hour)	SNMP response time measured in milliseconds averaged over the last hour
SNMP Unavailable (percent) (avg last hour)	Created by CME Formula Editor
ShortCall	Identifies a call successfully established, but with a call duration less than 1 second. In this case, the CallManager set the CallDuration value to 0 in the CDR table. A ShortCall call is also: - A Successful call - Any Inbound, Outbound, or other type of call described above.
SuccessfulCall	Identifies a call successfully established. Once the call is established, the communication starts between the 2 parties. A successful call can be an Inbound, Outbound, or any type of call described above.

Table 2: Key performance indicators

KPI	Comment
T1ChannelsActive	Total number of T1 channels currently in use in the target device
T1SpansInService	Total number of T1 spans available in the target device
TollBypassCall	Identifies a call where the caller is an internal extension, managed by the CallManager and where the callee can be an internal extension or any external PSTN Number, with one or more following criteria: - Outbound call - Off-net call - The call is going through a PSTN Gateway and caller site and PSTN Gateway site are different - An intersiteLegacyPBXCall can be also a TollBypassCall, if the PSTN Gateway site is different from the caller site. - TollBypass calls are interesting to save money for long distance or international calls using a remote PSTN Gateway with local fees7 Example: A caller in Boston makes a call to an external PSTN number base in London. Because there is an IP-VPN between the Boston office and the London office with a PSTN Gateway in London, the call goes through the IP network until the Londons PSTN Gateway.
TollbypassCallDuration	Time value in seconds of the call duration, when the call is classified as a TollBypass call.
Total Number of Calls (Nb) CME(Bulk) VOIP Cisco	Total number of inbound and outbound calls for this Call Manager device.
Total Number of Outgoing External Calls (Nb)	Any Outbound call going to the PSTN. This metric is a subset of the Cluster Total Number of External Calls.An Outgoing External call is define as: - A Local Call - A Long Distance Call - An International Call
Total Number of VoiceMail Direct Calls (Nb) CME(Bulk) VOIP Cisco	Total number of VoiceMail Calls that are Direct call to VoiceMail. This is the case when a user dials directly his VoiceMail. This metric is the opposite of ForwardToVoiceMail.
UnsuccessfulCall	Identifies a call which has not been successfully established. In this case, the call setup has been rejected and the communication never started between the 2 parties. An Unsuccessful call can be an Inbound, Outbound, or any type of call described above.
VoiceMailCall	Identifies a call where the final destination (callee) is a VoiceMail. The VoiceMail application is managed through a specific range of extensions number, defined site by site, using the global variable VoiceMailExtensionRange.
VoicemailCallDuration	Time value in Seconds of any call duration with the VoiceMail application.
VoicemailPackets	Number of Packets Sent + Received by the subelement during a call with the VoiceMail. This metric comes from the CMR table. Its set only once the call is established with one of the VoiceMail extension.

IBM Tivoli Netcool/Proviso Cisco IP Telephony 2.4.0.0 Technology Pack

Chapter 4: Configuring the technology pack

This chapter explains how to configure the Cisco IP Telephony Technology Pack and consists of the following topics:

Topic	Page
Overview	45
Before you begin	45
Configure the technology pack	46

Overview

Tivoli Netcool/Proviso supports the following two types of technology packs, based on the type of data that they collect:

- SNMP

  SNMP packs are MIB-based, and their configuration is relatively straightforward.

- Bulk (or UBA)

  Bulk technology packs collect data against non-SNMP devices, and rely on the UBA of the Tivoli Netcool/Proviso DataChannel to process the data. Prior to Tivoli Netcool/Proviso version 4.4.3, bulk packs could be very difficult to configure, and in many cases required extensive Tivoli Netcool/Proviso domain knowledge.

  Tivoli Netcool/Proviso version 4.4.3 introduces a GUI to configure Tivoli Netcool/Proviso UBA technology packs on supported Tivoli Netcool/Proviso platforms.

The Cisco IP Telephony Technology Pack is an SNMP and UBA technology pack.

Before you begin

Before configuring the Cisco IP Telephony Technology Pack, ensure that you:

- Have the following software and documentation for your version of Tivoli Netcool/Proviso:
  — Release notes for the current technology pack release.
  — *IBM Tivoli Netcool/Proviso Installation Guide.*
  — *IBM Tivoli Netcool/Proviso Upgrade Guide* (if performing an upgrade).
  — *IBM Tivoli Netcool/Proviso DataMart Configuration Guide.*

  > **Important:** *Refer to this guide to create an inventory profile and initiate a discovery.*

  — Access to the Tivoli Netcool/Proviso DataMart server.

— An X Window server on the DataMart server.

> *Note: (Tivoli Netcool/Proviso pre-v4.4.3) If there is no graphics card on the DataMart server, you can install the Xvfb virtual frame buffer package to provide X Window services, as described in the* IBM Tivoli Netcool/Proviso Installation Guide.

— Access to the SilverStream server.

— Access to the DataChannel server.

- Have completed the following tasks:

  — Reviewed the release notes for the current technology pack.

  > *Important: Release notes contain important information you need to consider before installing a technology pack. They also contain information on specific patches that need to be installed before you configure a technology pack.*

  — Installed the current version of the Tivoli Netcool/Proviso components, as described in the *IBM Tivoli Netcool/Proviso Installation Guide*.

  — Installed the MIB-II Technology Pack.

  > *Note: The MIB-II Technology Pack is a stand-alone technology pack that is contained in its own jar file.*

  — Installed the Cisco IP Telephony Technology Pack.

  > *Note: Installation instructions for a technology pack can be found in the Appendices of the* IBM Tivoli Netcool/Proviso Installation Guide (covers core and technology packs).
  > *Upgrade instructions for a technology pack can be found in Chapter 3 of the* IBM Tivoli Netcool/Proviso Upgrade Guide (covers core and technology packs).
  > *Localization is done automatically during installation of the technology pack.*

  — Configured at least one DataChannel.

  — Configured a UBA bulk collector subchannel.

  — Configured an SNMP collector subchannel.

  — Created a user account on the server where the ProvisoCUCM application is installed, so that the CUCM can FTP the CDR/CMR data stream back to the ProvisoCUCM application.

  > *Note: This technology pack contains a Java application, ProvisoCUCM, that sends data requests to CUCM servers. The ProvisoCUCM application requires the Java 2 Enterprise Edition (JRE 1.5 J2EE).*
  > *Starting with the Cisco IP Telephony 2.4.0.0 Technology Pack, the ProvisoCUCM application supports multiple Perfmon host collection for a single instance of the ProvisoCUCM application.*

Configure the technology pack

To configure the Cisco IP Telephony Technology Pack, follow these steps:

1. Load the DataMart environment.

   To load the shell with the DataMart environment, follow these steps:

   1-a. Log in to the DataMart server as `pvuser`.

   1-b. Change your working directory to the DataMart home directory (`/opt/datamart`, by default), using the following command:

   ```
   cd /opt/datamart
   ```

1-c. Load the shell with the DataMart environment, by sourcing the `dataMart.env` file, as follows:

    `. /opt/datamart/dataMart.env`

> *Note:* *After you load the DataMart environment into the shell, the PVMHOME variable is set to the DataMart home directory, /opt/datamart by default. These instructions assume that this variable has been set.*

2. Copy technology-specific files from the DataMart server to the DataChannel server.

    Technology-specific files are used to associate a UBA technology pack with a specific instance of the UBA.

    > *Note:* *While it is possible to install DataMart and DataChannel on the same server, in a typical installation these modules are installed on separate servers. If this is the case, use ftp to copy the technology-specific files. Otherwise, if DataMart and DataChannel are on the same server, use the cp command to copy the files to the appropriate DataChannel directory.*

    To copy technology-specific files to the DataChannel server, follow these steps:

    2-a. Log in to the Tivoli Netcool/Proviso DataChannel server by entering the user name and password that you specified when installing and configuring a DataChannel. The default user name and password are `pvuser` and `PV`, respectively.

    2-b. Change your working directory to the *DATA_CHANNEL_HOME*`/scripts/voip_cisco_ipt` directory by entering the following command, replacing *DATA_CHANNEL_HOME* with the DataChannel home directory (`/opt/datachannel`, by default):

        `$ cd DATA_CHANNEL_HOME/scripts/voip_cisco_ipt`

    2-c. Using the `ftp` utility in text mode, log into the DataMart server using the appropriate user name and password (`pvuser` and `PV`, by default).

    2-d. Using the `cd` subcommand, change your working directory to the `$PVMHOME/APFiles/voip_cisco_ipt/datachannel/scripts/voip_cisco_ipt` directory.

    2-e. Using the `get` subcommand, copy the Bulk Adaptor Design Files (`*.js`), scripts (if any), and other files (if any) from the DataMart server to the DataChannel server.

    2-f. **(Tivoli Netcool/Proviso pre-v4.4.3 only)** Copy the `voip_cisco_ipt_sample_dc.cfg` template file as follows:

        • Using the `cd` subcommand, change your working directory to the `$PVMHOME/APFiles/voip_cisco_ipt/datachannel/conf` directory.

        • Using the `get` subcommand, copy the `voip_cisco_ipt_sample_dc.cfg` template file from the DataMart server to the DataChannel server.

    2-g. Exit the `ftp` utility by entering the `bye` subcommand.

    2-h. Verify that the technology-specific files are now located in the target directory as follows:

        • **(Tivoli Netcool/Proviso v4.4.3 and later)** Verify that the Bulk Adaptor Design Files (`*.js`), scripts (if any), other files (if any) are now located in the *DATA_CHANNEL_HOME*`/scripts/voip_cisco_ipt` directory.

        • **(Tivoli Netcool/Proviso pre-v4.4.3 only)** Verify that the Bulk Adaptor Design Files (`*.js`), scripts (if any), other files (if any), and `voip_cisco_ipt_sample_dc.cfg` template file are now located in the *DATA_CHANNEL_HOME*`/scripts/voip_cisco_ipt` directory.

3. Activate data collection requests.

    During installation of the technology pack, all predefined data collection requests are promoted to the database and set to inactive (that is, **idle** displays in the **Active** column of the Tivoli Netcool/Proviso DataMart Request Editor). You need to activate these predefined data collection requests using the Request Editor.

    To set data collection requests to active, follow these steps:

3-a. Change your working directory to $PVMHOME/bin (/opt/datamart/bin, by default) on the DataMart server.

3-b. Invoke the DataMart GUI by entering the following command and pressing **Enter**:

```
pvm
```

3-c. Click the **Configuration** tab, then click **Request Editor** to open the Request Editor.

3-d. Click the **Collection** tab.

3-e. Click **Refresh**.

The predefined data collection requests are loaded into the Request Editor from the database.

3-f. Click the **Inactive** button in the **Filter** group box to display only idle requests.

3-g. In the **Sub-Element Groups** pane, select all idle data collection requests in the following group or groups:

```
Root->Sub-Element Collect->VOIP->Cisco
```

3-h. Click the **Active** box under **Details**. The Request Editor toggles the idle setting for these data collection requests from **idle** to **active** in the **Active** column.

3-i. Click **Save**.

4. Merge the technology pack subelement inventory text files.

Subelement inventory control rules for the Cisco IP Telephony Technology Pack are contained in the file voip_cisco_ipt_inventory_subelements.txt, which is installed in the following directory on the DataMart server:

```
$PVMHOME/APFiles/voip_cisco_ipt/datamart/conf
```

You must merge the contents of this file with the file inventory_subelements.txt located in *$PVMHOME*/conf (typically, /opt/datamart/conf) on the DataMart server:

To merge the subelement inventory control rules for the Cisco IP Telephony Technology Pack, follow these steps:

4-a. Change your working directory to $PVMHOME/conf by entering the following command:

```
cd $PVMHOME/conf
```

4-b. Copy voip_cisco_ipt_inventory_subelements.txt to the $PVMHOME/conf directory, by entering the following command:

```
cp $PVMHOME/APFiles/voip_cisco_ipt/datamart/conf/voip_cisco_ipt_inventory_subelements.txt .
```

4-c. Make a backup copy of the inventory_subelements.txt file by entering the following command:

```
cp inventory_subelements.txt inventory_subelements.txt.ORIG
```

4-d. Append the contents of voip_cisco_ipt_inventory_subelements.txt to inventory_subelements.txt, by entering the following command:

```
cat voip_cisco_ipt_inventory_subelements.txt >> inventory_subelements.txt
```

Important: *Ensure that you use two forward brackets (>>); otherwise, the original contents of inventory_subelements.txt will be overwritten.*

4-e. Perform a diff on the backed-up file and the appended file to ensure that the merge succeeded, as shown in the following example:

```
diff inventory_subelements.txt inventory_subelements.txt.ORIG
```

Important: *If you do not have a CCM environment, skip Step 5 and continue with Step 6.*

5. **CCM environment only:** Configure the Data Direct SQL Server Bridge

    The Tivoli Netcool/Proviso Cisco IP Telephony Technology Pack collects data from SNMP devices and, through SQL for Call Detail Records, from each CCM database.

    The technology pack UBA is responsible for retrieving CCM data, using the Data Direct SQL server bridge to do so. This bridge is part of the UBA installation. No additional software is required.

    You need to set up the Data Direct SQL server bridge to get Call Detail Records from each CallManager Publisher. The complete configuration is done by editing the `$DC_HOME/conf/odbc.ini` file as user `pvuser`.

    ```
    [ODBC Data Sources]
    Your_Data_Source1=DataDirect 4.20 SQL Server Wire Protocol
    Your_Data_Source2=DataDirect 4.20 SQL Server Wire Protocol
    Your_Data_SourceN=DataDirect 4.20 SQL Server Wire Protocol

    [Your_Data_Source1]
    Driver=PVmsss20.so
    Description=DataDirect 4.20 SQL Server Wire Protocol
    Address=xx.xx.xx.xx,1433
    AnsiNPW=Yes
    Database=CDR
    QuoteId=No

    [Your_Data_Source2]
    Driver=PVmsss20.so
    Description=DataDirect 4.20 SQL Server Wire Protocol
    Address=xx.xx.xx.xx,1370
    AnsiNPW=Yes
    Database=CDR
    QuoteId=No

    [Your_Data_SourceN]
    Driver=PVmsss20.so
    Description=DataDirect 4.20 SQL Server Wire Protocol
    Address=xx.xx.xx.xx,1433
    AnsiNPW=Yes
    Database=CDR
    QuoteId=No

    [ODBC]
    IANAAppCodePage=4
    InstallDir=/opt/datachannel/
    Trace=0
    TraceDll=/opt/datachannel/lib/odbctrac.so
    TraceFile=odbctrace.out
    UseCursorLib=0
    ```

    All fields above which appear in *italics* must be configured according to your CallManager Publisher environment, as follows:

Field	Description
[ODBC Data Sources]	One entry per CallManager Publisher. *Note:* The data source name must match the data source name specified in the corresponding URI (Uniform Resource Identifier) parameter in the dc.cfg file. Each line in this section should also be associated with a subsection that configures the data source.

Field	Description
[Data Source Name]	The configuration of the specified data source. • `[Data Source Name]`: for example, `[SANFRANCISCO]` • `Address`: the remote IP address and TCP port of the CallManager Publisher Database (for example, `192.168.1.1,1433`). To verify the remote connection configuration, establish the connection manually from a shell window: `telnet xx.xx.xx.xx 1433` or `telnet xx.xx.xx.xx 1370`. The remote TCP port can be 1433 or 1370 according to the SQL Server configuration.
[ODBC]	A global section that defines the global environment for the bridge.

Important: If you do not have a CUCM environment, skip Step 6 through Step 9, and continue with Step 10.

6. **CUCM environment only:** On the DataChannel host, create a directory for each CUCM server from which CDR, CMR, and Perfmon data files will be requested. For example, if you will be requesting data files from two CUCM servers, you might create the following directories:

```
/opt/datachannel/cucm1
/opt/datachannel/cucm2
```

These directories will contain the ProvisoCUCM application and other files needed to send SOAP requests to each CUCM server.

> *Note: If you will be requesting CDR and CMR data files through a master CUCM server, you need to create just one directory for those requests. However, if you will be requesting Perfmon data, you must create a separate directory for each CUCM server from which you will request Perfmon data.*

7. **CUCM environment only:** Copy the following files into *each one* of the directories you just created in Step 6:

   — `ProvisoCUCM.jar`
   — `cucm.properties`
   — `startcucm.sh`
   — `stopcucm.sh`

   These files were included in the technology-specific files you copied to `DATA_CHANNEL_HOME/scripts/voip_cisco_ipt` in step 2-e on page 47.

8. **CUCM environment only:** Configure each of the `cucm.properties` files you copied in Step 7.

   Each `cucm.properties` file is associated with an instance of the ProvisoCUCM application that is located in the same directory as the file. The ProvisoCUCM instance reads the `cucm.properties` file to find the address and login credentials of the associated CUCM server, the address and login credentials of the DataChannel host for the CUCM server to use when pushing the requested files via FTP back to the DataChannel host, and other required configuration details.

   The following table describes the fields in the `cucm.properties` files:

Field	Description
`cdr_output_dir`	The location on the DataChannel host where the ProvisoCUCM instance generates output from a CDR file and its associated CMR file. The output is a single CSV file that contains correlated data from the CDR file and CMR file. **Example**: `cdr_output_dir=/opt/uba/cdrcmr`

Field	Description
collect_cdr	If true, ProvisoCUCM requests CDR and CMR data from the CUCM server. If false, ProvisoCUCM will not poll the CUCM server for CDR and CMR data. **Example**: collect_cdr=true
collect_perfmon	If true, ProvisoCUCM requests Perfmon data from the CUCM server. If false, ProvisoCUCM will not poll the CUCM server for Perfmon data. **Example**: collect_perfmon=true
cucm.host	The IP address of the CUCM server associated with this properties file. **Examples**: cucm.host=10.1.2.3 cucm.host=cucm.mycorp.com
cucm.pass	User password required for login to the CUCM. **Example**: cucm.pass=cucmpwd
cucm.port	The port number for SOAP requests sent to the CUCM server. **Example**: cucm.port=443
cucm.user	User ID required for login to the CUCM. **Example**: cucm.user=cucmuser
debug	If true, enables debug mode for ProvisoCUCM operations. Error information pertaining to the SOAP interaction with the CUCM server is written to a log file. The log file is located in the same directory as the ProvisoCUCM.jar and cucm.properties files. If false, debug mode is not enabled. **Example**: debug=true
ftp.host	The IP address of the DataChannel host where the requested data files are to be returned through FTP. The FTP server must be the host where the ProvisoCUCM instance for this cucm.properties file is running. **Examples**: ftp.host=10.4.5.6 ftp.host=proviso.mycorp.com
ftp.pass	User password required for login to the DataChannel host that issued the SOAP request. **Example**: ftp.pass=provisopwd
ftp.remotedir	The location on the DataChannel host where the requested data files are to be copied. **Example**: ftp.remotedir=/export/home/pvuser/CUCM/files
ftp.secure	If true, instructs the CUCM server to return the requested data files over a secure FTP connection. If false, the CUCM server will not use a secure FTP connection. **Example**: ftp.secure=true

Field	Description
`ftp.user`	User ID required for login to the DataChannel host that issued the SOAP request. **Example**: `ftp.user=provisouser`
`grace_period`	The time, in milliseconds, to subtract from the polling start time. The polling start time is the time that the ProvisoCUCM instance begins polling the CUCM server for data. The grace period is intended to help you avoid missing data files that the CUCM has not yet written for the current time period. ProvisoCUCM uses the polling start time specified in the field `start_time` of the file `cucm.TIMESTAMP`. This file is located in the same directory as the `cucm.properties` file. If the file does not exist when ProvisoCUCM is instantiated, it starts polling the CUCM server immediately, creates `cucm.TIMESTAMP`, and writes the current time to it. **Example grace period (100 seconds)**: `grace_period=100000` **Example start time (1/20/2009 at 12:00):** `start_time=1232470820931`
`perfmon.host`*N*`.hostname`	The name of one of the multiple hosts on which Perfmon data is collected. **Example (host1)**: `perfmon.host1.hostname = host1.example.zz` **Example (host2)**: `perfmon.host2.hostname = host2.example.zz`
`perfmon.host`*N*`.pass`	The password to access one of the multiple hosts on which Perfmon data is collected. **Example (host1)**: `perfmon.host1.pass = pass` **Example (host2)**: `perfmon.host2.pass = pass`
`perfmon.host`*N*`.port`	The port number on one of the multiple hosts on which Perfmon data is collected. **Example (host1)**: `perfmon.host1.port = 443` **Example (host2)**: `perfmon.host2.port = 443`
`perfmon.host`*N*`.user`	The user name to access one of the multiple hosts on which Perfmon data is collected. **Example (host1)**: `perfmon.host1.user = admin` **Example (host2)**: `perfmon.host2.user = admin`
`perfmon_interval`	The interval, in milliseconds, at which ProvisoCUCM polls the CUCM server for Perfmon data files, and checks `perfmon_output_dir` for data files pushed there by the CUCM server. **Example (5 minutes):** `run_interval=300000`
`perfmon_output_dir`	The location on the DataChannel host where the ProvisoCUCM instance generates output, in CSV format, from a Perfmon data file. **Example**: `perfmon_output_dir=/opt/uba/perfmon`

Field	Description
`resend_sent_files`	If `true`, the CUCM server will re-send files that it has already successfully sent. Since the CUCM can be configured to send data files to any host specified by CUCM Web administration configuration settings, this field must be set to `true` to ensure that data files are also sent to the DataChannel host that requested them.
	Use the `false` setting in the following situations:
	• If you prefer to have the data files pushed back to the DataChannel host according to a schedule specified by CUCM Web administration configuration settings. Set the CUCM configuration to push the data files back to the DataChannel server where the ProvisoCUCM instance is running.
	• If data files are being pushed back to the DataChannel host too slowly for your needs.
	If this field is `false`, the ProvisoCUCM instance will request the data files from the CUCM server and receive none. It will then check for the data files in the location specified by the CUCM Web administration configuration (at time intervals specified by `run_interval` or `perfmon_interval`). If the files are there, ProvisoCUCM retrieves the files and generates the CSV output to `cdr_output_dir` (or `perfmon_output_dir` with Perfmon data) on the DataChannel host that requested the data.
	Example: `resend_sent_files=true`
`run_interval`	The interval, in milliseconds, at which ProvisoCUCM polls the CUCM server for CDR and CMR data files, and checks `cdr_output_dir` for data files pushed there by the CUCM server.
	Example (15 minutes): `run_interval=900000`

> **Note:** *Before proceeding to the next step, be sure you have configured each cucm.properties file in the directories you created in Step 6.*

9. **CUCM environment only:** Start all ProvisoCUCM applications by running the `startcucm.sh` file in each directory that you created in Step 6.

   ProvisoCUCM writes a log file in the same directory where its `ProvisoCUCM.jar` file is located. Monitor the log file to make sure that ProvisoCUCM is successfully communicating with the CUCM server. Also, verify that CSV files are being generated to the output directories (`cdr_output_dir` and/or `perfmon_output_dir`).

   > **Note:** *Be sure that all ProvisoCUCM instances are operating successfully before proceeding to the next step.*

10. Define global variables.

    Global variables are specific to each CCM or CUCM cluster. You assign values to global variables in either of the following files:

    — `CCMConfig.js`. with CCM clusters

    — `CUCMConfig.js` with CUCM clusters

    The Cisco IP Telephony Technology Pack includes the configuration files `CCMConfig.js` and `CUCMConfig.js`. In Step 2-e, you copied these files to `DATA_CHANNEL_HOME`/scripts/voip_cisco_ipt (typically, /opt/datachannel/scripts/voip_cisco_ipt).

These configuration files contain sample values. Edit either or both files to assign values appropriate for locations in your Cisco IP Telephony CCM or CUCM environment. The following table describes the global variables to define:

Variable	Description
CUSTOMERNAME	String specifying the customer's identifier. This value allows automatic grouping and report navigation by customer. **Example**: `var CUSTOMERNAME="TELINDUS";`
CMCLUSTER	String specifying the cluster's identifier. This value allows automatic grouping and report navigation by cluster. **Example**: `var CMCLUSTER="SF";`
OUTBOUNDPREFIX	Integer specifying the prefix to dial to call outside of the PBX (for example, `9` within the US, or `0` within Europe.) **Example**: `var OUTBOUNDPREFIX=0;`

Variable	Description
site	A variable assigned to the JavaScript object `Site`. A `Site` object defines a set of properties specific for a site, business department, location, remote office, or group of people. You can define multiple `Site` objects. Objects are distinguished through the site name you pass to the object. Create a `Site` object as follows: `site = new Site("MySite");` In the example, `MySite` is the site name. A `site` object contains the following methods: • `addLocalCallPrefix(string prefix)` The prefix argument specifies *n* digits in a local call prefix, where *n* is the prefix length. If the first *n* digits in a phone number match the prefix, the phone number is determined to be a local number. Many local call prefixes can be defined for the same site through this method. **Example**: `site.addLocalCallPrefix("999");` • `addExtensionRange(int startNumber, int endNumber)` The two arguments specify the extension range for a site, beginning with the first extension in the range, and ending with the last extension. Each number within the range is an internal extension for the named site. Many extension ranges can be defined for the site through this method. The values allow automatic grouping, report navigation by site, and path subelement definition. **Example**: `site.addExtensionRange(1000,1830);` • `addVoiceMailRange(int startNumber, int endNumber)` The two arguments specify the VoiceMail extension range for a site, beginning with the first VoiceMail extension in the range, and ending with the last extension. Each number within the range is an internal VoiceMail extension for the named site. Many VoiceMail extension ranges can be defined for the site through this method. The values allow automatic grouping, report navigation by site, and specific reports on the VoiceMail application. **Example**: `site.addVoiceMailRange(9000,9050);` • `addPstnGatewayIpAddress(string ipAddress)` The argument specifies the IP address of a PSTN gateway. Many PSTN gateway addresses can be defined for the named site through this method. The values allow automatic grouping, report navigation by site, and path and gateway subelement definition. **Example**: `site.addPstnGatewayIpAddress("10.1.184.20");` *Note: Use the following method **only** in the CUCMConfig.js file.* • `addCucmAddress(string ipAddress)` The argument specifies the IP address of a CUCM server in the cluster. **Example**: `site.addCucmAddress("10.1.6.8");` *Note: If you are collecting Perfmon data on multiple hosts, ensure that you specify all of the Perfmon hosts in the CUCMConfig.js file, by adding more addCucmAddress lines to the appropriate cluster sections.*

11. Run the initial SNMP inventory and initiate a discovery.

   An inventory collects data about the network resources that the technology pack monitors. After you install an SNMP technology pack, you must create an inventory profile using the **Inventory Tool Wizard** and then initiate a discovery by executing the inventory profile using the **Inventory Tool**.

   Running the initial inventory against SNMP objects is an intricate task and unfortunately beyond the scope of this configuration chapter. For instructions on using the **Inventory Tool Wizard** to create an inventory profile, and the **Inventory Tool** to execute the inventory profile, see the *IBM Tivoli Netcool/Proviso DataMart Configuration Guide.*

12. Edit pack-specific UBA parameters, based on the following Tivoli Netcool/Proviso platforms:

   — Tivoli Netcool/Proviso v4.4.3 and later

   — Tivoli Netcool/Proviso pre-v4.4.3

Tivoli Netcool/Proviso v4.4.3 and later

In this release of Tivoli Netcool/Proviso, you were instructed to modify the technology pack-specific UBA parameters when you installed the Cisco IP Telephony Technology Pack, using the Topology Editor. If you did not modify the UBA parameters with site-specific values or you want to make additional edits, you can do so now. Otherwise, you can go to the next step.

See the Installing Technology Packs chapter of the *IBM Tivoli Netcool/Proviso Installation Guide* for more information.

Tivoli Netcool/Proviso pre-v4.4.3

The Cisco IP Telephony Technology Pack requires specific UBA parameters that are not in the `dc.cfg` file. The DataChannel installer creates a `dc.cfg` file in the *DATA_CHANNEL_HOME*/conf directory (/opt/datachannel/conf, by default). These pack-specific parameters were delivered in a template file called `voip_cisco_ipt_sample_dc.cfg`.

The best practice on adding these pack-specific parameters to the `dc.cfg` file is to:

— Edit the pack-specific UBA parameters in the template file with site-specific values.

— Manually add them to the `dc.cfg` file.

To edit the pack-specific UBA parameters in the template file with site-specific values, follow these steps:

12-a. On the DataChannel server, change your working directory to the *DATA_CHANNEL_HOME*/scripts/voip_cisco_ipt directory by entering the following command, replacing *DATA_CHANNEL_HOME* with the DataChannel home directory (/opt/datachannel, by default):

   cd *DATA_CHANNEL_HOME*/scripts/voip_cisco_ipt

12-b. Make a backup copy of the `voip_cisco_ipt_sample_dc.cfg` template file, by entering the following command:

   cp voip_cisco_ipt_sample_dc.cfg voip_cisco_ipt_sample_dc.cfg.ORIG

12-c. In a text editor, open the `voip_cisco_ipt_sample_dc.cfg` template file for editing.

12-d. Edit the pack-specific UBA parameters according to the instructions provided in Appendix B, *Template file (Tivoli Netcool/Proviso pre-v4.4.3 only)*

12-e. When you are satisfied with your edits, write (but do not quit) the `voip_cisco_ipt_sample_dc.cfg` template file.

   Important: *Editing the dc.cfg file is a nontrivial task and prone to error. Take your time and check your work carefully.*

   To manually add the pack-specific UBA parameters to the `dc.cfg` file, follow these steps:

12-f. Open a second terminal emulator.

12-g. On the DataChannel server, change your working directory to the *DATA_CHANNEL_HOME*/conf directory (/opt/datachannel/conf, by default), by entering the following command:

cd *DATA_CHANNEL_HOME*/conf

12-h. Make a backup copy of the dc.cfg file, by entering the following command:

cp dc.cfg dc.cfg.ORIG

12-i. In a text editor, open the dc.cfg file for editing.

12-j. Search for the UBA parameters, which begin with the string UBA. These parameters were written to the dc.cfg file when you configured the UBA Bulk Collector and installed the DataChannel configuration, as described in the *IBM Tivoli Netcool/Proviso Installation Guide*.

12-k. Copy the pack-specific UBA parameters from the voip_cisco_ipt_sample_dc.cfg template file to the dc.cfg file.

12-l. When you are satisfied with your edits, do the following tasks:

— Quit the voip_cisco_ipt_sample_dc.cfg template file.

— Write and quit the dc.cfg file.

13. Load the DataChannel environment.

In subsequent steps, you will execute dccmd commands. To ensure that you can run these commands, load the shell with the DataChannel environment by following these steps:

13-a. Log in to the DataChannel server as pvuser.

13-b. Change your working directory to the DataChannel home directory (/opt/datachannel, by default), using the following command:

cd /opt/datachannel

13-c. Load the shell with the DataChannel environment, by sourcing the dataChannel.env file, as follows:

. /opt/datachannel/dataChannel.env

14. Restart the DataChannel to activate the UBA and read in changes to the deployed topology (v4.4.3 and later) or dc.cfg (pre-v4.4.3 only).

14-a. Open a terminal emulator on the DataChannel server.

14-b. Use the dccmd command to stop all DataChannel applications:

dccmd -action stop all

14-c. Use the dccmd command to release all daemons running in the DataChannel:

dccmd -action forget all

14-d. Use the following command to find the process identifiers (pids) associated with the DataChannel visual processes:

DATA_CHANNEL_HOME/bin/findvisual

where:

DATA_CHANNEL_HOME is /opt/datachannel, by default.

14-e. Use the following commands to stop each DataChannel visual process:

kill -9 <cnsw_pid>

kill -9 <logw_pid>

kill -9 <amgrw_pid>

kill -9 <cmgrw_pid>

14-f. Use the following commands to restart each DataChannel visual process:

```
cnsw
logw
amgrw
cmgrw
```

14-g. Use the dccmd command to start all DataChannel applications:

```
dccmd -action start all
```

14-h. Use the dccmd command to verify that all of the DataChannel applications started properly:

```
dccmd -action status all
```

More specifically, make sure that the UBA application associated with the DataChannel you configured for the Cisco IP Telephony Technology Pack is running.

14-i. Watch the output of the status switch to verify that all the necessary processes are running. If these processes are running, run the tail utility on the log file for the UBA by issuing a command similar to the following example:

tail -f *DATA_CHANNEL_HOME*/log/proviso.log | grep UBA.*<channel>*.*<collector>*- | more

where:

Variable	Meaning
DATA_CHANNEL_HOME	Is /opt/datachannel, by default.
<channel>	Specifies the channel number (for example, 1) you specified when configuring this DataChannel.
<collector>	Specifies the collector number (for example, 100) you specified when configuring this UBA Bulk Collector.
The trailing dash (–) after *<collector>*	Removes extraneous log messages from your view. That is, the trailing dash guarantees that the command displays only those messages generated by your application. The first set of messages relate to syntax checks.

The following table identifies some events to watch for during the syntax check:

Event	Meaning
The UBA application starts successfully, but then stops executing.	Typically, this event occurs because of a licensing issue.
The Bulk Adaptor Design File might be corrupt.	This event causes a syntax error before the UBA application connects to the database.
The UBA application connects to the database.	This event causes a message similar to the following example to display: DB_CONNECT Connecting to <sid> as <user> If you see this database connection message without prior errors, the UBA application has passed the syntax check.

15. Ensure that the bulk input files can be read.

   To verify that the UBA application can read the bulk input files, follow these steps:

   15-a. Place a bulk input file at the source input location.

   — **(Tivoli Netcool/Proviso v4.4.3 and later)** The source input location for bulk input files is specified using the `URI` parameter from the pack XSD file, which you can view using the Topology Editor.

   — **(Tivoli Netcool/Proviso pre-v4.4.3 only)** The source input location for bulk input files is specified using the `URI` parameter from the template file, which you added to the `dc.cfg` file in a previous step.

   Within the configured file retrieval interval (typically, five minutes), the UBA application retrieves the bulk input file and copies it to the following directory:

DATA_CHANNEL_HOME`/UBA.<channel>.<collector>/<instance>/do/`

   where:

Variable	Meaning
DATA_CHANNEL_HOME	Is `/opt/datachannel`, by default.
\<channel\>	Specifies the channel number (for example, 1) that you specified when configuring this DataChannel.
\<collector\>	Specifies the collector number (for example, 100) that you specified when configuring this UBA bulk collector.
\<instance\> (Tivoli Netcool/Proviso v4.4.3 and later)	Specifies the string for the `INSTANCES` parameter in the pack XSD file. Typically, this string represents the name of the pack and is read-only. You can view the string specified for `INSTANCES` by using the Topology Editor.
\<instance\> (Tivoli Netcool/Proviso pre-v4.4.3 only)	Specifies the string for the `INSTANCES` parameter in the pack template file. You were instructed to copy this parameter to the `dc.cfg` file in a previous step.

   The UBA application then processes the bulk input file according to the instructions in the Bulk Adaptor Design File.

   > *Note:* *The first time that the UBA processes a bulk input file, it passes a metric to the CME. The CME rejects this metric as a BAD_METRIC because the metric does not have an associated grouped subelement prior to the time this metric is recorded. This is expected behavior. The CME accepts metrics from the bulk input files after the inventory is run.*

   15-b. Ensure that the UBA application can successfully read the bulk input file that you copied into the source input location, by issuing a `tail` command similar to the following example:

`tail -f ` *DATA_CHANNEL_HOME*`/log/proviso.log | grep UBA.<channel>.<collector>- | more`

   The following table identifies the success messages that you should look for.

Success message	Meaning
`PERF_INPUT_PROCESSING Processed <integer> records in <float> seconds (<float> records/minute): <int> records`	Specifies a Bulk Adaptor Design File completion message. A Bulk Adaptor Design File successfully completes when an informational message similar to this one displays in the log file. Success occurs when *<int>* records equals 0.
`METRIC_STREAM_INFO Completed writing metric output:` *DATA_CHANNEL_HOME*`/UBA.<channel>.<collector>/streaming/` `state/temp/output/<time>.<instance>.NRAW.BOF; wrote <int> metrics; <int> bad resource IDs; <int> bad formula names (#())`	Specifies a metric creation success message. The UBA application successfully creates metrics when a debug 2 message similar to this one displays in the log file. For some technology packs, the metric creation may be done across different instances of UBA applications. Success occurs when *<int>* metrics is greater than one, *<int>* bad resource IDs equals 0, and *<int>* bad formula names equals 0.
`PERF_INVFLUSH Inserted/updated <int> inventory objects in <float> seconds`	Specifies an inventory success message. The inventory successfully completes when an informational message similar to this one displays in the log file. If *<int>* is greater than one, the UBA application created or updated at least one subelement, and the inventory process is successful. The log file might record further details (if necessary) in the messages associated with the `PERF_INVFLUSHPV` subelement message category.

16. Run the bulk inventory profile.

    The UBA application handles the inventory and metrics according to the instructions provided in the technology pack design file or files. The UBA application inserts the created elements, subelements, and metrics into the database. However, the UBA application does not handle the grouping of these elements and subelements.

    To handle the grouping of the elements and subelements that were inserted into the database, UBA technology packs supply a bulk inventory profile. This bulk inventory profile is automatically created when the pack is installed. Bulk inventory profiles use the following name syntax:

    `bulk_N`

where:

Syntax item	Meaning
`bulk_`	Identifies this as a bulk inventory profile for a UBA technology pack.
N	Specifies the collector number (for example, 100) the user specified when configuring this UBA Bulk Collector.

You must use the Inventory Tool to run a bulk inventory profile.

To run the bulk inventory profile for this technology pack, perform the following steps:

16-a. In the command window where you loaded the DataMart environment, change your working directory to `$PVMHOME/bin` (`/opt/datamart/bin`, by default) on the DataMart server.

16-b. Invoke the DataMart GUI by entering the following command and pressing **Enter**:

    pvm

16-c. Click **Inventory Tool** in the **Resource** tab. The Inventory Tool window appears.

This window displays a list of the existing inventory profiles on the **Configuration** tab. The name of the inventory profile to run is `bulk_N`, where *N* is the collector number configured for this pack.

16-d. On the **Configuration** tab, click on the bulk inventory profile for this technology pack and then select **Run Profile** from the **Action** menu.

The **Live Information** tab displays messages about the status of the profile. See the *IBM Tivoli Netcool/Proviso DataMart Configuration Guide* for more information about running an inventory profile.

16-e. (Optional) Every time the UBA technology pack design file creates new elements, subelements, and metrics, you must perform the previous steps to group the elements and subelements. One way to accomplish this task on a regular basis is to create a `cron` entry that makes use of the `inventory` CLI command. The following example shows a `cron` entry that periodically performs the grouping operation for a bulk inventory profile called `bulk_100`:

```
0 * * * * . /opt/datamart/dataMart.env && inventory -name bulk_100 -action pregrouping -reload -noX

0 * * * * . /opt/datamart/dataMart.env && inventory -name bulk_100 -action grouping -reload -noX
```

See the *ÌBM Tivoli Netcool/Proviso Command Line Interface Guide* for more information about the `inventory` command.

17. Deploy reports.

After the technology pack installation completes, the rules for the new device are automatically loaded into the database. The inventory process uses those rules to group elements and subelements. You must manually deploy (auto-group) the reports by associating them with groups in the NOC Reporting tree in the DataMart Resource Editor.

To deploy the Cisco IP Telephony Technology Pack reports, follow these steps:

17-a. Open the Tivoli Netcool/Proviso DataMart Resource Editor.

17-b. Click the **ReportSEGroup** tab.

17-c. Move the cursor to the left pane and scroll up to select any group under the **SUB-ELEMENTS->NOC Reporting** tree.

17-d. Right-click and select the **AutoGrouping** option from the menu. The **AutoGrouping** option places the reports in dynamically generated groups created during inventory.

17-e. Click **Yes** to continue.

17-f. Click **Close** to exit the message box, or click **Details** to view a description of any errors.

17-g. Optional: You can also deploy reports on a regular basis by creating a cron entry that makes use of the `inventory` CLI command and the `-reportGrouping` option. This option instructs the inventory command to run the report grouping rules and update the deployed reports stored in the database. Report grouping rules must first have been created before this option can be used. For information on creating report grouping rules, see the *IBM Tivoli Netcool/Proviso DataMart Configuration Guide*.

The following example shows a cron entry that periodically performs the deploy report operation:

```
0 * * * * . /opt/datamart/dataMart.env && inventory -noX -reportGrouping
```

See the *ÌBM Tivoli Netcool/Proviso Command Line Interface Guide* for more information about the `inventory` command.

Verifying resources

Use the Tivoli Netcool/Proviso DataMart Resource Editor to determine whether the technology pack resources (elements, subelements, properties, and so on) were successfully discovered and created in the database during inventory.

See the *IBM Tivoli Netcool/Proviso DataMart Configuration Guide* for information about using the Tivoli Netcool/Proviso DataMart Resource Editor.

Appendix A: UBA parameters (Tivoli Netcool/Proviso v4.4.3 and later)

This appendix provides UNIX reference pages for each of the pack-specific UBA parameters supplied with the XSD file for the Cisco IP Telephony Technology Pack. The descriptions are the same as those that display in the Topology Editor Help. These reference pages are provided for convenience.

Overview

The following pages provide a reference for the UBA parameters that this technology pack provides. The reference pages have the following sections:

- **Parameter name**. Each reference page begins with the parameter name, using the following syntax:

  [*device*.] [*instance*.] [*schema*.] *parameter_name*

  where:

  — *device* specifies the name of the device.

  — *instance* specifies the group alias, typically a string that represents the name of the technology pack.

  — *schema* specifies the string passed to the input schema object referenced in the bulk adaptor design file.

  — *parameter_name* specifies the name of the parameter.

  In the **Detail** sections of the reference pages, parameter names in the descriptions are typically referenced as *schema*.*parameter_name* or simply *parameter_name*. The descriptions do not reference the *device* or *instance* part of the parameter name.

- **Description**. A short description that identifies the purpose of the parameter.

- **Component**. The DataChannel application or component to which the parameter applies. The value specified for this parameter controls the behavior of this DataChannel application. This section can contain the following values:

  — **BLB** specifies the DataChannel BLB (Bulk Load Balancer) application.

  — **IF** specifies the DataChannel Inventory File (IF) application. Examples of IF applications include:

    - **SAMIF** specifies the IF application for the Alcatel-Lucent 5620 SAM Technology Pack.

    - **QCIF** specifies the IF application for the Alcatel-Lucent 5620 NM Technology Pack.

    - **CWMIF** specifies the IF application for the Cisco CWM Technology Pack.

  — **UBA** specifies the DataChannel UBA application.

  Most UBA technology packs operate with only the UBA application.

- **Value**. Specifies the following information:

  — **Default** identifies the default value, if one is specified, for the parameter.

  — **Attribute** specifies whether the parameter is writable.

  — **Location** specifies the location of the parameter in the Topology Editor.

- **Detail**. Provides details about the parameter, including possible values.

INSTANCES

Description

Group alias.

Component

UBA

Value

Default: VOIP_CISCO_IPT_PERFMON

Attribute: Read-only

Location: Advanced Properties tab

Detail

The DataChannel supports multiple instances of technology packs running in a single channel component. Therefore, there must be a way to guarantee that the DataChannel applications that handle inventory and metrics parse the correct design files and read the appropriate Bulk input files. The INSTANCES parameter helps ensure that the DataChannel applications that handle inventory and metrics perform the correct operation for a specific technology pack.

The value of INSTANCES is one of the following:

- VOIP_CISCO_IPT with CCM or CUCM metrics.

- VOIP_CISCO_IPT_PERFMON with CUCM Perfmon metrics.

This is a read-only parameter whose value you cannot change. Typically, the value for INSTANCES is a string that represents the name of the technology pack.

INSTANCES

Description

Group alias.

Component

UBA

Value

Default: VOIP_CISCO_IPT

Attribute: Read-only

Location: Advanced Properties tab

Detail

The DataChannel supports multiple instances of technology packs running in a single channel component. Therefore, there must be a way to guarantee that the DataChannel applications that handle inventory and metrics parse the correct design files and read the appropriate Bulk input files. The INSTANCES parameter helps ensure that the DataChannel applications that handle inventory and metrics perform the correct operation for a specific technology pack.

The value of INSTANCES is one of the following:

- VOIP_CISCO_IPT with CCM or CUCM metrics.

- VOIP_CISCO_IPT_PERFMON with CUCM Perfmon metrics.

This is a read-only parameter whose value you cannot change. Typically, the value for INSTANCES is a string that represents the name of the technology pack.

INSTANCES

Description

Group alias.

Component

UBA

Value

Default: VOIP_CISCO_IPT

Attribute: Read-only

Location: Advanced Properties tab

Detail

The DataChannel supports multiple instances of technology packs running in a single channel component. Therefore, there must be a way to guarantee that the DataChannel applications that handle inventory and metrics parse the correct design files and read the appropriate Bulk input files. The INSTANCES parameter helps ensure that the DataChannel applications that handle inventory and metrics perform the correct operation for a specific technology pack.

The value of INSTANCES is one of the following:

- VOIP_CISCO_IPT with CCM or CUCM metrics.

- VOIP_CISCO_IPT_PERFMON with CUCM Perfmon metrics.

This is a read-only parameter whose value you cannot change. Typically, the value for INSTANCES is a string that represents the name of the technology pack.

VOIP_CISCO_IPT.CCMINPUT.DELETEONACQUIRE

Description

Deletes CCM Bulk input files after acquisition.

Component

UBA

Value

Default: false

Attribute: Writable

Location: Advanced Properties tab

Detail

The `CCMINPUT.DELETEONACQUIRE` parameter specifies whether the Bulk input files should be preserved after the UBA acquires them. A related parameter - `CCMINPUT.URI` - specifies the location of the Bulk input files.

Set this parameter to the value `true` to instruct this UBA application to delete the CCM Bulk input files after it acquires them. Otherwise, set this parameter to `false` to instruct this UBA application to preserve the Bulk input files after it acquires them.

VOIP_CISCO_IPT.CCMINPUT.URI

Description

CCM Bulk input files location.

Component

UBA

Value

Default: No default value

Attribute: Read-only

Location: Properties tab

Detail

The DataChannel applications that handle inventory and metrics must be directed to the location of the Bulk input files generated by the devices associated with the technology on which the application operates. The `CCMINPUT.URI` parameter specifies the location for the specified DataChannel applications to retrieve these Bulk input files. A related parameter - `CCMINPUT.DELETEONACQUIRE` - specifies whether the UBA application should delete the Bulk input files after it acquires them.

The syntax for the URI is as follows:
`sqldb:odbc*threaded/username=`*`userName`*`;password=`*`password`*`;environment=`*`dataSourceName`*

For example: `sqldb:odbc*threaded/username=sa;password=netcool;environment=SANFRANCISCO`

> ***Note:*** *The URIs you specify must match the URIs of each CCM Publisher data source defined in the* `odbc.ini` *file.*

IBM Tivoli Netcool/Proviso Cisco IP Telephony 2.4.0.0 Technology Pack

VOIP_CISCO_IPT.CDRINPUT.DELETEONACQUIRE

Description

Deletes CUCM Bulk input files after acquisition.

Component

UBA

Value

Default: false

Attribute: Writable

Location: Advanced Properties tab

Detail

The `CDRINPUT.DELETEONACQUIRE` parameter specifies whether the Bulk input files should be preserved after the UBA acquires them. A related parameter - `CDRINPUT.URI` - specifies the location of these Bulk input files.

Set this parameter to the value `true` to instruct this UBA application to delete the CUCM Bulk input files after it acquires them. Otherwise, set this parameter to `false` to instruct this UBA application to preserve the Bulk input files after it acquires them.

VOIP_CISCO_IPT.CDRINPUT.URI

Description

CUCM Bulk input files location.

Component

UBA

Value

Default: No default value

Attribute: Read-only

Location: Properties tab

Detail

The DataChannel applications that handle inventory and metrics must be directed to the location of the Bulk input files generated by the devices associated with the technology on which the application operates. The CDRINPUT.URI parameter specifies the location, in Universal Resource Identifier (URI) format, for the specified DataChannel applications to retrieve Bulk input files for CDR data.

A related parameter - CDRINPUT.DELETEONACQUIRE - specifies whether the UBA application should delete these Bulk input files after it acquires them.

VOIP_CISCO_IPT.DESIGNFILE

Description

JavaScript file that controls UBA for CCM or CUCM metrics.

Component

UBA

Value

Default: CUCMAdaptor.js

Attribute: Read-only

Location: Properties tab

Detail

Netcool/Proviso technology packs control the behavior of the DataChannel UBA application through instructions contained in Bulk Adaptor design (JavaScript) files. The DESIGNFILE parameter identifies the name of a technology pack's design file.

CCM metrics require the CCMAdaptor.js design file. CUCM metrics require the CUCMAdaptor.js design file.

This is a read-only parameter.

VOIP_CISCO_IPT.DESIGNFILE

Description

JavaScript file that controls UBA for CCM or CUCM metrics.

Component

UBA

Value

Default: CCMAdaptor.js

Attribute: Read-only

Location: Properties tab

Detail

Netcool/Proviso technology packs control the behavior of the DataChannel UBA application through instructions contained in Bulk Adaptor design (JavaScript) files. The DESIGNFILE parameter identifies the name of a technology pack's design file.

CCM metrics require the CCMAdaptor.js design file. CUCM metrics require the CUCMAdaptor.js design file.

This is a read-only parameter.

VOIP_CISCO_IPT.INPUT_DIRECTORY

Description

Path to Bulk input files directory for CCM or CUCM metrics.

Component

UBA

Value

Default: sqldb:odbc*threaded/username=user&password=passwd&environment=EXAMPLE

Attribute: Writable

Location: Properties tab

Detail

The `INPUT_DIRECTORY` parameter specifies the path to the directory where the generated Bulk input files should be stored.

Do not enter any subdirectories and the actual wildcards used to specify the Bulk input files to be acquired. Any subdirectories and wildcards are automatically specified in the `URI`-related parameters. An example of an input directory specification is `opt/uba`.

CCM metrics are accessed through ODBC to a SQL database. CUCM metrics are accessed through SOAP requests.

VOIP_CISCO_IPT.INPUT_DIRECTORY

Description

Path to Bulk input files directory for CCM or CUCM metrics.

Component

UBA

Value

Default: No default value

Attribute: Writable

Location: Properties tab

Detail

The `INPUT_DIRECTORY` parameter specifies the path to the directory where the generated Bulk input files should be stored.

Do not enter any subdirectories and the actual wildcards used to specify the Bulk input files to be acquired. Any subdirectories and wildcards are automatically specified in the `URI`-related parameters. An example of an input directory specification is `opt/uba`.

CCM metrics are accessed through ODBC to a SQL database. CUCM metrics are accessed through SOAP requests.

VOIP_CISCO_IPT.INPUT_FTP_PASSWORD

Description

FTP or SFTP password for Bulk input files used in CCM or CUCM environments.

Component

UBA

Value

Default: No default value

Attribute: Writable

Location: Properties tab

Detail

The INPUT_FTP_PASSWORD parameter specifies the password that the server administrator assigned (using the ftp or sftp utility) to the FTP or SFTP user. The FTP or SFTP user specifies this password to gain access to the server on which the Bulk input files reside.

Likewise, the UBA uses this same password to gain access to the server on which the Bulk input files reside.

VOIP_CISCO_IPT.INPUT_FTP_USERNAME

Description

FTP or SFTP username for Bulk input files used in CCM or CUCM environments.

Component

UBA

Value

Default: No default value

Attribute: Writable

Location: Properties tab

Detail

The INPUT_FTP_USERNAME parameter specifies the username that the server administrator assigned (using the ftp or sftp utility) to the FTP or SFTP user. The FTP or SFTP user specifies this username to gain access to the server on which the Bulk input files reside.

Likewise, the UBA uses this same username to gain access to the server on which the Bulk input files reside.

VOIP_CISCO_IPT.INPUT_HOST

Description

Hostname for Bulk input files in CCM or CUCM environments.

Component

UBA

Value

Default: No default value

Attribute: Writable

Location: Properties tab

Detail

The INPUT_HOST parameter specifies the hostname of the server on which the Bulk input files reside. These are the files that the UBA parses.

VOIP_CISCO_IPT.INPUT_HOST

Description

Hostname for Bulk input files in CCM or CUCM environments.

Component

UBA

Value

Default: No default value

Attribute: Writable

Location: Properties tab

Detail

The INPUT_HOST parameter specifies the hostname of the server on which the Bulk input files reside. These are the files that the UBA parses.

VOIP_CISCO_IPT.INPUT_USE_SECURE_FTP

Description

Acquire CCM or CUCM Bulk input files using secure FTP.

Component

UBA

Value

Default: false

Attribute: Writable

Location: Properties tab

Detail

The INPUT_USE_SECURE_FTP parameter specifies whether FTP (File Transfer Protocol) or SFTP (secure FTP) is used. To use FTP, specify the value false. Otherwise, to use SFTP, specify the value true. The default value is false.

To use the sftp command, you must have an SSH client installed on the servers where the Bulk input files reside and where the DataChannel is running. Typically, an SSH client is installed by default on most Unix systems. For more information, see your operating system documentation or the sftp manpage.

> ***Note:*** *You cannot do the following:*

- Use an FTP client to connect to an SFTP server
- Connect to an FTP server with a client that supports only SFTP

VOIP_CISCO_IPT.INPUT_USE_SECURE_FTP

Description

Acquire CCM or CUCM Bulk input files using secure FTP.

Component

UBA

Value

Default: false

Attribute: Writable

Location: Properties tab

Detail

The `INPUT_USE_SECURE_FTP` parameter specifies whether FTP (File Transfer Protocol) or SFTP (secure FTP) is used. To use FTP, specify the value `false`. Otherwise, to use SFTP, specify the value `true`. The default value is `false`.

To use the `sftp` command, you must have an SSH client installed on the servers where the Bulk input files reside and where the DataChannel is running. Typically, an SSH client is installed by default on most Unix systems. For more information, see your operating system documentation or the `sftp` manpage.

>   ***Note:*** *You cannot do the following:*

*   Use an FTP client to connect to an SFTP server
*   Connect to an FTP server with a client that supports only SFTP

VOIP_CISCO_IPT_PERFMON.DESIGNFILE

Description

JavaScript file that controls UBA for CUCM Perfmon metrics.

Component

UBA

Value

Default: CUCMPerfmonAdaptor.js

Attribute: Read-only

Location: Properties tab

Detail

Netcool/Proviso technology packs control the behavior of the DataChannel UBA application through instructions contained in Bulk Adaptor design (JavaScript) files. The DESIGNFILE parameter identifies the name of a technology pack's design file.

This is a read-only parameter. You cannot change the name of the technology pack's Bulk Adaptor design file.

VOIP_CISCO_IPT_PERFMON.INPUT_DIRECTORY

Description

Path to Bulk input files directory for CUCM Perfmon metrics.

Component

UBA

Value

Default: No default value

Attribute: Writable

Location: Properties tab

Detail

The INPUT_DIRECTORY parameter specifies the path to the directory where the generated Bulk input files should be stored.

Do not enter any subdirectories and the actual wildcards used to specify the Bulk input files to be acquired. Any subdirectories and wildcards are automatically specified in the URI-related parameters. An example of an input directory specification is opt/uba.

CUCM Perfmon metrics are accessed through SOAP requests.

IBM Tivoli Netcool/Proviso Cisco IP Telephony 2.4.0.0 Technology Pack

VOIP_CISCO_IPT_PERFMON.INPUT_FTP_PASSWORD

Description

FTP or SFTP password for Bulk input files used for collecting Perfmon metrics in CUCM environments.

Component

UBA

Value

Default: No default value

Attribute: Writable

Location: Properties tab

Detail

The INPUT_FTP_PASSWORD parameter specifies the password that the server administrator assigned (using the ftp or sftp utility) to the FTP or SFTP user. The FTP or SFTP user specifies this password to gain access to the server on which the Bulk input files reside.

Likewise, the UBA uses this same password to gain access to the server on which the Bulk input files reside.

VOIP_CISCO_IPT_PERFMON.INPUT_FTP_USERNAME

Description

FTP or SFTP username for Bulk input files used for collecting Perfmon metrics in CUCM environments.

Component

UBA

Value

Default: No default value

Attribute: Writable

Location: Properties tab

Detail

The INPUT_FTP_USERNAME parameter specifies the username that the server administrator assigned (using the ftp or sftp utility) to the FTP or SFTP user. The FTP or SFTP user specifies this username to gain access to the server on which the Bulk input files reside.

Likewise, the UBA uses this same username to gain access to the server on which the Bulk input files reside.

VOIP_CISCO_IPT_PERFMON.INPUT_HOST

Description

Hostname for Bulk input files containing Perfmon metrics in CUCM environments.

Component

UBA

Value

Default: No default value

Attribute: Writable

Location: Properties tab

Detail

The INPUT_HOST parameter specifies the hostname of the server on which the Bulk input files reside. These are the files that the UBA parses.

VOIP_CISCO_IPT_PERFMON.INPUT_USE_SECURE_FTP

Description

Acquire CUCM Perfmon Bulk input files using secure FTP.

Component

UBA

Value

Default: false

Attribute: Writable

Location: Properties tab

Detail

The `INPUT_USE_SECURE_FTP` parameter specifies whether FTP (File Transfer Protocol) or SFTP (secure FTP) is used. To use FTP, specify the value `false`. Otherwise, to use SFTP, specify the value `true`. The default value is `false`.

To use the `sftp` command, you must have an SSH client installed on the servers where the Bulk input files reside and where the DataChannel is running. Typically, an SSH client is installed by default on most Unix systems. For more information, see your operating system documentation or the `sftp` manpage.

>   ***Note:*** *You cannot do the following:*

• Use an FTP client to connect to an SFTP server

• Connect to an FTP server with a client that supports only SFTP

VOIP_CISCO_IPT_PERFMON.PERFMON.DELETEONACQUIRE

Description

Deletes CUCM Perfmon Bulk input files after acquisition.

Component

UBA

Value

Default: false

Attribute: Writable

Location: Advanced Properties tab

Detail

The `PERFMON.DELETEONACQUIRE` parameter specifies whether the Bulk input files should be preserved after the UBA acquires them. A related parameter - `PERFMON.URI` - specifies the location of these Bulk input files.

Set this parameter to the value `true` to instruct this UBA application to delete the CUCM Perfmon Bulk input files after it acquires them. Otherwise, set this parameter to `false` to instruct this UBA application to preserve the Bulk input files after it acquires them.

VOIP_CISCO_IPT_PERFMON.PERFMON.URI

Description

CUCM Perfmon Bulk input files location.

Component

UBA

Value

Default: No default value

Attribute: Read-only

Location: Properties tab

Detail

The DataChannel applications that handle inventory and metrics must be directed to the location of the Bulk input files generated by the devices associated with the technology on which the application operates. The PERFMON.URI parameter specifies the location, in Universal Resource Identifier (URI) format, for the specified DataChannel applications to retrieve Bulk input files for CDR data.

A related parameter - PERFMON.DELETEONACQUIRE - specifies whether the UBA application should delete these Bulk input files after it acquires them.

Appendix B: Template file
(Tivoli Netcool/Proviso pre-v4.4.3 only)

You should read this appendix after you open the `voip_cisco_ipt_sample_dc.cfg` template file for editing, as instructed in Chapter 4, *Configuring the technology pack*.

This appendix describes the pack-specific UBA parameters that you need to add to the `dc.cfg` file, and explains how to tailor the values to your specific deployment.

Template file name and location

The `voip_cisco_ipt_sample_dc.cfg` template file is located in the following directory on the DataChannel server:

> *DATA_CHANNEL_HOME*/scripts/voip_cisco_ipt
> (`/opt/datachannel/scripts/voip_cisco_ipt`, by default)

You were instructed to copy the `voip_cisco_ipt_sample_dc.cfg` template file in a configuration step (step 2 on page 47) described in Chapter 4.

Pack-specific UBA parameters

The `voip_cisco_ipt_sample_dc.cfg` template file provides the following pack-specific UBA parameters:

```
UBA.<channel_number>.<collector_number1>.INSTANCES=<instance>
UBA.<channel_number>.<collector_number1>.<instance>.TIMEZONE=GMT
UBA.<channel_number>.<collector_number1>.<instance>.DESIGNFILE=CCMAdaptor.js
UBA.<channel_number>.<collector_number1>.<instance>.CCMINPUT.URI=<input_files_location1>
UBA.<channel_number>.<collector_number1>.<instance>.CCMINPUT.DELETEONACQUIRE=true

UBA.<channel_number>.<collector_number2>.INSTANCES=<instance>
UBA.<channel_number>.<collector_number2>.<instance>.TIMEZONE=GMT
UBA.<channel_number>.<collector_number2>.<instance>.DESIGNFILE=CUCMAdaptor.js
UBA.<channel_number>.<collector_number2>.<instance>.CDRINPUT.URI=<input_files_location2>
UBA.<channel_number>.<collector_number2>.<instance>.CDRINPUT.DELETEONACQUIRE=false

UBA.<channel_number>.<collector_number3>.INSTANCES=<instance>
UBA.<channel_number>.<collector_number3>.<instance>.TIMEZONE=GMT
UBA.<channel_number>.<collector_number3>.<instance>.DESIGNFILE=CUCMPerfmonAdaptor.js
UBA.<channel_number>.<collector_number3>.<instance>.PERFMON.URI=<input_files_location1>
UBA.<channel_number>.<collector_number3>.<instance>.PERFMON.DELETEONACQUIRE=false
```

The following table describes the values that you must provide for these UBA parameters.

UBA Parameter Value	Meaning
<channel_number>	Replace with the channel number that was configured for this technology pack. This channel number appears in the `dc.cfg` file.
<collector_number>	Replace with the UBA Bulk Collector number that was configured for this technology pack. This collector number appears in the `dc.cfg` file.
<instance>	Replace with an arbitrary string that identifies a group alias to be associated with subsequent lines in this section of the `dc.cfg` file. See *Additional information about UBA parameters* on page 90 for more information on this UBA parameter value. The template file specifies `VOIP_CISCO_IPT` as an example. If you replace this string with one of your own, make sure that you replace it in the other parameters where it is specified.
<timezone>	Replace with the correct time zone, as specified in the `/etc/default/init` file on the source host. For example: `UBA.1.1.VOIP_CISCO_IPT.TIMEZONE=GMT` The time zone must be set correctly. Otherwise, the pack will not deploy.
<input_files_location>	Specify the location of the bulk input files that the device generates, and the URIs of each CCM Publisher data source defined in the `odbc.ini` file. See *Additional information about UBA parameters* on page 90 for more information about this UBA parameter value.

Additional information about UBA parameters

This section provides more information about the INSTANCES, URI, and DB_USERNAME parameters.

INSTANCES

The DataChannel UBA application supports multiple instances of technology packs running in a single channel component. Therefore, there must be a way to guarantee that the UBA parses the correct design file and reads the appropriate bulk input files. The INSTANCES parameter helps ensure that the DataChannel UBA application performs the correct operation for a specific technology pack.

The Cisco IP Telephony Technology Pack provides an INSTANCES parameter in its `voip_cisco_ipt_sample_dc.cfg` template file. You supply an arbitrary string — referred to as a group alias — to the INSTANCES parameter. After you define the INSTANCES parameter with a specific string, make sure you specify this string wherever *<instance>* appears in the template file.

You can associate this group alias with any arbitrary string. For example, you might associate this group alias with the location (for example, `BOSTON`, `LOWELL`, `BERLIN`, `PARIS`, and so forth) of the data source.

URI

The DataChannel UBA application needs to know where to find the bulk input files that the supported device generates. Therefore, you must specify a Universal Resource Identifier (URI) for the location of the bulk input files. To define this location, the Cisco IP Telephony Technology Pack provides a `URI` parameter in its `voip_cisco_ipt_sample_dc.cfg` template file.

You must specify the URI for each CCM Publisher bulk adaptor configured in the `dc.cfg` file.

> **Note:** *The URIs that you specify in the dc.cfg file must match the URIs of each CCM Publisher data source defined in the odbc.ini file.*

Follow these guidelines when specifying a URI in the template or `dc.cfg` file:

- Use Internet-standard URIs.

- Specify the file protocol, FTP (File Transfer Protocol), or SFTP (secure FTP).

- The file protocol is appropriate only when specifying a path on the same host computer.

- When using the file protocol, specify a full absolute path after the initial `file://`. This results in three slashes after the word `file`, because the full path must begin with a slash.

- When using FTP or SFTP, use the following syntax:

`ftp://`*<username>*`:`*<encrypted_password>*`@`*<hostname>*`//full/path/to/directory/specific_string`

`sftp://`*<username>*`:`*<encrypted_password>*`@`*<hostname>*`//full/path/to/directory/specific_string`

where:

— *<username>* specifies the user name that the server administrator assigned (using the `ftp` or `sftp` utility) to the FTP or SFTP user. The FTP or SFTP user specifies this user name to gain access to the server on which the technology pack is installed.

— *<encrypted_password>* specifies the password that the server administrator assigned (using the `ftp` or `sftp` utility) to the FTP or SFTP user. The FTP or SFTP user specifies this password to gain access to the server on which the technology pack is installed. The password specified here should be the encrypted password.

— *<hostname>* specifies the host name of the server on which the bulk input files are located. These are the files that the UBA parses.

— `specific_string` refers to the string that ends an entry for the URI line.

Example:

`UBA.1.1.VOIP_CISCO_IPT.CDRINPUT.URI=ftp://pvuser:CACCDHDBCCCJHCGL@KLPRO02Z7//opt/uba/cdrcmr/*`

To use the `sftp` command, you must have an SSH client installed on the servers where the bulk input files are located and where the DataChannel is running. Typically, an SSH client is installed by default on most UNIX systems. For more information, see your operating system documentation or the `sftp` reference page.

Note that you cannot do the following:

- Use an FTP client to connect to an SFTP server

- Connect to an FTP server with a client that supports only SFTP

DB_USERNAME

Use the following guidelines to determine whether you have the correct value for the `UBA.`*<channel_number>*`.`*<collector_number>*`.DB_USERNAME` parameter in the `dc.cfg` file:

- The UBA technology pack requires the DataChannel UBA application to process metrics only. In this scenario, the UBA technology pack provides a metrics schema in its design file. In this case, DB_USERNAME must be set to PV_COLL.

- The UBA technology pack requires the DataChannel UBA application to process both inventory and metrics. In this scenario, the UBA technology pack provides metrics and inventory schemas in its design file. In this case, DB_USERNAME must be set to PV_GUI.

For the Cisco IP Telephony Technology Pack, DB_USERNAME should be set to PV_GUI.

Example

The following example shows the UBA parameter settings for the Cisco IP Telephony Technology Pack:

```
UBA.1.98.ROOT_DIRECTORY=/opt/datachannel
UBA.1.98.INSTANCES=VOIP_CISCO_IPT
UBA.1.98.RUNINTERVAL=900
UBA.1.98.VOIP_CISCO_IPT.TIMEZONE=GMT
UBA.1.98.VOIP_CISCO_IPT.DESIGNFILE=CUCMPerfmonAdaptor.js
UBA.1.98.VOIP_CISCO_IPT.PERFMON.URI=ftp://user:cryptedpass@examplehost//opt/uba/
perfmon/*.csv
UBA.1.98.VOIP_CISCO_IPT.PERFMON.DELETEONACQUIRE=false
UBA.1.98.METRIC_STREAM_TYPE=BOF
UBA.1.98.DEBUG_WALKBACK_ON_ADAPTOR_ERROR=TRUE
UBA.1.98.DUAL_LOGGING=true
UBA.1.98.LOG_FILTER=FEWI 12345
UBA.1.98.SERVICE_INSTANCE=GLOBAL
UBA.1.98.COLLECTOR_LIST=98
UBA.1.98.DB_USERNAME=PV_GUI
UBA.1.98.DB_PASSWORD=AAAC
UBA.1.98.INVENTORY_SUBELEMENT_FLUSH_THRESHOLD=1

UBA.1.99.ROOT_DIRECTORY=/opt/datachannel
UBA.1.99.INSTANCES=VOIP_CISCO_IPT
UBA.1.99.RUNINTERVAL=900
UBA.1.99.VOIP_CISCO_IPT.TIMEZONE=GMT
UBA.1.99.VOIP_CISCO_IPT.DESIGNFILE=CUCMAdaptor.js
UBA.1.99.VOIP_CISCO_IPT.CDRINPUT.URI=ftp://user:cryptedpass@examplehost//opt/uba
/cdrcmr/*.csv
UBA.1.99.VOIP_CISCO_IPT.CDRINPUT.DELETEONACQUIRE=false
UBA.1.99.METRIC_STREAM_TYPE=BOF
UBA.1.99.DEBUG_WALKBACK_ON_ADAPTOR_ERROR=TRUE
UBA.1.99.DUAL_LOGGING=true
UBA.1.99.LOG_FILTER=FEWI 12345
UBA.1.99.SERVICE_INSTANCE=GLOBAL
UBA.1.99.COLLECTOR_LIST=99
UBA.1.99.DB_USERNAME=PV_GUI
UBA.1.99.DB_PASSWORD=AAAC
UBA.1.99.INVENTORY_SUBELEMENT_FLUSH_THRESHOLD=1

UBA.1.101.ROOT_DIRECTORY=/opt/datachannel
UBA.1.101.INSTANCES=VOIP_CISCO_IPT
UBA.1.101.RUNINTERVAL=900
UBA.1.101.VOIP_CISCO_IPT.TIMEZONE=EST
UBA.1.101.VOIP_CISCO_IPT.DESIGNFILE=CCMAdaptor.js
UBA.1.101.VOIP_CISCO_IPT.CCMINPUT.URI=sqldb:odbc*threaded/username=sa&password=n
etcool&environment=SF
```

```
UBA.1.101.VOIP_CISCO_IPT.CCMINPUT.DELETEONACQUIRE=false
UBA.1.101.METRIC_STREAM_TYPE=BOF
UBA.1.101.DEBUG_WALKBACK_ON_ADAPTOR_ERROR=TRUE
UBA.1.101.DUAL_LOGGING=true
UBA.1.101.LOG_FILTER=FEWI 12345
UBA.1.101.SERVICE_INSTANCE=GLOBAL
UBA.1.101.COLLECTOR_LIST=101
UBA.1.101.DB_USERNAME=PV_GUI
UBA.1.101.DB_PASSWORD=AAAC
UBA.1.101.INVENTORY_SUBELEMENT_FLUSH_THRESHOLD=10
```

NOTES

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information about the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte character set (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan Ltd.
1623-14, Shimotsuruma, Yamato-shi
Kanagawa 242-8502 Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement might not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
2Z4A/101
11400 Burnet Road
Austin, TX 78758
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

If you are viewing this information in softcopy form, the photographs and color illustrations might not appear.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at www.ibm.com/legal/copytrade.shtml.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java and all Java-based trademarks and logos are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Other product and service names might be trademarks of IBM or other companies.

© Copyright IBM Corp. 2010.

US Government Users Restricted Rights — Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

IBM Tivoli Netcool/Proviso Cisco IP Telephony 2.4.0.0 Technology Pack

Additional Copyright Information

The following copyright information is for software used by Tivoli Netcool/Proviso.

Tcl 8.3.3, Combat/TCL 0.7.3, Combat/TCL 0.7.5, TclX 8.3, TK 8.3.3

This software is copyrighted by the Regents of the University of California, Sun Microsystems, Inc., Scriptics Corporation, and other parties. The following terms apply to all files associated with the software unless explicitly disclaimed in individual files.

The authors hereby grant permission to use, copy, modify, distribute, and license this software and its documentation for any purpose, provided that existing copyright notices are retained in all copies and that this notice is included verbatim in any distributions. No written agreement, license, or royalty fee is required for any of the authorized uses. Modifications to this software may be copyrighted by their authors and need not follow the licensing terms described here, provided that the new terms are clearly indicated on the first page of each file where they apply.

IN NO EVENT SHALL THE AUTHORS OR DISTRIBUTORS BE LIABLE TO ANY PARTY FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF THIS SOFTWARE, ITS DOCUMENTATION, OR ANY DERIVATIVES THEREOF, EVEN IF THE AUTHORS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

THE AUTHORS AND DISTRIBUTORS SPECIFICALLY DISCLAIM ANY WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT. THIS SOFTWARE IS PROVIDED ON AN "AS IS" BASIS, AND THE AUTHORS AND DISTRIBUTORS HAVE NO OBLIGATION TO PROVIDE MAINTENANCE, SUPPORT, UPDATES, ENHANCEMENTS, OR MODIFICATIONS.

GOVERNMENT USE: If you are acquiring this software on behalf of the U.S. government, the Government shall have only "Restricted Rights" in the software and related documentation as defined in the Federal Acquisition Regulations (FARs) in Clause 52.227.19 (c) (2). If you are acquiring the software on behalf of the Department of Defense, the software shall be classified as "Commercial Computer Software" and the Government shall have only "Restricted Rights" as defined in Clause 252.227-7013 (c) (1) of DFARs. Notwithstanding the foregoing, the authors grant the U.S. Government and others acting in its behalf permission to use and distribute the software in accordance with the terms specified in this license.

SCOTTY Stack

This software is copyrighted by Juergen Schoenwaelder, the Technical University of Braunschweig, the University of Twente, and other parties. The following terms apply to all files associated with the software unless explicitly disclaimed in individual files.

The authors hereby grant permission to use, copy, modify, distribute, and license this software and its documentation for any purpose, provided that existing copyright notices are retained in all copies and that this notice is included verbatim in any distributions. No written agreement, license, or royalty fee is required for any of the authorized uses. Modifications to this software may be copyrighted by their authors and need not follow the licensing terms described here, provided that the new terms are clearly indicated on the first page of each file where they apply.

IN NO EVENT SHALL THE AUTHORS OR DISTRIBUTORS BE LIABLE TO ANY PARTY FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF THIS SOFTWARE, ITS DOCUMENTATION, OR ANY DERIVATIVES THEREOF, EVEN IF THE AUTHORS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

THE AUTHORS AND DISTRIBUTORS SPECIFICALLY DISCLAIM ANY WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT. THIS SOFTWARE IS PROVIDED ON AN "AS IS" BASIS, AND THE AUTHORS AND

DISTRIBUTORS HAVE NO OBLIGATION TO PROVIDE MAINTENANCE, SUPPORT, UPDATES, ENHANCEMENTS, OR MODIFICATIONS.

Various copyrights apply to this package, listed in 3 separate parts below. Please make sure that you include all the parts. Up until 2001, the project was based at UC Davis, and the first part covers all code written during this time. From 2001 onwards, the project has been based at SourceForge, and Networks Associates Technology, Inc hold the copyright on behalf of the wider Net-SNMP community, covering all derivative work done since then. An additional copyright section has been added as Part 3 below also under a BSD license for the work contributed by Cambridge Broadband Ltd. to the project since 2001.

Part 1: CMU/UCD copyright notice: (BSD like)

Copyright © 1989, 1991, 1992 by Carnegie Mellon University

Derivative Work - 1996, 1998-2000

Copyright © 1996, 1998-2000 The Regents of the University of California

All Rights Reserved

Permission to use, copy, modify and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appears in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of CMU and The Regents of the University of California not be used in advertising or publicity pertaining to distribution of the software without specific written permission.

CMU AND THE REGENTS OF THE UNIVERSITY OF CALIFORNIA DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. IN NO EVENT SHALL CMU OR THE REGENTS OF THE UNIVERSITY OF CALIFORNIA BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM THE LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Part 2: Networks Associates Technology, Inc copyright notice (BSD)

Copyright © 2001, Networks Associates Technology, Inc

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

- Neither the name of the NAI Labs nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDERS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Part 3: Cambridge Broadband Ltd. copyright notice (BSD)

Portions of this code are copyright © 2001, Cambridge Broadband Ltd.

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

- The name of Cambridge Broadband Ltd. may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDER "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

BLT 2.4u

Portions (c) 1993 AT&T, (c) 1993 - 1998 Lucent Technologies, (c) 1994-1998 Sun Microsystems, Inc., and (c) 1987-1993 The Regents of the University of California.

Permission to use, copy, modify and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appears in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the names of AT&T, Lucent Technologies Inc., Sun Microsystems, Inc. and The Regents of the University of California not be used in advertising or publicity pertaining to distribution of the software without specific written permission.

THE COPYRIGHT HOLDERS AND OTHER CONTRIBUTORS DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. IN NO EVENT SHALL THE COPYRIGHT HOLDERS OR OTHER CONTRIBUTORS BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM THE LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

CMU-SNMP 1.14

CMU/UCD copyright notice: (BSD like) Copyright 1989, 1991, 1992 by Carnegie Mellon University

Derivative Work - 1996, 1998-2000 Copyright 1996, 1998-2000 The Regents of the University of California

All Rights Reserved

Permission to use, copy, modify and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appears in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of CMU and The Regents of the University of California not be used in advertising or publicity pertaining to distribution of the software without specific written permission.

CMU AND THE REGENTS OF THE UNIVERSITY OF CALIFORNIA DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. IN NO EVENT SHALL CMU OR THE REGENTS OF THE UNIVERSITY OF CALIFORNIA BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM THE LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Scotty 2.8, incrTCL 3.0, [incr TCL] 3.2

Portions Copyright (c) 1987-1994 The Regents of the University of California. Copyright (c) 1994-1995 Sun Microsystems, Inc.

This software is copyrighted by the Regents of the University of California, Sun Microsystems, Inc., and other parties. The following terms apply to all files associated with the software unless explicitly disclaimed in individual files.

The authors hereby grant permission to use, copy, modify, distribute, and license this software and its documentation for any purpose, provided that existing copyright notices are retained in all copies and that this notice is included verbatim in any distributions. No written agreement, license, or royalty fee is required for any of the authorized uses. Modifications to this software may be copyrighted by their authors and need not follow the licensing terms described here, provided that the new terms are clearly indicated on the first page of each file where they apply.

IN NO EVENT SHALL THE AUTHORS OR DISTRIBUTORS BE LIABLE TO ANY PARTY FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF THIS SOFTWARE, ITS DOCUMENTATION, OR ANY DERIVATIVES THEREOF, EVEN IF THE AUTHORS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

THE AUTHORS AND DISTRIBUTORS SPECIFICALLY DISCLAIM ANY WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT. THIS SOFTWARE IS PROVIDED ON AN "AS IS" BASIS, AND THE AUTHORS AND DISTRIBUTORS HAVE NO OBLIGATION TO PROVIDE MAINTENANCE, SUPPORT, UPDATES, ENHANCEMENTS, OR MODIFICATIONS.

RESTRICTED RIGHTS: Use, duplication or disclosure by the government is subject to the restrictions as set forth in subparagraph (c) (1) (ii) of the Rights in Technical Data and Computer Software Clause as DFARS 252.227-7013 and FAR 52.227-19.

Portions Copyright (c) 1993-1998 Lucent Technologies, Inc.

Permission to use, copy, modify, and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies and that both that the copyright notice and warranty disclaimer appear in supporting documentation, and that the names of Lucent Technologies any of their entities not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission.

Lucent disclaims all warranties with regard to this software, including all implied warranties of merchantability and fitness. In no event shall Lucent be liable for any special, indirect or consequential damages or any damages whatsoever resulting from loss of use, data or profits, whether in an action of contract, negligence or other tortuous action, arising out of or in connection with the use or performance of this software.

UCD SNMP 4.2.5

Portions Copyright 1989, 1991, 1992 by Carnegie Mellon University. Derivative Work - 1996, 1998-2000, Copyright 1996, 1998-2000 The Regents of the University of California All Rights Reserved

Permission to use, copy, modify and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appears in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of CMU and The Regents of the University of California not be used in advertising or publicity pertaining to distribution of the software without specific written permission.

CMU AND THE REGENTS OF THE UNIVERSITY OF CALIFORNIA DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. IN NO EVENT SHALL CMU OR THE REGENTS OF THE UNIVERSITY OF CALIFORNIA BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM THE LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Portions Copyright: (c) 2001-2003, Networks Associates Technology, Inc, (c) 2001-2003, Cambridge Broadband Ltd, (c) 2003-2005, Sparta, Inc., (c) 2004, Cisco, Inc and Information Network Center of Beijing University of Posts and Telecommunications, (c) Fabasoft R&D Software GmbH & Co KG, 2003 oss@fabasoft.com. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

IBM Tivoli Netcool/Proviso Cisco IP Telephony 2.4.0.0 Technology Pack

3. Neither the names of Networks Associates Technology, Inc, Cambridge Broadband Ltd., Sparta, Inc., Cisco, Inc, Beijing University of Posts and Telecommunications, Fabasoft R&D Software GmbH & Co KG or any of its subsidiaries, brand or product names, nor the names of their contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDERS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

JDOM 1.0

Copyright (C) 2000-2004 Jason Hunter & Brett McLaughlin. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions, and the following disclaimer.

 2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions, and the disclaimer that follows these conditions in the documentation and/or other materials provided with the distribution.

3. The name "JDOM" must not be used to endorse or promote products derived from this software without prior written permission. For written permission, please contact <request_AT_jdom_DOT_org>.

 4. Products derived from this software may not be called "JDOM", nor may "JDOM" appear in their name, without prior written permission from the JDOM Project Management <request_AT_jdom_DOT_org>.

 In addition, we request (but do not require) that you include in the end-user documentation provided with the redistribution and/or in the software itself an acknowledgement equivalent to the following:

"This product includes software developed by the JDOM Project (http://www.jdom.org/)." Alternatively, the acknowledgment may be graphical using the logos available at http://www.jdom.org/images/logos.

THIS SOFTWARE IS PROVIDED ``AS IS'' AND ANY EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE JDOM AUTHORS OR THE PROJECT CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

This software consists of voluntary contributions made by many individuals on behalf of the JDOM Project and was originally created by Jason Hunter <jhunter_AT_jdom_DOT_org> and Brett McLaughlin <brett_AT_jdom_DOT_org>. For more information on the JDOM Project, please see <http://www.jdom.org/>.

Regex 1.1a

Copyright (C) 1996, 1999 Vassili Bykov. It is provided to the Smalltalk community in hope it will be useful.

1. This license applies to the package as a whole, as well as to any component of it. By performing any of the activities described below, you accept the terms of this agreement.

2. The software is provided free of charge, and ``as is'', in hope that it will be useful, with ABSOLUTELY NO WARRANTY. The entire risk and all responsibility for the use of the software is with you. Under no circumstances the author may be held responsible

for loss of data, loss of profit, or any other damage resulting directly or indirectly from the use of the software, even if the damage is caused by defects in the software.

3. You may use this software in any applications you build.

4. You may distribute this software provided that the software documentation and copyright notices are included and intact.

5. You may create and distribute modified versions of the software, such as ports to other Smalltalk dialects or derived work, provided that:

a. any modified version is expressly marked as such and is not misrepresented as the original software;

b. credit is given to the original software in the source code and documentation of the derived work;

c. the copyright notice at the top of this document accompanies copyright notices of any modified version.

Xwpick

Copyright © 1993, 1994 by Evgeni Chernyaev

Permission to use, copy, modify, and distribute this software and its documentation for non-commercial purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both the copyright notice and this permission notice appear in supporting documentation. Xwpick is used for printing utilities.

Sieve of Eratosthenes

Copyright Frank Pilhofer, fp@fpx.de

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

Neither the name of Frank Pilhofer nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

IBM®

Free Manuals Download Website

http://myh66.com

http://usermanuals.us

http://www.somanuals.com

http://www.4manuals.cc

http://www.manual-lib.com

http://www.404manual.com

http://www.luxmanual.com

http://aubethermostatmanual.com

Golf course search by state

http://golfingnear.com

Email search by domain

http://emailbydomain.com

Auto manuals search

http://auto.somanuals.com

TV manuals search

http://tv.somanuals.com