Managing Your Cisco Unified Communications

Stuart Parham
Session Objectives

▪ This is about:

An overview of the challenges in managing converged communications systems, covering both service fulfilment and assurance functions.

In-depth description of management applications that support Cisco Communication Managers (CCM)

In-depth description of management applications that support Cisco Communication instrumentation

▪ This is not about:

In-depth description of Converged Communication technologies and Converged Communication design

In-depth description of the Cisco IOS® technologies used for Converged Communication
Managing your Cisco Unified Communications

1. I have IPT. What do I need to manage?
2. What is this CUCMS all about?
3. And what does it really look like?
Managing your Cisco Unified Communications

Section 1: I have IPT. What do I need to manage

Stuart Parham
Managing your Cisco Unified Communications

1. I have IPT. What do I need to manage?
   - Is it really different to traditional telephony?
   - What do I have to look at?
   - Voice Quality
   - What management methodology should I follow?

2. What is this CUCMS all about?

3. And what does it really look like?
Managing Cisco Unified Communications

The broad range of Cisco Unified Communications products provides enormous flexibility.

What provides value in terms of flexibility makes the need for unified management more critical than ever before.
Traditional PBX Architecture

Classic PBX Functionality Breaks Down Into Four Categories

- **Call Processing**
- **Line Connections**
- **Switching**
- **Trunk Connections**

Traditional PBX vendors now provide IP line cards for PBX (Still Centralised Architecture)

PBX Phones

IP Phones

Tie Line

PSTN
Cisco Unified Communications System Architecture

Computer Telephony Interface (CTI)
Application Programming Interface (XML, JTAPI, SMDI)

Call Processing

Line Connections
Switching

Trunk Connections

IP Phones, Softphone Analogue Phones

Unity, IPCC
Communication Manager Server
Voice Ready Ethernet LAN Switch
Voice Enabled Router or Gateway

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The “Managed” Environment has changed

The Network is the PABX!
Voice and Data share the NW: QoS

With the migration to converged networks and unified communications, network administrators need to...

- **Ensure proper quality of service for different types of traffic**, each with different transport requirements, over IP packet-based network.

  - Voice and video traffic has low bandwidth requirements, but cannot tolerate delays, packet loss, and jitter.
  - Data traffic is bursty in nature and tolerant to delay and jitter.

- Ensure availability of unified communications applications and the readiness of the IP infrastructure to provide them to the end-users.

- Understand the IP communications functionalities and relationships of each device and link in the network.
Managing your Cisco Unified Communications

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2. What is this CUCMS all about?

3. And what does it really look like?
Telephony Management is a Century old Problem…

No dial-tone…
There is an echo on my call…
The other caller sounds like cra…. My phone don’t work!

I get dial-tone but I can’t dial…
I can’t get an outside line…
I didn’t change anything…
Finger Pointing Used To Be Easy…

Phones

Fixed
Wiring

PBX

External

Sp1

Sp2

Pstn

Craft Terminal
Conceptually, It Looks Simple!
Actually, it is a little bit more complex…
Managing your Cisco Unified Communications

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Signaling of a Voice Connection

Packet Delay >250ms

Packet Delay >100ms

Delay Jitter >30ms

Packet Delay >100ms

Codec | Packetization | Serialization

Uplink | Backbone | Downlink

Propagation
Switching / Queuing
„Store &Forward“
Hops
Bandwidth
Delay
Delay Jitter
Packet Loss

Processing
Speaker
Microphone
Echo
Codec
Delay

Input Queuing
Jitter Buffer
Codec

Processing
Speaker,
Microphone
Echo
Codec
Jitter Buffer
Delay
Packet Loss
ITU-T G. 107

- Weighted echo path loss (WEPL)
- Round-trip delay ($Tr$)
- Coding/Decoding
- Circuit noise ($N_c$) referred to 0 dB
- Equipment impairment factor ($I_e$)
- Packet-loss robustness factor ($B_{pl}$)
- Packet-loss probability ($P_{pl}$)
- Mean one-way delay ($T$)
- Absolute delay ($T_a$)
- Quantizing distortion ($q_{du}$)
- Expectation factor ($A$)
- Sidetone masking rating ($STM_R$)
- Listener sidetone rating ($LSTR$) ($LSTR = STM_R + Dr$)
- Talker echo loudness rating ($TEL_R$)
MOS Measuring Voice Quality

**Codec**

<table>
<thead>
<tr>
<th>Method</th>
<th>Codec</th>
<th>Kbits/Sec</th>
<th>MOS Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM</td>
<td>G.711</td>
<td>64</td>
<td>4.5</td>
</tr>
<tr>
<td>ADPCM</td>
<td>G.728/G.727</td>
<td>16/24/32</td>
<td>3.3 - 4.2</td>
</tr>
<tr>
<td>SB-ADPCM</td>
<td>G.722</td>
<td>48/56/64</td>
<td>4.5</td>
</tr>
<tr>
<td>CS-ACELP</td>
<td>G.729/G.729A</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>LD-CELP</td>
<td>G.728</td>
<td>16</td>
<td>4.0 - 4.1</td>
</tr>
<tr>
<td>MP-MLQ</td>
<td>G.723.A/G.723.1A</td>
<td>6.3/5.3</td>
<td>3.5 - 4.0</td>
</tr>
</tbody>
</table>

- Voice in Carrier Networks is > 4 = “Toll Quality“
- Mobile Voice < 4 = „Business Quality“
- MOS 3.6 = minimum Standard

MOS - Mean Opinion Score
CQE - Conversational Quality, Estimated
R-Factor What is it?

- The ITU E model, as defined in G.107 (03/2003), predicts the subjective quality that is experienced by an average listener by combining the impairment caused by transmission parameters (such as loss and delay) into a single rating, the transmission rating factor $R$ (the R Factor).

- This rating, expressed in a scale of 0 (worst) to 100 (best) can be used to predict subjective user reactions, such as the MOS.

- Specifically, the MOS can be obtained from the R Factor with a converting formula.

- Thus the R Rating is an estimate of the quality that can be expected if the network is realized the way it is planned.
The Calculation of the R Factor

Ro = Signal to Noise Ratio
Is = combination of impairments on the Voice Signal
Id = Impairment through Delay
le-eff = Impairment through Low Bit Rate Codec
A = Advantage of Access

\[ R = Ro - Is - Id - le-eff + A \]

- The result of this calculation is a Rating Factor
- The R Factor combines all relevant Parameters for a given connection
R-Factor

Objective MOS CQE | Subjective MOS

<table>
<thead>
<tr>
<th>R-Value</th>
<th>MOS</th>
<th>User Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>4 - 4.34</td>
<td>Very satisfied</td>
</tr>
<tr>
<td>80</td>
<td>4.03</td>
<td>Satisfied</td>
</tr>
<tr>
<td>70</td>
<td>3.6</td>
<td>Some users dissatisfied</td>
</tr>
<tr>
<td>60</td>
<td>3.1</td>
<td>Many users dissatisfied</td>
</tr>
<tr>
<td>50</td>
<td>2.58</td>
<td>Nearly all users dissatisfied</td>
</tr>
</tbody>
</table>
K-Factor

- K-factor (Klirrfaktor) is mean opinion score (MOS) estimator of the endpoint-type defined in ITU standard P.564.

- This standard relates to the testing and performance requirements of such a device. K-factor predates the standard. A P.564 compliant version will follow.

- K-factor is trained using thousands of speech samples and impairment scenarios, along with target P.862.1 MOS scores for each scenario.

- The trained K-Factor device in the IP Phone or Gateway can then ‘recognize’ the current impairment, and produce a running MOS score prediction.
K-Factor (cont.)

- R-factor is based on three dimensions: loss, delay, echo. K-factor and other P.564 MOS estimators measures of packet loss only, which is a network effect.

- They are packet loss metrics projected onto a psychological scale.

- In general, primary stats (packet loss, jitter, CR) will show visible degradation well before MOS starts to degrade.

- Hence MOS is a secondary symptom of network problems since it is at heart, a packet loss meter.

- Packet loss counts, jitter, concealment ratio, and concealment second counters are primary statistics, based on direct observation. MOS is a secondary statistic.

- Hence, use MOS as a flag, but then use primary stats to investigate/qualify the alarm. Use primary metrics in SLAs rather than MOS.
Managing your Cisco Unified Communications

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2. What is this CUCMS all about?

3. And what does it really look like?
Many perspectives of IPT management

Telecoms
- BHCA
- Trunk Utilization
- Call Accounting
- Voicemail
- Voice Quality (MOS)

Data Networking
- SNMP MIBs
- QoS
- Availability
- SLAs
- Security

Server Admin.
- CPU & Memory
- Disk Capacity
- OS Efficiency
- DoS Attacks

Application Mgmt
- Database schemas
- Interoperability
- APIs
- Viruses
What do we need to manage an Unified Communications network?

1. Easily CONFIGURE a converged network environment
2. Proactively MONITOR voice, video and data elements
3. Quickly TROUBLESHOOT detected faults

Performance Monitoring
Network Discovery & Inventory
Service Provisioning
Network Fault Isolation & Diagnostics
Start with the Basics

- Don’t forget – voice is a service running on a data network
- Start with good data networking management principles
  - Inventory & Software • Configurations • Change Logging • Message Logging • Availability Monitoring • Fault Monitoring • Performance Monitoring • Security
- Apply best practices to your management processes
  - Change Control • OPS Training • Procedure Documents • Daily Monitoring and Reporting
Q and A
Backup slides
How Cisco is computing the R-Factor

\[ R = Ro - Is - Id - Ie + A \]

- **Ro** - Maximum attainable quality given the transmission means from a basic signal to noise ratio.
  
  Typically, this value is around 95

- **Is** – Simultaneous impairment associated with quantization of the waveform.

- **Id** – Impairment as a result of transmission latency.
  
  We assume it to be zero

- **Ie** – Equipment impairment, comprising of initial encoding capability, and degradation due to lost samples.
  
  \[ Ie = leo + (95 - leo) \times le1 \]

- **A** – Advantage factor due to the listener’s tolerance of degradation of quality.
  
  We use a constant factor of 1.0 for A
CVTQ (K-Factor) -- MOS Estimation on VoIP Endpoint

- Cisco Voice Transmission Quality (CVTQ) is the Cisco Implementation on K-Factor
- Module resides in phone, observes actual (not predicted) frame loss pattern and generates MOS score based on training (loss pattern, codec selection, and frame size)

![Diagram of VoIP endpoint](image-url)
CVTQ predicts AVERAGE PESQ score for each network conditions

SOUNDS BAD

SOUNDS GOOD

PESQ (P.862.1) MOS score

0.5% packet loss
3.85 = kfactor MOS
Real vs. Predicted

G.711 ap. 1.PLC mean P.862.1 score vs. loss rate (uniform) RED: P.862.1 BLUE: kf prediction

PESQ-MOS Scale

20ms packet loss rate Percentage (Uniform distribution)
## CVTQ used Values (K-Factor)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Phone Display Name</th>
<th>User Interface Text and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLQKav</td>
<td>Avg MOS LQK</td>
<td>Average of individual k-factor MOS scores (8 second interval) generated since start of call.</td>
</tr>
<tr>
<td>CS</td>
<td>Conceal Seconds</td>
<td>Number of wall-clock seconds in call in which some (&gt;zero) packet loss concealment is observed. Audible impairment is possible. Call Duration = (OK seconds + Conceal Seconds)</td>
</tr>
<tr>
<td>SCS</td>
<td>Severely Concealed Seconds</td>
<td>Number of CS in which &gt;5% concealment (packet loss) is observed. Audible impairment is probable.</td>
</tr>
<tr>
<td>CCR</td>
<td>Cumulative Conceal Ratio</td>
<td>Ratio of cumulative concealment time to cumulative speech time observed since start of call. This is an ‘effective packet loss ratio’, much better than RTP packet loss definition.</td>
</tr>
</tbody>
</table>
CVTQ (K-Factor) Cisco Implementation

- CVTQ is supported from CallManager 4.2 or higher version
- Cisco 7940, 7960, 7941, 7961, 7970 and 7971 IP phone support CVTQ in SCCP mode (you must have new firmware, the firmware can be downloaded from CM 4.2 or 5.X)
- All other Cisco IP phones including 7985 do not support CVTQ
- All SIP based phones do not support CVTQ
- Sampling Rate is every 8 seconds
- Score will be sent at the end of the call by using Call Maintenance Records (CMR)
- The CMR record contains MOS, CS, SCS and CCR
K-Factor Cisco Implementation (Cont.)

- Service Monitor V2.0 shows a subset of K-factor (CVTQ) in CMR.
- MLQKav as MOS,
- CS as Concealment Seconds,
- SCS as Severely Concealed Seconds,
- CCR as Concealment Ratio in CVTQ report.
- SM also shows CMR Jitter and Packet Loss in CVTQ report.

- SM compares MLQKav with MOS threshold, if MLQKav from CMR lesser than MOS threshold, SM sends out trap.
Managing your Cisco Unified Communications:

Section 2: SMB Unified Communication Management (CMM/CMD and netManager)
Managing your Cisco Unified Communications

1. I have IPT. What do I need to manage?

2. What is this CUCMS all about?

   SMB Voice Management
   - Cisco Unified Provisioning Manager (CUPM)
   - Cisco Unified Operations Manager (CUOM)
   - Cisco Unified Service Monitor (CUSM)
   - Cisco Unified Service Statistics Manager (CUSSM)

3. And what does it really look like?
UC NMS positioning

Cisco netManager

UC Management Suite (CUCMS)
- Provisioning Manager
- Operations Manager
- Service Monitor
- Service Statistics Manager

Number of Devices vs. Number of Users/phones

Partner delivered management
Customer self management

Cisco Monitor Manager
Cisco Monitor Director
Managing your Cisco Small Sized Unified Communications

Cisco Monitor Manager & Cisco Monitor Director
Cisco Monitor Manager – Overview

- Purpose-built Voice and Data management application designed solely for the SMB market.
- Up to 75 devices and 250 IP Phones (Multi Vendor)
- Comprehensive real-time monitoring, alerting and reporting
  - Network-wide Inventory and Reporting
  - Cisco IP Telephony Monitoring
  - Cisco Device Performance Monitoring
  - Interface Traffic Monitoring
  - Real-time Alert Notifications via Emails and Pager Messages
  - Persistent Storage of Performance, Inventory and Alerts for Historical Reports
- Configuration Archive
- Built-in Troubleshooting Tools
- Network Discover including VPN Peers
Cisco Monitor Manager – Dual Deployment Scenarios

- **Self Managed** - Cisco Monitor Manager is a stand-alone application that can be used by Small and Medium Businesses in order to self-manage their corporate and remote offices.

- **Cisco Partner Managed** - Cisco Monitor Manager is also a key component of the VAR Managed Service Provider Solution providing distributed intelligence and comprehensive alerts and reports to the Cisco Monitor Director that resides at the partner’s location.
Sub 250 SMB Users - Self Managed
Small Business ISR-based IP Telephony Deployment
CMD – “Smart Alerts”

- Alert Details contains:
  - Client Info
  - Device Info
  - Severity
  - Message
  - Alert data and time
  - Topology
  - Perf. Graphs
  - Alert History

- Acknowledge Alert
  - Change the alert status and click.
Cisco Monitor Director Partner Console

SMB Managed Customers

Related Alerts

Alert Dependent Information
Cisco Monitor Director – Key Feature & Benefits

- Centralized network management tool for Cisco Partners planning to offer managed services to their SMB end user customers.
- Central dashboard
- SMB network topology visibility to the Cisco Monitor Director for comprehensive network view
- Cisco IP Telephony Monitoring
- Secure, and reliable communication between Partner & SMB customers
- Receives network status, alerts and reports from Cisco Monitor Manager systems installed at the SMB customer’s location.
- Real time alerts and notifications through Email and Pager with alert filtering capability
- Integration with trouble ticketing applications.
- Scheduled HTML-based monthly reports
Cisco VAR Managed Services – Monthly Report

1. Deploy
2. Monitor
3. Alert
4. Notify
5. View Details
6. Report
7. Setup VPN, Connect and Fix
8. Monthly Reports (Email)

SSL
# Cisco IP Telephony Monitoring

| Cisco Unified Communications Manager Express | • Infrastructure Monitoring - Status  
• Phone Registration  
• Key Phones Status  
• Active Calls |
|---|---|
| Cisco Unity Express | • Mailbox Usage Monitoring  
• Voice Mail Memory Monitoring  
• Voice Mail Recording Time Monitoring  
• Operational Status Monitoring |
| Cisco IP Phones | • Registration / Connectivity Status  
• IP Phone Information such as Phone Number, Username and Phone Model  
• Physical connectivity of Cisco IP Phones Monitoring |
| Cisco Voice Gateway | • Trunk Utilization Report  
• Voice Port Status Monitoring |
| Digital Signal Processor (DSP) | • Operational Status Monitoring |
| Threshold Alerts | • Cisco IP Phone Registration Threshold Alerts  
• Cisco Key IP Phones Registration Threshold Alerts  
• Voice Mail Capacity Threshold Alerts  
• Cisco Unity Express Session Utilization Threshold Alerts  
• Orphaned Mailbox Threshold Alerts  
• Trunk Utilization Threshold Alerts |
## Cisco SMB Class Device Support

<table>
<thead>
<tr>
<th>Device Family</th>
<th>Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cisco Aironet Access Points</strong></td>
<td>Cisco Aironet 1100, AP521 and 1200 Series</td>
</tr>
<tr>
<td><strong>Cisco Airespace Access Points</strong></td>
<td>Cisco Airespace 2006, 4112, 4124, 4136, and 4402 Wireless LAN Controllers, WLC521 and AP521. Airespace 1010, 1020, and 1030 Series</td>
</tr>
<tr>
<td><strong>Cisco Routers</strong></td>
<td>Cisco 830/850/870, Cisco 1700/1800/1841, Cisco 2600/2800, Cisco 3600/3700/3800, Cisco Unified Communications 500 Series for Small Business</td>
</tr>
<tr>
<td></td>
<td>Cisco SBS 101/106/107/200</td>
</tr>
<tr>
<td><strong>Cisco Catalyst Switches</strong></td>
<td>Cisco Catalyst 2900XL, 2940, 2950, 2955, 2970, 3550, 3500XL, 3560, and 3750 Series, and Catalyst Express 500 Series</td>
</tr>
<tr>
<td><strong>Cisco ASA and Cisco PIX Security Appliances</strong></td>
<td>Cisco ASA 5505 and 5510, Cisco PIX 501, 506, 506E, 515, and 515E</td>
</tr>
<tr>
<td><strong>Cisco Unified Communications Express</strong></td>
<td>Cisco Unified Communications Manager Express</td>
</tr>
<tr>
<td></td>
<td>Cisco Unity® Express</td>
</tr>
<tr>
<td><strong>Cisco Unified IP phones</strong></td>
<td>Cisco IP Phones 7900 Series</td>
</tr>
</tbody>
</table>
Managing your Cisco Medium Sized Unified Communications

Cisco netManager Unified Communications
What is Cisco netManager?

- Simple, easy to use, proactive monitoring and troubleshooting application for commercial mid-market networks – addressing mid-market concerns
- Real-time operational and performance monitoring for a converged network, including coverage for Cisco Unified Communications elements
- Support for broad range of Cisco platforms (routers, switches, PIX firewalls, IDS, ASA and Wireless Access Points)
- Easy visualization of network status through topology and service-level views (SLV)
- Increases productivity and speeds troubleshooting by providing contextual diagnostic tools and easy one-click access to devices
- Single monitoring interface for both Cisco and non-Cisco elements of the network/application infrastructure.
- Powerful reports providing the ability to view historical trends
- Can be licensed as:
  - Cisco netManager - IP Infrastructure
  - Cisco netManager - Unified Communications (Unified Communications is inclusive of IP Infrastructure)
  - Licensed based on time (subscription/permanent), feature (Data/UC) and scale (50/100 device and AP’s, 250/500/1000 phones)
Cisco netManager - IP Infrastructure
Manage your network proactively and efficiently

**Discovery & Visualization**
- Discover the network and collect detailed device inventory
- Support for broad range of Cisco devices (routers, switches, PIX firewalls, IDS, ASA and Access Points)
- Get visibility into servers, workstations, printers and network devices
- Visualize the network using physical and service level* view

**Monitoring**
- Monitor network status using a customizable dashboard
- Get real-time visibility into key performance metrics such as CPU, interface, and response time for network devices
- Flexible monitoring, users select monitoring parameters

**Alerting and troubleshooting**
- Proactive and reactive alerts sent via: email, SMS, SNMP Traps, windows pop-ups, launching programs, etc
- Rapid troubleshooting using contextual diagnostics (ping, traceroute, DNS lookup)

**Analyze network trends**
- Extensive, out of the box pre-configured reports, including various top 10 reports
- Analyze short-term and long-term historical network trends
- Easily extend reports to meet specific network needs
Cisco netManager – Unified Communications

- Support for all the layers of Cisco Unified Communications System
- Supports 100 device with 1000 phones/users over 10 locations
- Auto discovery of detailed inventory and capability
- Actionable service level view of UC deployment. Cluster views, gateway and application operational status
- Phone and device inventory reports: phone status, phone search
  - SCCP and SIP Phones
  - Phone status change reports
- Contextual performance monitoring, alerting, reporting and trending
- Support for broad range of Cisco platforms
- Multi-vendor support
Service Level View

- Real-time visualization of operational status of UC deployment
- UC Service dependency status, context sensitive drill down diagnostics
- Phone search and phone status. Most recent operational events
- Context sensitive device/service status, performance monitoring and trending
CNM-UC Service Level View

Device status

Recent events

Phone search
Service Level View

- Phone Search – Enables quick phone search, highlighting association of phone with cluster
Network Level Views

- Actionable, real-time network level view with physical connectivity and link up/down status
- Current operational status of devices
- Context sensitive drill down details and diagnostic tools
- Device search, event summary and scroll window for latest event details
Cisco netManager Device & Alert Status

- Real-time device operational status, alert status
- High level inventory information
- User may organize based on static or dynamic groups
Detailed Device Status – Communications Manager
Device Details – Voice Gateway
Cisco netManager Reports Overview

- **netManager reports** provide users a historical trend on a large number of network variables
- A large number of pre-configured reports are provided
- Reports fall into various categories: performance based reports, device reports, etc
Cisco netManager Top 10 reports

CPU Utilization

<table>
<thead>
<tr>
<th>Device</th>
<th>CPU</th>
<th>CPU Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>nmtg-sj-comm-prl.cisco.com</td>
<td>Processor</td>
<td>99%</td>
</tr>
<tr>
<td>192.168.140.98</td>
<td>Processor</td>
<td>8%</td>
</tr>
<tr>
<td>192.168.140.82</td>
<td>Processor</td>
<td>5%</td>
</tr>
<tr>
<td>192.168.137.89</td>
<td>Processor</td>
<td>4%</td>
</tr>
<tr>
<td>nmtg-acm-mg13.cisco.com</td>
<td>Processor</td>
<td>4%</td>
</tr>
<tr>
<td>192.168.140.83</td>
<td>Processor</td>
<td>3%</td>
</tr>
<tr>
<td>172.20.4.145</td>
<td>Processor</td>
<td>2%</td>
</tr>
<tr>
<td>192.168.140.84</td>
<td>Processor</td>
<td>1%</td>
</tr>
<tr>
<td>nmtg-sj-comm-sec.cisco.com</td>
<td>Processor</td>
<td>2%</td>
</tr>
<tr>
<td>192.168.137.86</td>
<td>Processor</td>
<td>0%</td>
</tr>
</tbody>
</table>

Disk Utilization

<table>
<thead>
<tr>
<th>Device</th>
<th>Disk</th>
<th>Percent Full</th>
</tr>
</thead>
<tbody>
<tr>
<td>nmtg-sj-comm-prl.cisco.com</td>
<td>C:\Label.W2K Serial Number 70be6</td>
<td>32.5%</td>
</tr>
<tr>
<td>nmtg-sj-comm-sec.cisco.com</td>
<td>C:\Label.W2K Serial Number 70be6</td>
<td>21.7%</td>
</tr>
<tr>
<td>192.168.140.98</td>
<td>C:\Label.W2K Serial Number 50634</td>
<td>10%</td>
</tr>
<tr>
<td>192.168.137.89</td>
<td>D:\Label.STI_DATA Serial Number 7</td>
<td>0.6%</td>
</tr>
<tr>
<td>192.168.140.84</td>
<td>D:\Label.STI_DATA Serial Number 4</td>
<td>0.6%</td>
</tr>
<tr>
<td>172.20.4.145</td>
<td>D:\Label.STI_DATA Serial Number 1</td>
<td>0%</td>
</tr>
</tbody>
</table>

Memory Utilization

<table>
<thead>
<tr>
<th>Device</th>
<th>Memory</th>
<th>Percent Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>nmtg-sj-comm-sec.cisco.com</td>
<td>Physical RAM</td>
<td>85.9%</td>
</tr>
<tr>
<td>nmtg-sj-comm-prl.cisco.com</td>
<td>Physical RAM</td>
<td>83.4%</td>
</tr>
<tr>
<td>192.168.140.98</td>
<td>VO</td>
<td>81%</td>
</tr>
<tr>
<td>192.168.140.82</td>
<td>VO</td>
<td>77.9%</td>
</tr>
<tr>
<td>nmtg-acm-mg13.cisco.com</td>
<td>VO</td>
<td>78.0%</td>
</tr>
<tr>
<td>192.168.137.89</td>
<td>VO</td>
<td>86.1%</td>
</tr>
<tr>
<td>172.20.4.145</td>
<td>VO</td>
<td>63.7%</td>
</tr>
<tr>
<td>nmtg-sj-comm-prl.cisco.com</td>
<td>Virtual Memory</td>
<td>39.3%</td>
</tr>
<tr>
<td>192.168.140.105</td>
<td>VO</td>
<td>36.4%</td>
</tr>
<tr>
<td>172.20.4.145</td>
<td>Processor</td>
<td>35%</td>
</tr>
</tbody>
</table>

Interface Utilization

No interface performance monitor records.

Interface Traffic

No interface performance monitor records.

Ping Response Time

No ping performance monitor records.
Event History Reports

- Network level Event history report
- Device and Group level reports
- Reports based on problem areas
- Time filtering on reports
- User customizable portlet based reports (work views)
Phone Reports

- Phone reports contain information on User, IP, MAC, CM/CME details, Switch/port details etc.

- Different Types of reports
  - IP Phone Inventory reports
  - IP Phone status change reports
# netManager - Server and OS Requirements

<table>
<thead>
<tr>
<th>Requirement Type</th>
<th>Minimum Requirements</th>
</tr>
</thead>
</table>
| System Hardware        | • Any PC or server platform with a Intel or AMD processor equal to or greater than 2.0 GHz.  
                          | • Color monitor.  
                          | • CD-ROM drive.                                                                                                                                                                                                       |
| Memory (RAM)           | 1GB                                                                                                                                                                                                                  |
| Swap File Space        | 1.5 GB                                                                                                                                                                                                                |
| Available Drive Space  | • 30 GB hard disk space.  
                          | • NTFS file system (required for secure operation).  
                          | • At least 16 MB in Windows temporary directory (%TEMP%).                                                                                                                                                             |
| System Software        | • ODBC Driver Manager 4 3.5.10 or later  
                          | • Windows Server 2003 with Service Pack 1 and Service Pack 2, Standard and Enterprise Editions                                                                                                                      |
netManager – How is it licensed?

Licensing based on

- **Feature**: Cisco netManager – IP or Cisco netManager - UC

- **Scale**:
  - Device and AP based for netManager – IP (50 device/AP or 100 device/AP)
  - Phone based for netManager – UC (250 phones or 500 phones) – possible to stack UC license up to 1000 phones

- **Time**: 1 year subscription (Annual right-to-use (RTU)) or Perpetual RTU

- Upgrade from Cisco netManager - IP to Cisco netManager - UC supported

- No upgrades possible with 1 year time limited licenses
Cisco netManager Summary

- Affordable, easy to use tool for monitoring mid-size networks
- Increased network visibility provides revenue opportunity for Cisco hardware/services
- Enables customers to optimize their network and introduce new services
- Product capabilities allow for insertion in every opportunity
- Increased revenue as customer grows – tool allows customer to grow and ensures investment protection
- VIP program provides additional incentives
BACKUP
Section 2: What is this Cisco UC Management Suite (CUCMS) all about

Fred Manicom
Managing your Cisco Unified Communications

1. I have IPT. What do I need to manage?

2. What is this CUCMS all about?

   SMB Voice Management
   - Cisco Unified Provisioning Manager (CUPM)
   - Cisco Unified Operations Manager (CUOM)
   - Cisco Unified Service Monitor (CUSM)
   - Cisco Unified Service Statistics Manager (CUSSM)

3. And what does it really look like?
### Product mappings

<table>
<thead>
<tr>
<th>Plan and Design</th>
<th>Implement</th>
<th>Operate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT - RAM</td>
<td><strong>Provisioning</strong></td>
<td><strong>Service Statistics Manager</strong></td>
</tr>
<tr>
<td>Assessed/prepare network for TelePresence</td>
<td>- Voice infrastructure provisioning</td>
<td>- Executive &amp; Operations reports</td>
</tr>
<tr>
<td>- Network assessment prior to the deployment or service expansion of TelePresence solution</td>
<td>- Dial plans &amp; partitioning</td>
<td>- Capacity planning reports</td>
</tr>
<tr>
<td></td>
<td>- Batch provisioning</td>
<td><strong>Service Monitor</strong></td>
</tr>
<tr>
<td></td>
<td><strong>CiscoWorks Voice Manager</strong></td>
<td>- Voice quality using sensors and phones</td>
</tr>
<tr>
<td></td>
<td>- GW/GK Configuration</td>
<td>- Reporting &amp; SLAs</td>
</tr>
<tr>
<td></td>
<td>- Voice port configuration</td>
<td>- Telepresence support</td>
</tr>
<tr>
<td></td>
<td>- GW/GK dial plans</td>
<td><strong>Operations Manager</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Service-level views</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Proactive testing including SCCP &amp; SIP phones</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Track inventory, changes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Video endpoint support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Phone-Phone testing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Telepresence support</td>
</tr>
</tbody>
</table>

---

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Cisco Unified Communications Management Suite
Functional architecture

Service Statistics Manager

Service Monitor

Operations Manager

Provisioning Manager
## Managing your Cisco Unified Communications

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>I have IPT. What do I need to manage?</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>What is this CUCMS all about?</td>
</tr>
<tr>
<td></td>
<td>SMB Voice Management</td>
</tr>
<tr>
<td></td>
<td>Cisco Unified Provisioning Manager (CUPM)</td>
</tr>
<tr>
<td></td>
<td>Cisco Unified Operations Manager (CUOM)</td>
</tr>
<tr>
<td></td>
<td>Cisco Unified Service Monitor (CUSM)</td>
</tr>
<tr>
<td></td>
<td>Cisco Unified Service Statistics Manager (CUSSM)</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>And what does it really look like?</td>
</tr>
</tbody>
</table>
# Cisco Unified Communications Enterprise Management Suite

## Product mappings

<table>
<thead>
<tr>
<th>Plan and Design</th>
<th>Implement</th>
<th>Operate</th>
</tr>
</thead>
</table>
| Assess/prepare network for IP Communications  
  • Hardware/software compliance  
  • Predict overall call quality  
  • Best practice analysis | Deploy and provision  
  • Voice infrastructure provisioning  
  • Dial plans & partitioning  
  • Batch provisioning | Manage moves, adds, changes  
  • Endpoint devices  
  • Users, services  
  • Phones, lines, voicemail, … |

### CiscoWorks Voice Manager

- GW/GK Configuration  
  • Voice port configuration  
  • GW/GK dial plans

### Provisioning Manager

### Service Statistics Manager

- Executive & Operations reports  
- Capacity planning reports

### Service Monitor

- Track and report on user experience  
  • Voice quality using sensors and phones  
  • Reporting & SLAs  
  • Telepresence support

### Operations Manager

- Monitor and diagnose problems  
  • Service-level views  
  • Proactive testing including SCCP & SIP phones  
  • Track inventory, changes  
  • Video endpoint support  
  • Phone-Phone testing  
  • Telepresence support
Provisioning Manager

- **Single view** of a subscriber and their services
- **Simplified** management of subscribers, services, and Cisco Unified resources
  - Day 1 – *template* deployments
  - Day 2 – *delegate* MACDs
- Single provisioning interface to Cisco Unified systems
  - **Policy-based**, business oriented
  - With the speed and accuracy of *automation*
  - Manage multiple CCM Cluster, CCME, Unity, Unity Express, and Unity Connection systems from one Provisioning Manager
Cisco Unified Provisioning Manager

Request for Service

Service Active

Provisioning
• Unified: ONE interface
• Simplified: business-process & user-oriented
• Rapid: <1 minute for activation
• Accurate: Reduce manual & duplicate entry errors
• User-friendly: template-based interface & business abstraction

Automated Activation

Cisco Unified CallManager clusters

Cisco Unified CallManager Express
Cisco Unity Express

Cisco Unity voicemail systems

Prior to CUPM – Manual System Provisioning

• Automated Activation
Day 1 Services – Infrastructure Configuration

- **Policy and Service Definitions**
  Create policies, policy based service offerings and subscriber types

- **Template** based Infrastructure provisioning
  Push Dial-Plan components and other ‘common’ constructs to end systems

- **Batch** processing of total ‘services’ for subscribers
  Bulk create initial subscribers and provision their services
CUPM Multi-Dimensional Policy

- **Domains**
  Defines groupings of subscribers for delegation purposes

- **Service Areas**
  Defines how to map to the devices and applications in the voice network

- **Subscriber Types**
  Defines policy related to type of Subscribers in the organization
CUPM Concepts
Domains and Service Areas

Domains allow you to sub-divide a shared environment creating separate secure locally administrated partitions that contain Service Areas which determine the dial plans and other voice related configuration settings available for subscriber types in the domain.
Managed Voice Domains

CU PM Concepts

Administrators

Domains

Service Areas

Call and Message Processors

Global View

France

- Paris HQ
- Nice

Germany

- Munich
- Frankfurt
- Bonn

North America

- New York
- Toronto

Unity

CM

Unity Express

Unity Express

CM Express

CM Express

Unity Express
Provisioning Attributes are configuration settings that are applied to a product during activation.

Provisioning Attributes can be assigned at different levels.

Attributes at a higher precedence level override those at a lower precedence level.

You can override any set policy by using the Provisioning Attributes settings in the Advance Order Options on the Order Entry page (Highest Precedence).

Order Entry
Advanced Order Options

Service Area
"ParisLocal"

Subscriber Type
"Executive"
Attribute VideoEnabled=True

Domain
"France"
Attribute VideoEnabled=False
PM Concepts

Business Rules

Provisioning Manager contains a pre-defined set of Business Rules that control:

- Processing of orders
- Behavior of synchronization process
- Default values for various objects

Control steps of the ordering workflow

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IsAuthorizationRequiredForAddOrder</td>
<td>False</td>
</tr>
<tr>
<td>PhoneAssignmentDoneBy</td>
<td>Assignment</td>
</tr>
<tr>
<td>PhoneShippingDoneBy</td>
<td>Shipping</td>
</tr>
<tr>
<td>PhoneReceiptDoneBy</td>
<td>OrderOwner</td>
</tr>
</tbody>
</table>

Rules can be set per Domain or in a global template assigned to all new Domains
CUPM Scenario: Deployment Setup
CUPM Deployment Setup

Setup Devices
  Add Call and Message Processors
  Infrastructure Sync
  Subscriber Sync
Setup Deployment
  Create Domain
  Create Service Areas
  Domain Sync
  Provision Network
User Administration
Setup Devices

1. Add the Paris HQ Publisher CCM to PM
2. Synchronize CCM constructs and subscribers into PM database
Setup Devices
Add Call Processors

Note: Steps for adding a Message Processor are basically the same
Setup Devices
Add Call Processors (Cont.)

Configure existing Call Processor

Alternate launch: Infrastructure Configuration > Setup Devices > Call Processors

Enter details about CallManager or CallManager Express

Note: Original dialog expands based on Type and Version selected

Configure a New Call Processor

Enter the following information:
- Name:
- Type:
- IP Address:
- Version:
- Device Protocol:
- User Name:
- Password:

Save | Cancel
Setup Devices
Infrastructure Sync

Screen displayed after New Call Processor Save or by selecting Infrastructure Configuration > Setup Devices > Call Processors > View Call Processor and selecting the Call Processor to view from the displayed list.

PM Inventory

CallManager

Discovers all objects in CCM that PM uses and are not specific to individual subscribers. For example:
- Calling Search Space
- Voice Device Groups
- Route Patterns
- Translation Patterns
Discovers all objects in CCM related to individual subscribers. For example:
- Configured Phones
- Configured Lines
- Device Profiles
Setup Deployment

1. Create new Domain

2. Create and configure Service Area for Lobby Phones

3. Create additional Service Areas as needed

4. Synchronize Domain with existing CCM subscribers
Setup Deployment
Create Domain

Displays list of existing Domains

Option:
- New Domain
- View Domain

Enter the following information:
- Domain ID: France
- Description: Admin control for ParisHQ and Nice subscribers

Note: After you click Save, please wait until the screen refreshes to display the new Domain. Please be patient as this operation might take some time to complete.
Setup Deployment
Configure Service Areas

Create Service Area result dialog

Assign a block of directory numbers

Service Area Configuration
Add New Directory Number Block

Enter the following information:
- Prefix: 2
- First Number: 1
- Last Number: 100
- Minimum Length: 4

Assign a Call Processor

Select Dial Plan (pulled from CCM during infrastructure sync)

What type of subscribers can be assigned to this Service Area

Assign a Call Processor

Create Service Area result dialog

Select Dial Plan (pulled from CCM during infrastructure sync)

What type of subscribers can be assigned to this Service Area

Assign a block of directory numbers

Service Area Configuration
Add New Directory Number Block

Enter the following information:
- Prefix: 2
- First Number: 1
- Last Number: 100
- Minimum Length: 4

Assign a Call Processor

Select Dial Plan (pulled from CCM during infrastructure sync)

What type of subscribers can be assigned to this Service Area

Assign a block of directory numbers
Setup Deployment
Domain Sync

Put existing subscribers discovered during Call Processor Subscriber Sync into the Domain and appropriate Service Area

Domain Sync behavior is controlled by the following business rules:
- AssociateAllUsersInCallProcessor
- AssociateUserByDeptCode

Details filled in on completion
Provision Network
Configuration Templates Overview

Configuration Templates provide the ability to create or extend CallManagers, CallManager Express, and Unity Express configurations in a consistent reusable manner.

Configuration templates allow replaceable keywords for consistency across devices.

CallManager configuration templates provide a list of configurable items and include configuration boxes for all necessary attributes.

CallManager Express and Unity Express configuration templates are created by adding the appropriate IOS commands.

CallManager Group
Call Park
Call Pickup Group
Call Search Space
H323 Gateway
Hunt List
Hunt Pilot
Line Group
Location
Media Resource Group
Media Resource List
Route Group
Route List
Route Partition
Route Pattern
Translation Pattern
Voice Device Group
Voicemail Pilot
Voicemail Profile
Voice Region
Provision Network
Create Template

Only users with the global user role ‘Administration’ can use Configuration Templates
Provision Network
Create Template – Add Items

1. Select a configuration item type or embed another template
2. Complete the required field information
3. Repeat steps 1 & 2 for each configuration item type required

Template Configuration
Add a Configuration Template Item

Configuration Template: Site_RP_CSS
Add: 
Device Type: CallManager
Item Type: Route Partition
Name: *${SITE}_Local
Description: *${SITE}_Local

Notes: The ${KEYWORD} construct allows you to create generic templates. The keyword is defined during configuration.
Use the ‘Existing Configuration Template’ to embed templates configuring other constructs.
Provision Network
Create Template – Generate Configuration

This selection area is used as filters to select the Call Processor that will be configured.

Select Domain. This will then populate Device pull-down with only the CCMs defined in the selected Domain.

Note: Selecting a SA will auto-populate the Device field since only one processor can be associated with a SA.

Select Keyword list to use for substitution.

Once processor is selected, PM will analyze the items to ensure they are supported by the version of CCM.
Provision Network
Push Template

Choose to run now or at a scheduled time

Notice the keyword substitution
Batch Provisioning
Overview

The **Batch Provisioning** feature allows you to create subscribers and provision their services automatically
- Enables easy roll outs of new offices
- Simplifies the transition off of legacy systems

Done via a **Batch Action Files** consisting of attributes used to provision a service and a corresponding value
- **Required Attributes:**
  - Order Type (Add, Change, Cancel)
  - UserID (Subscriber)
  - Product Name (orderable product or bundle)
  - Service Area
- **Additional required attributes if creating the subscriber:**
  - First Name
  - Last Name
  - Optional (Domain, Phone Number, Email, Department)

Provisioning Manager provides sample files that contain most of the commonly-used actions. The sample files are located in the `<install dir>/sep/ipt/config/sample/batchProvisioning` folder.
Batch Provisioning
Create Batch Action File

Add and provision a group of subscribers

To create a batch action file you create a spreadsheet of users, phones, and lines and then convert it to a tab-delimited text file.

File should be saved to client PC and not PM server.

<table>
<thead>
<tr>
<th>OrderType</th>
<th>UserID</th>
<th>FirstName</th>
<th>LastName</th>
<th>Domain</th>
<th>ProductName</th>
<th>Phone Type</th>
<th>ServiceArea</th>
<th>MAC Address</th>
<th>Enable Extension Mobility</th>
<th>Line Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>add</td>
<td>marcel</td>
<td>Marcel</td>
<td>Dionne</td>
<td>France</td>
<td>Phone Service</td>
<td>Cisco 7960</td>
<td>NiceEmployee</td>
<td>00059a3b8a01</td>
<td>yes</td>
<td>Auto-Assigned Line</td>
</tr>
<tr>
<td>add</td>
<td>patrick</td>
<td>Patrick</td>
<td>Roy</td>
<td>France</td>
<td>Phone Service</td>
<td>Cisco 7960</td>
<td>NiceEmployee</td>
<td>00059a3b8a02</td>
<td>yes</td>
<td>Auto-Assigned Line</td>
</tr>
<tr>
<td>add</td>
<td>luc</td>
<td>Luc</td>
<td>Robtaille</td>
<td>France</td>
<td>Phone Service</td>
<td>Cisco 7961</td>
<td>NiceEmployee</td>
<td>00059a3b8a03</td>
<td>yes</td>
<td>Auto-Assigned Line</td>
</tr>
<tr>
<td>add</td>
<td>steve</td>
<td>Steve</td>
<td>Duchene</td>
<td>France</td>
<td>Phone Service</td>
<td>Cisco 7962</td>
<td>NiceEmployee</td>
<td>00059a3b8a04</td>
<td>yes</td>
<td>Auto-Assigned Line</td>
</tr>
</tbody>
</table>

The action file must contain a single row of column headers:

- The data columns can be in any order.
- Any number of non required attributes can be included.
- Batch Examples can be found in the following directory:
  <Installation Directory>/sep/ipt/config/sample/batchProvisioning folder.
Batch Provisioning
Create Batch Project

User must have the Global Administration user role

Upload and run or Batch Action File
Batch Provisioning
Upload Batch Action File

**Batch Provisioning**
Configure a Batch Project

- Project 'NiceSubscribers' successfully created.
  - Project Name: NiceSubscribers
  - Project Notes: [admin Mon Jan 29 16:31:15 PST 2007]
  - Add the Nice office employees
  - Created On: 01/29/2007 16:31:15 -0800 by padmin

**Project Schedule**
- Schedule Start: (not set)
- Status: Not Scheduled

**Batch Project Actions**
1. **Upload a Batch Action File**

   - Action
   - Status
   - Order Type
   - User ID
   - Product
   - Service Area
   - Details

   There are no batch actions to list.

**Batch Provisioning Configuration**
Upload a Batch Action File

- File to Upload: C:\My Documents\Cisco_06\AddPhoneServiceNice.txt
- Browse...

**Steps**
1. Upload a Batch Action File
2. Next Page

**Notes**
- File should be on Client PC
Batch Provisioning
Execute Batch Project

Choose to run now or at a scheduled time

Details

Batch Provisioning
Configure a Batch Project

Project Name: NiceSubscribers
Project Notes: [admin Mon Jan 29 16:31:15 PST 2007]
Add the Nice office employees

Created On: 01/29/2007 16:31:15 -0800 by padmin

Project Schedule
Schedule Start: (not set)
Project Start Date/Time: 
Status: Not Scheduled

Batch Project Actions
Upload a Batch Action File
✓ File Upload Completed
File AddPhoneServiceNice.txt uploaded successfully on 01/29/2007 16:34:42 PST

<table>
<thead>
<tr>
<th>Action</th>
<th>Status</th>
<th>Order Type</th>
<th>User ID</th>
<th>Product</th>
<th>Service Area</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not Started</td>
<td>add</td>
<td>marcel</td>
<td>Phone Service</td>
<td>NiceEmployee</td>
<td>View</td>
</tr>
<tr>
<td>2</td>
<td>Not Started</td>
<td>add</td>
<td>roy</td>
<td>Phone Service</td>
<td>NiceEmployee</td>
<td>View</td>
</tr>
<tr>
<td>3</td>
<td>Not Started</td>
<td>add</td>
<td>lucr</td>
<td>Phone Service</td>
<td>NiceEmployer</td>
<td>View</td>
</tr>
<tr>
<td>4</td>
<td>Not Started</td>
<td>add</td>
<td>steved</td>
<td>Phone Service</td>
<td>NiceEmployer</td>
<td>View</td>
</tr>
</tbody>
</table>

Exit
A **CUPM User** is personnel with authorization to perform various tasks in Provisioning Manager

Task authorization is based on assigned user roles

User Types:

**Global**
- Complete authorization to perform all tasks in PM
- PM Admin (created at install) has global administrative rights

**Domain Specific**
- Authorization limited to tasks within a specific domain
- Individual user roles are related to either policy or workflow tasks
- Can be assigned more than one user role

Users can also order services; thus, user can also becomes a subscriber (discussed shortly)
CUPM Concepts

User Roles

<table>
<thead>
<tr>
<th>User Type</th>
<th>User Roles</th>
<th>Rights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>Administration</td>
<td>Full rights</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>Configure system cleanup activities</td>
</tr>
<tr>
<td>Domain Specific</td>
<td>Policy</td>
<td>Manage phone inventory, create new subscriber types, and set phone button templates</td>
</tr>
<tr>
<td></td>
<td>Ordering</td>
<td>Subscriber management and product ordering</td>
</tr>
<tr>
<td></td>
<td>Advance Ordering</td>
<td>All Ordering privileges plus can set provisioning attributes at time of order</td>
</tr>
<tr>
<td></td>
<td>Advance Assignment</td>
<td>All Ordering privileges plus can assign MAC at time of order</td>
</tr>
<tr>
<td></td>
<td>Approval</td>
<td>Approves or rejects provisioning requests</td>
</tr>
<tr>
<td></td>
<td>Assignment</td>
<td>Assigns phone (MAC address) to an order</td>
</tr>
<tr>
<td></td>
<td>Shipping</td>
<td>Ensures equipment sent before order processing continues</td>
</tr>
<tr>
<td></td>
<td>Receiving</td>
<td>Ensures equipment received before order processing continues</td>
</tr>
</tbody>
</table>

- User Roles determines level of access within Provisioning Manager
- Some domain specific roles are only applicable if workflow is enabled
A **Subscriber** is an entity which uses IP telephony services provided by the underlying voice applications.

Subscriber Type defines the products that can be provisioned for subscribers of this type.

**Default Subscriber Types:**

- Employee
- Contractor
- Manager
- Senior Manager
- Executive
- Operator

Default Subscriber Role Types can be modified in a global template or a per domain basis.

Default Domain Subscriber Role Types take on values of global template subscriber types at time of domain creation only.

If Provisioning Manager **Self-Care mode** is enabled, a subscriber can order services for themselves; thus, a Subscriber can also become a User.
CUPM Scenario: Managing MACD
Workflow coordinates activities of the ordering process (approve, phone assignment, shipping, and receiving)

Individual activities can be enabled or disabled and assigned to different User Roles resulting in many possible workflow arrangements on a per domain basis.
Create Subscriber

Cisco Unified Provisioning Manager

1. Provisioning Dashboard

2. Add Subscriber
   - View Subscribers
   - View Services
   - Search Subscribers

3. Manage Subscriber
   - Create Subscriber or Select Subscriber to Update
     - Subscriber ID: MainLobby
     - First Name: Main
     - Last Name: Lobby
     - Contact Phone Number: x65999
     - Contact Email: facilities@chambers.com
     - Department: Facilities

4. Assigned Employee
   - Available
   - Assigned
     - Contractor
     - Executive
     - Manager
     - Operator
     - Senior Manager

- Click 'Create' to save changes.
Order Services
Phone and Line

<table>
<thead>
<tr>
<th>Product Catalog: Category “Telephony and Messaging”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Phone Service</strong></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Listing depends on the products associated with the subscriber type and devices in Domain
(Example listing for another subscriber type)

Order Entry
Ordered Product List

| You are Ordering: Phone Service |
| Provides a standard set of voice services |

This product contains the following:
- A single extension number
- A single IP handset
Order Services
Phone and Line

No selections in this step of the wizard based on subscriber type products settings.

Phones available depends on products specified for subscriber type. After selecting one, phone picture is displayed.

Phone assignment available here if user has Ordering – Advanced Assignment user role assigned. (Note: based on Business Rule, workflow may still wait for an assignment activity.)
Order Services
Phone and Line

Order Entry
Order Confirmation

You are Ordering: Phone Service
Service Area: ParisLobby
Phone Button Template: Standard 7960

Order only matches one Service Area so no selection necessary

Allows for setting specific Provisioning Attributes for ordered products. User must have Ordering – Advanced Ordering user role assigned.

Confirm Details:
- Line
  - Line: Auto-Assigned Line
  - Line Position: 1 - Available
- Phone
  - MAC Address: 00059a3b7700
  - Phone: Cisco 7960

Advanced Order Options...

Confirmation of Order
Thank you. Your customer's order has been accepted. Please give the order number to the customer. They will need this information in the future when dealing with other Customer Service Representatives.

Order Number:

Note the order number to track provisioning progress

DONE
Order Services
Phone and Line - Status

Check status of order

Dashboard can provide direct links to orders pending.
Can search orders by order number, or subscriber.

Status can be:
- In Progress
- Waiting for ‘workflow step’
- Hold (error condition)
- Cancel
- Complete

Order Search Results

Search Criteria:  Extended Status : Waiting for Approval, Waiting to Assign, Waiting to Receive, Waiting to Ship, Waiting for Return  Subscriber Domain : France

Found 1 Orders.

<table>
<thead>
<tr>
<th>Order Number</th>
<th>Subscriber</th>
<th>Order Date</th>
<th>Author</th>
<th>Status</th>
<th>Extended Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Main Lobby</td>
<td>01/22/2007 12:12:40 -0800</td>
<td>marjy</td>
<td>RELEASED</td>
<td>Waiting for Approval</td>
</tr>
</tbody>
</table>
Order Services
Phone and Line – Workflow Completion

User David with ‘Approver’ user role in the France Domain logs in.

Workflow related activities

Order 1 is waiting to be approved before continuing in the order workflow.

Depending on business rules, workflow can also require user intervention for workflow steps: assignment, shipping, and receiving.
Order Services
Phone and Line – Workflow Completion (Cont.)

Order 1 is waiting to be approved before continuing in the order workflow.

If there are more than 1 Approvers in a domain, then one approver could defer to another.

Add comments to appear in order history.

Order 1 is waiting to be approved before continuing in the order workflow.
Order Services
Phone and Line – Order Completion

Order can be searched by number or subscriber to get current status
Order Services
Change Phone

Upgrade Phone

Use Provisioning Dashboard > Manage Subscribers > Search Subscribers to search for the new Subscriber ID
Order Services
Change Phone

Choose new phone type, and assign phone
(Note assign step depends on business rules)

Assign any Provisioning Attributes
(Option only displayed if user has Advanced Ordering User Role)
Order Services
Change Owner

Use Provisioning Dashboard > Manage Orders > Order Subscriber Services to search for the new Subscriber ID.
# Order Services

## Change Owner

### Change Owner

#### Choose a New Owner

<table>
<thead>
<tr>
<th>Current Owner</th>
<th>Choose New Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Susan Guitez (susang)</td>
<td>steveb</td>
</tr>
</tbody>
</table>

**Product(s):**
- Phone (Cisco 7960: SEP000059A3B88FF)
  - MAC Address: 00059A3B88FF
  - Phone: N/A
- Line (65000 Susan Guitez)
  - Line: N/A

### Change Owner Confirmation

<table>
<thead>
<tr>
<th>Current Owner</th>
<th>New Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Susan Guitez (susang)</td>
<td>steveb</td>
</tr>
</tbody>
</table>

**Product(s):**
- Phone (Cisco 7960: SEP000059A3B88FF)
  - MAC Address: 00059A3B88FF
  - Phone: N/A
- Line (65000 Susan Guitez)
  - Line: N/A

- [Submit](#) | [Back](#) | [Cancel](#)
Order Service
Messaging Service

Then follow the similar steps as ordering phone and line
CUPM Integration with CUOM

- Details button added to list of Subscriber’s phone tasks
- Launches Operations Manager IP Phone Details report
Provisioning Manager Summary

- **Single view** of a subscriber and their services
- **Simplified** management of subscribers, services, and Cisco Unified resources
  - Day 1 – *template* deployments
  - Day 2 – *delegate* MACDs
- Single provisioning interface to Cisco Unified systems
  - **Policy-based**, business oriented
  - With the speed and accuracy of **automation**
  - Manage multiple CCM Cluster, CCME, Unity, Unity Express, and Unity Connection systems from one Provisioning Manager
Q and A
Managing your Cisco Unified Communications

1. I have IPT. What do I need to manage?

2. What is this CUCMS all about?

   - SMB Voice Management
   - Cisco Unified Provisioning Manager (CUPM)
   - Cisco Unified Operations Manager (CUOM)
   - Cisco Unified Service Monitor (CUSM)
   - Cisco Unified Service Statistics Manager (CUSSM)

3. And what does it really look like?
# Cisco Unified Communications Enterprise Management Suite

## Product mappings

<table>
<thead>
<tr>
<th>Plan and Design</th>
<th>Implement</th>
<th>Operate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assess/prepare network for IP Communications</strong></td>
<td><strong>Deploy and provision</strong></td>
<td><strong>Manage moves, adds, changes</strong></td>
</tr>
<tr>
<td>• Hardware/software compliance</td>
<td>• Voice infrastructure provisioning</td>
<td>• Endpoint devices</td>
</tr>
<tr>
<td>• Predict overall call quality</td>
<td>• Dial plans &amp; partitioning</td>
<td>• Users, services</td>
</tr>
<tr>
<td>• Best practice analysis</td>
<td>• Batch provisioning</td>
<td>• Phones, lines, voicemail, …</td>
</tr>
<tr>
<td><strong>CiscoWorks</strong></td>
<td><strong>Voice Works</strong> Manager</td>
<td><strong>Service Statistics Manager</strong></td>
</tr>
<tr>
<td><strong>Voice Manager</strong></td>
<td><strong>Provisioning Manager</strong></td>
<td><strong>Service Monitor</strong></td>
</tr>
<tr>
<td><strong>GW/GK Configuration</strong></td>
<td><strong>Deploy</strong> and provision</td>
<td><strong>Track and report on user experience</strong></td>
</tr>
<tr>
<td>• Voice port configuration</td>
<td>• Voice infrastructure provisioning</td>
<td>• Voice quality using sensors and phones</td>
</tr>
<tr>
<td>• GW/GK dial plans</td>
<td>• Dial plans &amp; partitioning</td>
<td>• Reporting &amp; SLAs</td>
</tr>
<tr>
<td><strong>Operations Manager</strong></td>
<td><strong>Manage moves, adds, changes</strong></td>
<td><strong>Telepresence support</strong></td>
</tr>
<tr>
<td><strong>Monitor and diagnose problems</strong></td>
<td></td>
<td>• Service-level views</td>
</tr>
<tr>
<td>• Service-level views</td>
<td></td>
<td>• Proactive testing including SCCP &amp; SIP phones</td>
</tr>
<tr>
<td>• Proactive testing including SCCP &amp; SIP phones</td>
<td></td>
<td>• Track inventory, changes</td>
</tr>
<tr>
<td>• Track inventory, changes</td>
<td></td>
<td>• Video endpoint support</td>
</tr>
<tr>
<td>• Video endpoint support</td>
<td></td>
<td>• Phone-Phone testing</td>
</tr>
<tr>
<td>• Phone-Phone testing</td>
<td></td>
<td>• Telepresence support</td>
</tr>
<tr>
<td>• Telepresence support</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unified Communications Operations Manager

- Real-time visualisation and monitoring of the entire Unified Communications system
- Service Level views
- Active service assurance with proactive fault management
- Powerful diagnostic tests and troubleshooting capabilities
- Correlation, analysis, and presentation of voice service quality data and alerts
- Inventory tracking and change monitoring
- Contextual cross-launch into other CW tools like RME, CV, CM etc and also VTG serviceability tools like CCM-RTMT, CCM web-pages
Cisco Unified Operations Manager

Customize NB messages:
- Notification Groups
- Events Sets
- Event descriptions
- SNMP trap customization
- Syslog Messages
Cisco Unified Operations Manager

You Are Here ➔ Monitoring Dashboard

**Service Level View**
- Current status of various devices, applications, and phones, and the connectivity and relationships among them.

**Alerts and Events**
- Current alerts and events on various devices and applications supporting IP telephony services.

**Service Quality Alerts**
- Current alerts and issues regarding service quality in the IP telephony services.
  - Click to launch Service Monitor

**IP Phone Status**
- List of IP phones that are experiencing outages in service.
  - Click to View All Phones
Cisco Unified Operations Manager

You Are Here: Monitoring Dashboard

Service Level View: Current status of various devices, applications, and phones, and the connectivity and relationships among them.

Alerts and Events: Current alerts and events on various devices and applications supporting IP telephony services.

Service Quality Alerts: Current alerts and issues regarding service quality in the IP telephony services.

IP Phone Status: List of IP phones that are experiencing outages in service.

Click to launch Service Monitor

Click to View All Phones
Performance Monitoring
Cisco Unified Operations Manager

- Alert Details
- Event Details
- Device Types: MediaServer, PhoneAccessSwitch, PhoneAccessVoxSwitch
Cisco Unified Operations Manager

- Monitors registration between phones and CCMs or CMEs
- Monitors registration between gateways and CCMs or CMEs
- Monitors registration of CTI Ports between CCM/CME and UC Applications (such as Unity and IPCC)
- Uses knowledge of these relationships to determine logical and physical relationships in the IP network and UC deployment
- Uses this knowledge to determine service outages and impact
- Does not need any user intervention or special skill sets (always-on)
Cisco Unified Operations Manager

Service Level View
Current status of various devices, applications, and phones, and the connectivity and relationships among them.

Alerts and Events
Current alerts and events on various devices and applications supporting IP telephony services.

Service Quality Alerts
Current alerts and issues regarding service quality in the IP telephony services.

IP Phone Status
List of IP phones that are experiencing outages in service. Click to launch Service Monitor.

Click to View All Phones
# Cisco Unified Operations Manager

![Cisco Unified Operations Manager](http://uom-demo1:1741 - Cisco Unified Operations Manager - Mozilla Firefox)

**Cisco Unified Operations Manager**

**All IP Phones/Lines** as of Sun 07-Jan-2007 22:29:13 EST

<table>
<thead>
<tr>
<th>Ext.</th>
<th>User</th>
<th>IP Address</th>
<th>MAC Address</th>
<th>Model</th>
<th>Regd.</th>
<th>CCM/CME Address</th>
<th>Switch Address</th>
<th>Port</th>
</tr>
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<tbody>
<tr>
<td>1021</td>
<td>Auto 1021</td>
<td>192.168.137.5</td>
<td>0003b6710b</td>
<td></td>
<td></td>
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<td>3643</td>
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<tr>
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<td>21002</td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Column Selector**

- **Hidden Column(s):**
  - CCM
  - Switch Name
  - Port Status
  - VLAN Name
  - VLAN ID
  - SRST mode
  - SRST Router

- **Displayed Column(s):**
  - CCM/CME Address
  - Ext.
  - IP Address
  - MAC Address
  - Model
  - Regd.
  - Port
  - Switch Address
  - User

---

*Session ID:*

*Presentation_ID:

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Cisco Unified Operations Manager

Overview
IP Phones and Applications reports to view provide data about IP Phones and IP Communications Applications.

Options
Search: Use this option to search for IP phones based on Extension number, IP Address or MAC address.
Inventory Analysis: Use this option to search inventory of phones based on various parameters.
All IP Phones: This provides a report of all IP phones in your network.
SRST IP Phones: This provides a report of all phones configured for SRST as defined in the SRST poll settings.
SIP Phones: This provides a report of all SP phones in your network.
IP Communicators: This provides a report of IP Communicators in your network.
All CTI Applications: This provides a report of all CTI applications in your network.

You may not be able to use some of these functions if you do not have the required privileges or licenses.
Overview

This page allows you to set up phone status tests, synthetic tests, and node-to-node tests.

You may not be able to use some of these functions if you do not have the required privileges or licenses.

Options

- Phone Status Tests: Set up phone status tests.
- Synthetic Tests: Set up synthetic tests.
- Batch Tests: Set up Batch tests.
- Node-to-Node Tests: Set up node-to-node tests.
Diagnostics – Phone Status Test

Cisco Unified Operations Manager
A product from the Cisco Unified Communications Management Suite

- Test sends a ping to the IP Phone from either both the OM server or just from an IOS, IP SLA-enabled, device
- Test can be run once or on a schedule
## Diagnostics – Synthetic Transactions Tests

### Test Name | Test Description
--- | ---
Phone Registration | Checks if a phone can register with the CallManager
Off-Hook | Checks if a phone gets dial tone
End-to-End Call | Checks if a phone can call another phone (real or simulated)
Conference Connection | Creates a conference and connects to it
Unity Message Waiting Indicator | Checks if the message waiting indicator light goes on after a message is left
Cisco Emergency Responder (CER) | Checks if CER is able to route calls based on a 911 call
TFTP download | Checks if the phone configuration is downloadable
Diagnostics – Batch Tests

- Comprehensive Phone-to-phone tests: End to End calls (remote site, PSTN, DID), Hold, Park, Transfer...
- Dial plan tests: Verify class of restriction and gateway availability
- Acceptance tests, Check-out tests, site inventory and status
Diagnostics – Node to Node Tests

Generate synthetic traffic (IP SLA based)

- Quality/Latency/Jitter/packet loss
- Gateway registration

End - End testing (signaling + data path)
Unified Communications Operations Manager

**Summary**

- Real-time visualisation and monitoring of the entire Unified Communications system
- Service Level views
- Active service assurance with proactive fault management
- Powerful diagnostic tests and troubleshooting capabilities
- Correlation, analysis, and presentation of voice service quality data and alerts
- Inventory tracking and change monitoring
Managing your Cisco Unified Communications

1. I have IPT. What do I need to manage?

2. What is this CUCMS all about?
   - SMB Voice Management
   - Cisco Unified Provisioning Manager (CUPM)
   - Cisco Unified Operations Manager (CUOM)
   - Cisco Unified Service Monitor (CUSM)
   - Cisco Unified Service Statistics Manager (CUSSM)

3. And what does it really look like?
<table>
<thead>
<tr>
<th>Product mappings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plan and Design</strong></td>
</tr>
</tbody>
</table>
| Assess/prepare network for IP Communications  
  - Hardware/software compliance  
  - Predict overall call quality  
  - Best practice analysis | Deploy and provision  
  - Voice infrastructure provisioning  
  - Dial plans & partitioning  
  - Batch provisioning | Manage moves, adds, changes  
  - Endpoint devices  
  - Users, services  
  - Phones, lines, voicemail, …  
  **Service Statistics Manager**  
  - Executive & Operations reports  
  - Capacity planning reports  
  **Service Monitor**  
  - Track and report on user experience  
  - Voice quality using sensors and phones  
  - Reporting & SLAs  
  - Telepresence support  
  **Operations Manager**  
  - Monitor and diagnose problems  
  - Service-level views  
  - Proactive testing including SCCP & SIP phones  
  - Track inventory, changes  
  - Video endpoint support  
  - Phone-Phone testing  
  - Telepresence support |

- CiscoWorks Voice Manager  
  - GW/GK Configuration  
  - Voice port configuration  
  - GW/GK dial plans
Cisco Unified Service Monitor

- Real-time monitoring and alerting of most common quality of voice issues.
- 60 second granularity of QoV analysis, presented as R-factor MOS score, or end-of-call QoV presented as CVTQ (K-factor) MOS score.
- Easily integrated ‘Cisco IP phone-like’ hardware probe – uses SPAN port to observe RTP streams. Probe installs and integrates as if a Cisco IP phone.
- QoV alerts [threshold based] sent as SNMP traps to Cisco Unified Operations Manager and/or manager of managers (MOM).
- Combination of hardware (passive probes) and software
- Live monitoring of multiple voice streams
- Alerting when call quality degrades
- Scalable architecture
Service Monitor Architecture

Cisco Sensor
Monitors call’s RTP streams

Communication Manager
Cluster

CVTQ

SYSLOG

Cisco 1040 sends MOS scores for active calls

Cisco 1040

Unified Service Monitor
Stores and Evaluates MOS values and sends SNMP traps when Threshold is crossed

Unified Service Monitor
Can send SNMP traps to Manager of Managers

Unified Operations Manager
Presents alert information and tools to take immediate action

Cisco

Unified Operations Manager
Service Monitor – Cisco 1040 Sensors

- Provides real time voice quality measurement, system-wide
- 802.3af PoE (Power over Ethernet) compliant
- Uses ITU G107 R-factor to compute MoS
- FCC Class B certified
- Supports 100 concurrent RTP streams
- Two 10/100 Ethernet interface (one management and one SPAN port)
- Supports CDP (Cisco Discovery Protocol)
- Supports external power adaptor
- User experience monitored every 60 seconds and alerted if below MOS threshold
Service Monitor – CVTQ

- K-factor (Klirrfaktor) is mean opinion score (MOS) estimator of the endpoint-type defined in ITU standard P.564.
- CVTQ - Cisco-Voice Transmission Quality
- CVTQ is supported by Cisco Unified Communications Manager
- Score is sent at the end of the call by using Call Management Records
- Cisco 7940, 7960, 7941, 7961, 7970, and 7971 IP Phones support CVTQ in SCCP mode
- The correct levels of firmware are required within the IP Phones
- CVTQ is **not** currently supported in
  - Video IP Phones, SIP Phones, Softphones (IP Communicator, CUPC)
  - Other IP Phone models like 7905, 7911, 7920, 7936 etc
Service Monitor – Software Component

- Manages and configures Cisco 1040
  - Creates Cisco 1040 configuration file
  - Define Cisco 1040 image file

- Scalability and Redundancy
  - Up to 50 Cisco 1040 sensors per instance of Service Monitor
  - Multiple Services Monitor instances can be deployed
  - Multiple Service Monitors can be defined for each 1040 (primary and secondary)

- Integration via North-Bound Interface
  - MOS values created within the 1040 probe forwarded to Service Monitor, via SYSLOG event, and evaluated against user-defined thresholds
  - Threshold violations forwarded as SNMP trap.
  - Operations Manager can receive and display traps as Service Quality Alerts
Cisco Unified Operations Manager

Service Quality Alerts
# Cisco Unified Operations Manager
## Service Quality Alerts

### Service Quality Alerts as of Wed 30-Nov-2005 04:19 PST

### Showing: All Alarms with 102 alerts

<table>
<thead>
<tr>
<th>#</th>
<th>ID</th>
<th>Type</th>
<th>Extension</th>
<th>Destination</th>
<th>Latest Event Time</th>
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<tbody>
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<td>P Phone</td>
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<td>44.44.2.6</td>
<td>24-Nov-2005 04:27:18</td>
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<td>7</td>
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<td>9</td>
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<td>10</td>
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<td>11</td>
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<td>13</td>
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<td>44.44.1.28</td>
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<td>14</td>
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<td>15</td>
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<td>16</td>
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<td>17</td>
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<td>19</td>
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<td>2205</td>
<td>44.44.2.29</td>
<td>24-Nov-2005 04:27:18</td>
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</tbody>
</table>
Cisco Unified Operations Manager
Service Quality Alerts

Service Quality Alert Detail

Multiple Service Quality Issues on Destination: 2111001
Description: 5 events in the last 10 minutes

Event ID: 000001RM

Property Value
Destination 1211003
Destination IP Address 172.20.121.132
Destination Type IP Phone
Destination Model 7960
Switch For Destination 172.20.121.141
Destination Port 3/3
SourceEndpoint 1211004
Source IP Address 172.20.121.132
Source Type IP Phone
Source Model 7960
Source Port 3/2
Detection Algorithm null
MOS 2.0
Critical MOS Threshold 3
Cause Jitter
Codec G711
Jitter 50 ms
Packet Loss 10 Packets
Probable 37

Tools:
- Select
- SQ Event History/Path Analysis
- Node-to-Node
Service Monitor - Reports

Cisco Unified Service Monitor
A product from the Cisco Unified Communications Management Suite

Minute by Minute Reports
(Sensor Based)

Most Impacted Endpoints
Ext. Min.
x9513 38
x7267 23
x4123 18
x6569 12
x5432 10

Call by Call Reports
(Phone Based)

Service Quality Report
Ext. MOS
x6212 3.8
x6894 3.2
x4593 3.6
x4356 4.6
x7664 2.8

Most Impacted Endpoints
Ext. Min.
x2512 34
x1263 26
x7561 11
x8435 10
Service Monitor - Reports

- Consolidation of voice quality reports collected from multiple clusters
- “Most impacted endpoints reports” provides details of the endpoints experiencing the most severe voice quality issues over a period

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>IP Address</th>
<th>Device Type</th>
<th>Cumulative Talk Time (min)</th>
<th>Impaired Minutes</th>
<th>% of Impaired Minutes</th>
<th>Average MOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 192.168.137.39</td>
<td>192.168.137.39</td>
<td>Cisco 7960</td>
<td>663.0</td>
<td>343</td>
<td>60.92</td>
<td>4.4</td>
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<tr>
<td>2. 192.168.137.40</td>
<td>192.168.137.40</td>
<td>Cisco 7960</td>
<td>496.0</td>
<td>365</td>
<td>61.49</td>
<td>4.4</td>
</tr>
<tr>
<td>3. 192.168.137.39</td>
<td>192.168.137.39</td>
<td>Cisco 7960</td>
<td>274.0</td>
<td>143</td>
<td>52.18</td>
<td>4.4</td>
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<tr>
<td>4. 192.168.137.45</td>
<td>192.168.137.45</td>
<td>Cisco Conference Bridge Software</td>
<td>136.0</td>
<td>78</td>
<td>57.35</td>
<td>4.4</td>
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<td>5. 192.168.137.8</td>
<td>192.168.137.8</td>
<td>Cisco 7960</td>
<td>135.0</td>
<td>43</td>
<td>31.85</td>
<td>4.4</td>
</tr>
<tr>
<td>6. 192.168.137.9</td>
<td>192.168.137.9</td>
<td>Cisco 7960</td>
<td>127.0</td>
<td>43</td>
<td>33.85</td>
<td>4.4</td>
</tr>
<tr>
<td>7. 192.168.137.41</td>
<td>192.168.137.41</td>
<td>Cisco 7960</td>
<td>41.0</td>
<td>30</td>
<td>73.17</td>
<td>4.4</td>
</tr>
<tr>
<td>8. 192.168.137.11</td>
<td>192.168.137.11</td>
<td>Cisco 7960</td>
<td>101.0</td>
<td>26</td>
<td>25.74</td>
<td>4.4</td>
</tr>
<tr>
<td>9. 192.168.137.39</td>
<td>192.168.137.39</td>
<td>Cisco 7960</td>
<td>46.0</td>
<td>26</td>
<td>56.52</td>
<td>4.4</td>
</tr>
<tr>
<td>10. 192.168.137.42</td>
<td>192.168.137.42</td>
<td>Cisco 7960</td>
<td>31.0</td>
<td>22</td>
<td>70.96</td>
<td>4.4</td>
</tr>
</tbody>
</table>
Service Monitor – Positioning CVTQ and Cisco 1040 sensors

- Cisco 1040 sensors and CVTQ complement each other and bring total solution to voice quality measurement
- Cisco 1040 sensors provide real time voice quality information for all voice calls monitored by sensors
- Cisco 1040 sensors have no restriction on the version of CallManager and end points
- Cisco 1040 sensors support CME/CUE environment as well as CCM/Unity
- CVTQ support provides customers the ability to monitor voice quality of *all calls* in the network with CallManager 4.2 or higher, 794X, 796X and 797X IP Phones
- In a CallManager 4.2 or higher environment, Cisco 1040 sensors can be used to monitor key Executive phones/Voicemail system/Gateway/Troubleshooting and CVTQ can be used to understand overall voice quality
Cisco Unified Service Monitor Benefits

Voice quality monitoring and alerting for every call and every call segment

Valuable after the effect reports on poorest quality calls, most impacted endpoints etc

Easy to deploy and maintain solution based on SW only or SW and HW

Integrated diagnostics when used in conjunction with Cisco Unified Operations Manager
Managing your Cisco Unified Communications

1. I have IPT. What do I need to manage?

2. What is this CUCMS all about?
   - SMB Voice Management
   - Cisco Unified Provisioning Manager (CUPM)
   - Cisco Unified Operations Manager (CUOM)
   - Cisco Unified Service Monitor (CUSM)
   - Cisco Unified Service Statistics Manager (CUSSM)

3. And what does it really look like?
# Cisco Unified Communications Enterprise Management Suite

## Product mappings

<table>
<thead>
<tr>
<th>Plan and Design</th>
<th>Implement</th>
<th>Operate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assess/prepare network for IP Communications</strong>&lt;br&gt;• Hardware/software compliance&lt;br&gt;• Predict overall call quality&lt;br&gt;• Best practice analysis</td>
<td><strong>Deploy and provision</strong>&lt;br&gt;• Voice infrastructure provisioning&lt;br&gt;• Dial plans &amp; partitioning&lt;br&gt;• Batch provisioning</td>
<td><strong>Manage moves, adds, changes</strong>&lt;br&gt;• Endpoint devices&lt;br&gt;• Users, services&lt;br&gt;• Phones, lines, voicemail, …</td>
</tr>
<tr>
<td><strong>CiscoWorks Voice Manager</strong>&lt;br&gt;GW/GK Configuration&lt;br&gt;• Voice port configuration&lt;br&gt;• GW/GK dial plans</td>
<td><strong>Provisioning Manager</strong></td>
<td><strong>Service Statistics Manager</strong>&lt;br&gt;• Executive &amp; Operations reports&lt;br&gt;• Capacity planning reports</td>
</tr>
<tr>
<td><strong>Service Monitor</strong>&lt;br&gt;Track and report on user experience&lt;br&gt;• Voice quality using sensors and phones&lt;br&gt;• Reporting &amp; SLAs&lt;br&gt;• Telepresence support</td>
<td><strong>Operations Manager</strong>&lt;br&gt;Monitor and diagnose problems&lt;br&gt;• Service-level views&lt;br&gt;• Proactive testing including SCCP &amp; SIP phones&lt;br&gt;• Track inventory, changes&lt;br&gt;• Video endpoint support&lt;br&gt;• Phone-Phone testing&lt;br&gt;• Telepresence support</td>
<td></td>
</tr>
</tbody>
</table>
Cisco Unified Service Statistics Manager

- Leverages wealth of data in Operations Manager and Service Monitor
- Enables partitioning of Unified Communications statistics data
  - Based on network, service, business and user criteria
  - System-wide, across multiple CUCM clusters, Unity voicemail systems, CUCME and gateways
- Enables SLA creation, measurement and verification based on Unified Communications metrics
- Generates out-of-the-box reports
  - Specific focus on Executive, Operations and Capacity Planning roles
- Provides ability to customize reports based on user needs
- Enables export of data and reports to external applications
Cisco Unified Service Statistics Manager

High Level Architecture

Service Statistics Manager

- Web-based Reporting GUIs
- Statistics Analysis Engine
- Reporting Engine

Statistics Database

External Apps

Standard Reports Repository

Cisco Unified Communications Management Products

Cisco Unified Communications Network
Cisco Unified Service Statistics Manager

Executive (CIO/CTO) Users

- Insight into overall voice service delivered to users
  - Call volume
  - Service quality
  - Service availability
  - Trends over time—getting better or worse?
  - Top problems, most impacted user groups

- Reports across overall deployment, across selected clusters, or user-defined groups of phones, locations, etc.
Executive Home View

- Drill down for more details by clicking on the bar chart.
- Drill down on the per cluster chart will provide further information on the date and time the data was gathered.
Executive Home View – Call Quality

Graph | Attributes | Monitor Information

Call Quality \text{uom-demos}.cisco.com/GQCM41Cluster1
Tue 23-Nov-2007 PST to Wed 21-Nov-2007 PST

- Total Number of Calls
- Number of Poor Calls
- Number of Good Calls
- Number of Fair Calls
- Number of Acceptable Calls

Graph Generated on: Fri 21-Dec-2007 04:11 PST
Legend Details

Session ID
Presentation_ID
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Cisco Unified Service Statistics Manager

Operations Users

- Exception reporting
  - Unusual call volume, Top N calls/users/…

- Troubleshooting reports
  - Reports on IP SLA tests, Call Failure Analysis reports, …

- Traffic reports
  - Per call category (on-net/long distance/…), completed vs. incomplete calls, duration, per site/location, per user-defined group, …

- Service Quality reports
  Voice quality call detail reports, threshold violations, trending

- Availability reports
  - CUCM, CUCME, CUC, CUE, Gateway, Trunk Group, Trunk availability

- SLA reports
  - SLA capacity trends
  - SLA compliance history
  - Executive summary
    - Health summary
Cisco Unified Service Statistics Manager

**Capacity Planning**

- Set thresholds for utilization and capacity
- Detailed utilization reports
  - Gateway, trunk group, trunk, ... traffic and utilization
  - CPU, Memory, Disk resource utilization
  - Voicemail utilization reports
    - Voicemail port utilization over time and over instances
- Capacity trend reports
  - Gain visibility into capacity trends over time, estimate days to capacity thresholds being crossed
- Top N Upgrade/Downgrade Candidates
  - Identify top N trunk upgrade/downgrade candidates, and proactively budget for and upgrade equipment, preventing service-impacting problems
CUSSM Custom Graphs

- Create a custom line graph for Call Volume
CUSSM Custom Graphs

- Generate Graph
# SLA Compliance Matrix

## Gateway SLA Utilisation 24 Hour Detail

**Cisco Unified Service Statistics Manager**

A product of the Cisco Unified Communications Management Suite

### SLA Details for Gateway - SLA (Gateway Utilization)

<table>
<thead>
<tr>
<th>Compliance Objective</th>
<th>75.0 %</th>
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</thead>
<tbody>
<tr>
<td>Owner</td>
<td>admin</td>
</tr>
<tr>
<td>Date Created</td>
<td>Thu 06-Sep-2007 21:19 PDT</td>
</tr>
<tr>
<td>Last Updated</td>
<td>Tue 25-Sep-2007 16:33 PDT</td>
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<tr>
<td>Comments</td>
<td>Roll</td>
</tr>
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</table>

**Compliance Summary (Last 24 hours compliance: 86.11%)**

![Graph showing compliance summary]

**SLA Violation History (From Thu 20-Dec-2007 09:00 PST to Fri 21-Dec-2007 09:00 PST)**

<table>
<thead>
<tr>
<th>SLA Element</th>
<th>Threshold Condition</th>
<th>Weight</th>
<th>Current Status</th>
<th>Financial Impact</th>
<th>Violation History (Last 24 hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>uon-dom04.cisco.com 192.168.140.38</td>
<td>Gateway Utilisation T1 PRI Utilisation Less than or equal to 55.0 % for 10 min.</td>
<td>1</td>
<td>$300</td>
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<td>$150</td>
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Q and A