HP OpenView
Service Quality Manager

IP Multimedia Services Value Pack

User's Guide

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Contents

Preface

This document describes the IP Multimedia Services Value Pack for OpenView Service Quality Manager.

Intended Audience

This document is intended for OpenView SQM integrators, users and administrators.

Required Knowledge

It is assumed that the reader is familiar with the functionality of OpenView SQM and has previous experience of the following:

- System administration and operations

- Service level management.

It is assumed that the reader is familiar with the concepts described in the following books:

- *HP OpenView Service Quality Manager Overview*

- *HP OpenView Service Quality Manager Administrators Guide*

- *HP OpenView Service Quality Manager Information Modeling Reference Guide*

Goal of this document is not to describe IP Multimedia Services; it is assumed that the reader is familiar with this domain.

Software Versions

The software versions referred to in this document are specified in Section #Software and hardware requirement.

Typographical Conventions

The following typographical conventions are used in this book:

Bold	New terms and to emphasize important words.
Italic	File names, programs, and parameters.
	The names of other documents referenced in this manual.
`Monospace`	Source code and examples of file contents.
	Commands that you enter on the screen.
	Pathnames.
	Keyboard key names.

Associated Documents

For a full list of OpenView SQM user documentation, refer to the *HP OpenView Service Quality Manager Product Family Introduction*.

Support

You can visit the HP OpenView support web site at:

http://support.openview.hp.com/support.jsp

This Web site provides contact information and details about the products, services, and support that HP OpenView offers.

HP OpenView online software support provides customer self-solve capabilities. It provides a fast and efficient way to access interactive technical support tools needed to manage your business. As a valued support customer, you can benefit by using the support site to:

- Search for knowledge documents of interest
- Submit enhancement requests online
- Download software patches
- Submit and track progress on support cases
- Manage a support contract
- Look up HP support contacts
- Review information about available services
- Enter discussions with other software customers
- Research and register for software training

Chapter 1

OV SQM IPMS Value Pack description

1.1 OpenView Service Quality Manager

OpenView SQM provides a complete service quality management solution. It consolidates quality indicators across all domains — telecom, IT networks, servers, and applications — providing end-to-end visibility on service quality. OpenView SQM links service quality degradations to potential effects on business, allowing network support personnel to address problems and prioritize actions proactively.

OpenView SQM monitors the service quality by aggregating information coming from all data sources, such as the network, the IT infrastructure, and the service provider's business processes. Using this information, service operators can pinpoint infrastructure problems and identify their potential affect on customers, services, and Service Level Agreements (SLAs).

Figure 1 - OpenView SQM Main Components
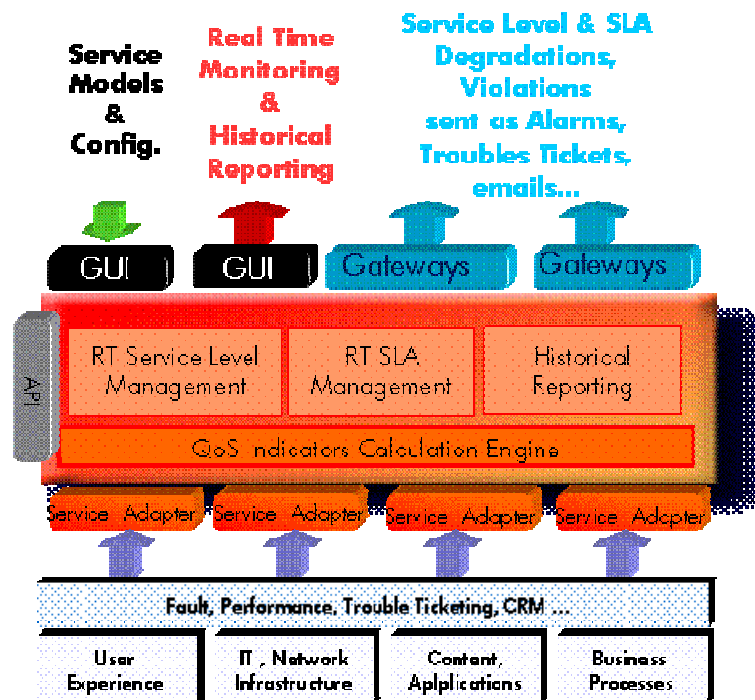
For a detailed description of OpenView SQM, refer to the *HP OpenView Service Quality Manager Overview*.

1.2 What is a value pack?

1.2.1 Objective

The HP OpenView Service Quality Manager Value Pack software extends the value and benefits of the HP OpenView Service Quality Manager.

The objective of such value packs is to:

- Provide quick time to value with pre-configured platforms

  - Pre-implemented best practices to improve time to deploy

  - Facilitate integration with customer environment

- Leverage from projects, partners and industry standards

  - Include subject matter experts know-how and recommendations in Service Management into the product

- Improve the value delivered by the OV SQM product

  - Enrich engine capabilities with pre-defined specialized added value with customer focus

  - Provide an operational foundation for a solution that can easily be customized and extended to map customer contexts

- Secure cost of operations

  - Multi-technology / vendor catalogue of solutions and components that keep developing in line with new services.

1.2.2 OV SQM Value Pack approach

1.2.2.1 Defining Service model and KQIs

The methodology that is being used in general to develop SLA and service management solutions involves the following steps that will be re-iterated as a life-cycle to keep improving a solution:

1. Define the scope of the requirements by looking at the different use cases. For example, key operational processes as described in the eTOM (Enhanced Telecom Operation Map) from the Telemanagement Forum (www.tmfcentral.com) can be used as a reference to analyze what would be the right metrics that best characterize those processes.

 A use case would then be about:

- describing standard activities of the people or group of people that will use the system

- identifying the key metrics and policy that describe the activity of that operator (process oriented) but also that describe the behavior of the domain is operating (technology oriented).

- defining a set of KQIs (Key Quality Indicators) that would keep giving the current and historical status of those metrics.

- defining how those KQIs will be used by which other system(s).
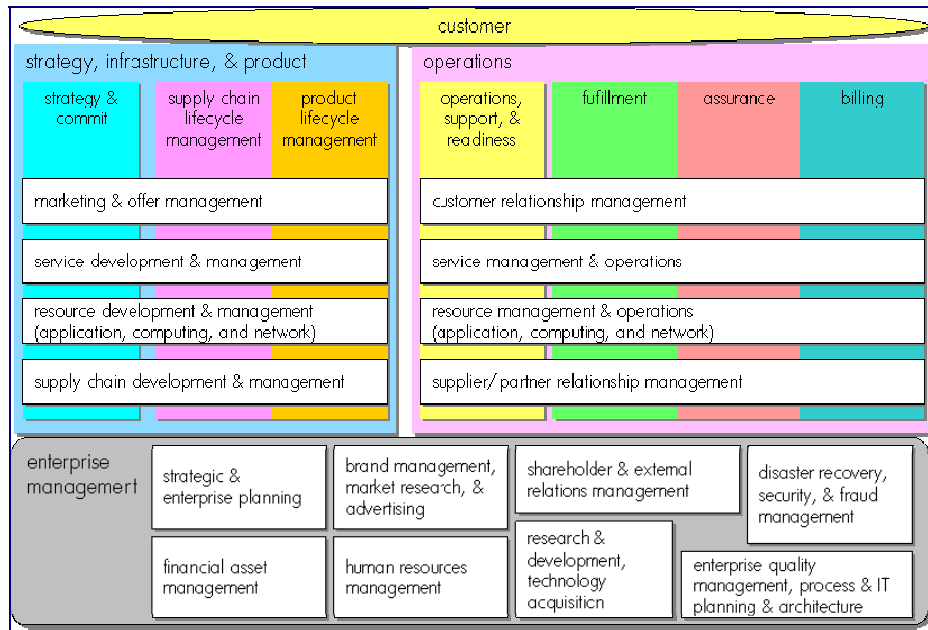
Figure 2 - eTOM – TeleManagement Forum

2. As suggested by the figure below that represents how KQIs can be defined at the top of a hierarchy of indicators, the second step is about analyzing all available data sources and defining how KQIs will be computed and / or aggregated from raw data.
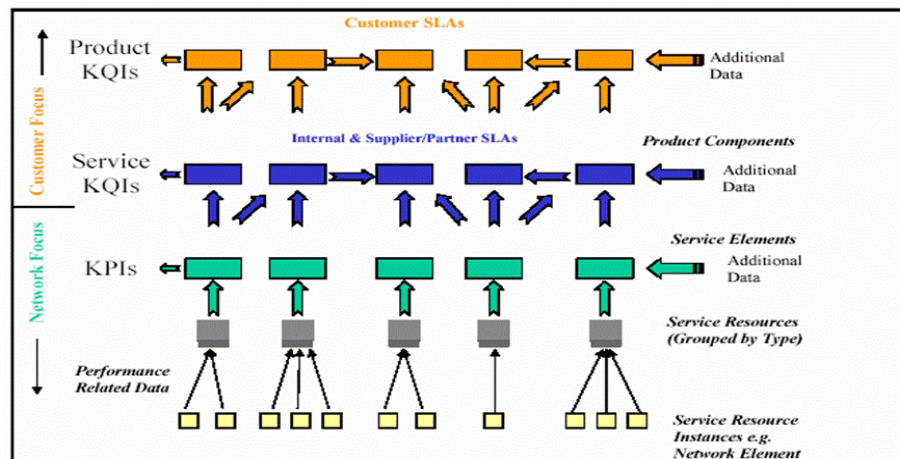
Figure 3 – Key Indicator Hierarchy *(from TeleManagement Forum)*

3. The 3rd step is about designing a service model that will structure the KQIs around service components into a service to provide a consistent and comprehensive view of that service.

The purpose of a service model is to accommodate many different domains, from access devices, service access points, transport networks, applications to activation and maintenance processes that all contribute to a service and its management. A service model ensures consistency between all possible views that will be provided to various interested groups or parties.

4. From the model that has been design, the last step is about:

- deploying real services as individual instances of the service model

- defining service levels ("class of service") that will correspond to the objectives of the different types of users (Customer facing people, planning people, partner managers, service managers…)

- defining SLAs as contracts binding a particular service instance, a particular Service Level for a customer.

- defining reports as particular and specific views about services, service availability, SLA status…

- deploying data collection and integration to third party applications.
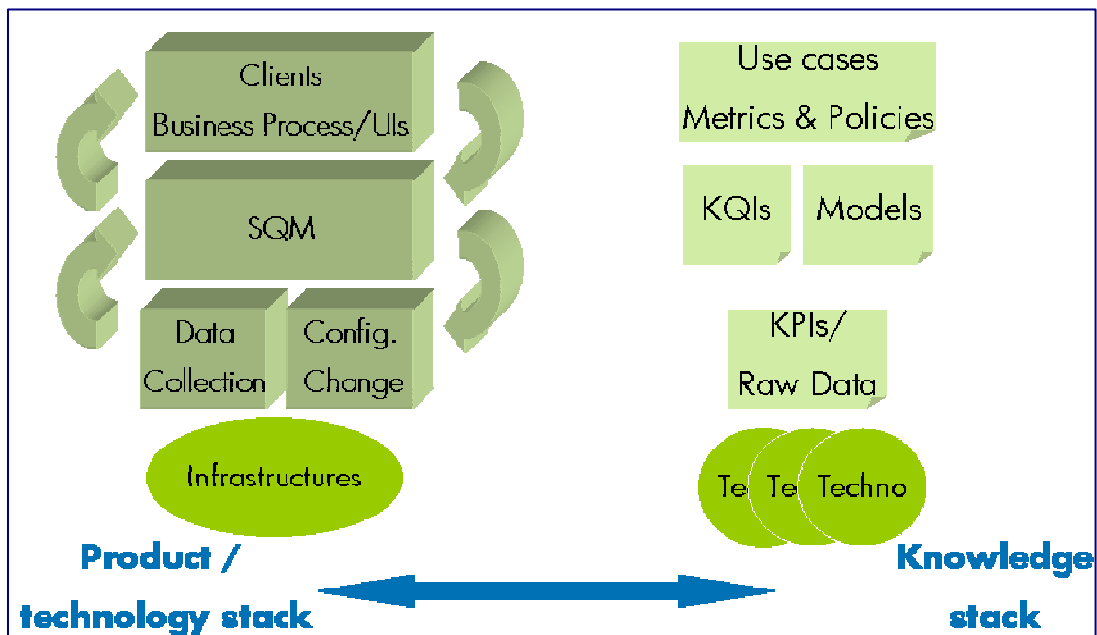
Figure 4 – OV SQM Value Pack solution analysis

1.2.2.2 Analysis of Data sources

There are many types of data sources that can be consider to provide raw data from which KQIs can be computed. Those data sources with typical raw data can be categorized as follows:

- Fault Management systems

  - Statistics on faults against (group of) Network Elements and Service Resources, based on severity, ages …

  - State, state changes of Network Elements and Service Resources

- Performance management systems

  - Performance data from all domains involved in service delivery

  - Delivered performance against committed performance

- Mediation / usage systems

  - Information about traffic / volumes, based on users, applications and services profiles

- Probes

  - End to end performance metrics from active probes (user simulation)

  - Detailed user experience (service access and utilization) from passive probes (decoding signaling protocols)

- Applications log files

  - Information about application sessions and service consumption (error codes, volumes)

- Trouble Ticketing systems

  - Information about customer outages, problem resolution delays to further compute services MTTRs, MTBFs...

- Service Provisioning systems

  - Information about service ordering and activation to further compute Mean Time To Deliver …

The purpose of Data Source Analysis is to elect, combine and aggregate the most significant and economical metrics that are needed to compute the required KQIs.

1.2.2.3 Data collection

Integration to data sources to collect service related metrics always being a complex issue, one of the objectives of the OV SQM value pack is to provide a quick and easy way to facilitate that integration by:

- normalizing the interfaces through a mediation database that is included in the OV SQM core product

- providing a set of tables to load the pre-defined collected metrics.

- providing the appropriate dedicated Service Adapters that will connect to the mediation DB and retrieve the pre-defined metrics to feed the service model.

In some cases, additional tools are included in the OV SQM value pack to help loading data from well known third party product.
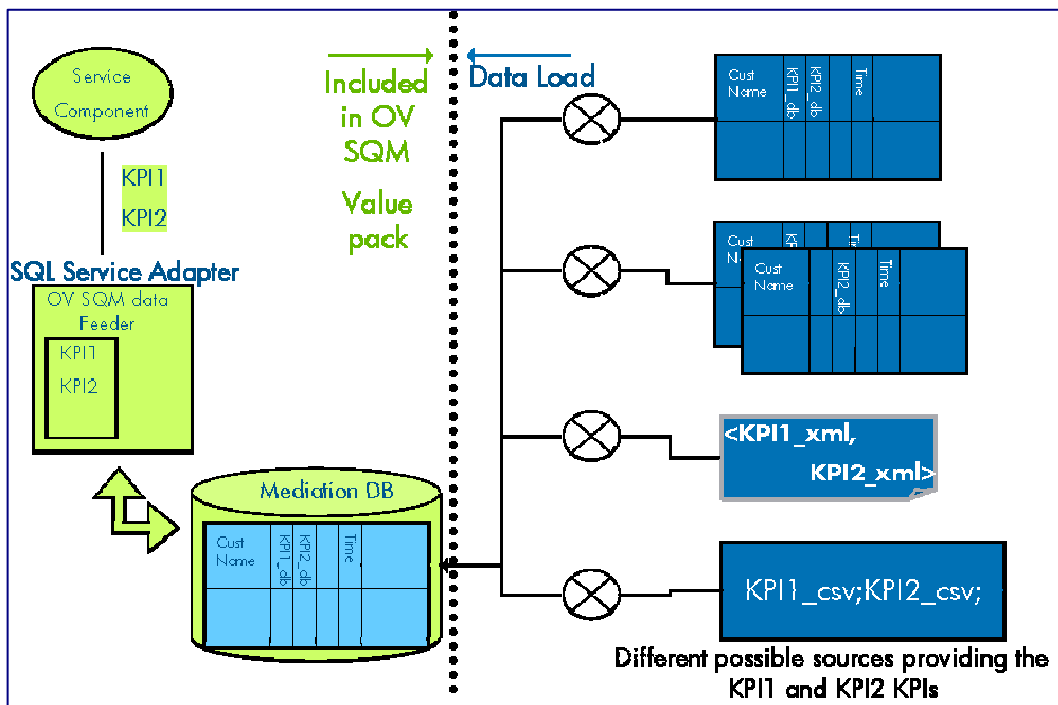
Figure 5 – OV SQM Value Pack: data collection through a mediation database

1.2.2.4 Validation / simulation data

Once one OV SQM value pack has been installed, a set of parameter values can be loaded in the different tables of the mediation database for that value pack.

Those parameter values representing one day of likely data and will help:

- validating the installation and showing live screens and reports.

- demonstrating the product for education or training purposes

Figure 6 – OV SQM Value Pack: quick data integration
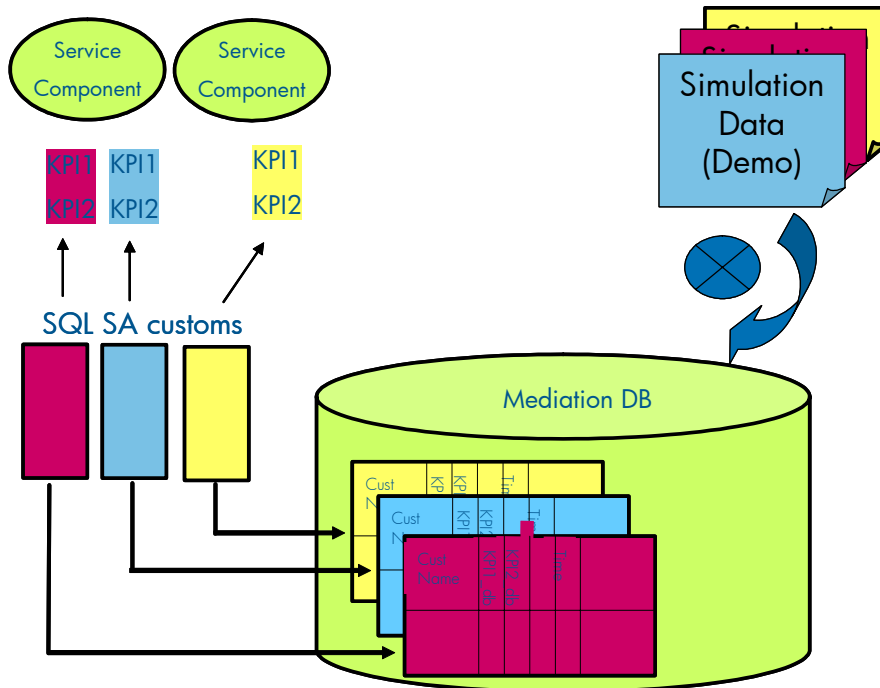
1.2.2.5 Pre-defined reports

OpenView SQM produces a variety of reports on service quality, service metrics, trends, and SLA status. OpenView SQM uses Business Objects to report the service quality information.

OpenView SQM contains a collection of predefined reports, including:

- Reports on OpenView SQM data, such as service definitions, SLAs, and service levels.

- Reports representing the mean time between faults, the mean time to repair the faults, service degradation and the availability of each service and service component.

1.2.3 Value pack typical content

An OV SQM value pack contains:

- Software add-ons to the OV SQM core products,

- Tools to install and run the value pack on top of a running OV SQM system,

- Documentation to help customers understanding the content of a value pack and augmenting the solution when needed.

1.2.3.1 Software Add-ons

- Service Model and KQIs with calculation expressions

- Service Levels and basic SLAs

- SQL Service Adapters Customs

1.2.3.2   Tools

- Scripts and 1 day of data to populate the mediation DB

- Scripts to setup the Solution Set and to load the sample in the OV SQM repository

1.2.3.3   Documentation

- Value Pack user guide (this document)

- Service Model reference manual (HTML)

- Value Pack release notes

1.2.4   An open solution

The OV SQM value packs provide a quick way to deploy a solution in the context of a specific use case. Nevertheless, it can also be considered as a starter for a customer willing to deploy a more comprehensive and specialized solution. The solution has been design to facilitate different ways to expand the provided packaged by leveraging standard OV SQM features.

Among others, the customer will be able to:

- create new service instances, new service levels based on the pre-defined service model and KQIs to address different use cases, thanks to the graphical administration user interface,

- easily add new KQIs based on the pre-defined collected data thanks to the graphical OV SQM service designer,

- add new tables with new raw data from a new source in the mediation database and create a new Service Adapter thanks to the OV SQL SA toolkit. From this new raw parameters, new KQIs for existing or new service components can be defined,

- load real data or collection similar raw data but from another source of data by modifying the data load scripts,

- deploy new ad-hoc service adapters directly connecting to a data source, removing the mediation tables and replacing the SQL Service Adapter.

- create new reports

1.3   Introduction to the OV SQM IP Multimedia Services Value Pack

1.3.1   IP Multimedia Services: key aspects regarding Quality of Service

An increasing number of service providers are pushing for the triple play of voice, video, and data over cable, fiber, or copper networks. Such services give the service provider the opportunity to reduce customer churn and increase revenue per customer. These broadband services, however, require the management and monitoring of different types of traffic with advanced QoS features.

Having established very high standard of quality for voice and television with traditional delivery networks, guaranteeing similar VoIP or IPTV quality across triple play deployments is now mandatory.

The OV SQM IPMS value pack provides a solution to monitor triple play SLAs, ensuring that voice, video and data applications run across service infrastructures within expected QoS objectives. Such QoS objectives would reflect what is

considered an acceptable level of video or voice quality for common services as well as for dedicated subscribers (like Corporate accounts).

For a **Voice over IP**, quality objectives would for example meet the following generally accepted standards:

- Call Setup Delay: < 3 s

- Latency: < 150ms

- Jitter: < 10ms

- Packet Loss: 10**-5 BER

Within these QoS parameter limits, voice quality generally is given a MOS – Mean Opinion Score, the de-facto industry standard for measuring voice quality on a 1 to 5 scale – of 4.0 or higher, which indicates a good quality.

For **Video services**, despite the lack of standards, key indicators can be identified to characterize the most prevalent transport techniques used for Video on Demand (VOD) and IPTV (Broadcast TV over IP). Video on Demand streams are typically unicast UDP/IP flows with video payload that is MPEG2 Transport Stream (ISO 13818). Broadcast TV over IP streams are typically multicast UDP/IP flows with MPEG2 TS payload.

Video over IP flow quality measurements can for example involve IP cumulative jitter, packet loss and MPEG TS errors. More synthetic indicators that combine different simple quality measurement are provided with the IPMS value pack to help assessing and monitoring the end-user perception of the Video services.

1.3.2   IP Multimedia Services management challenges

1.3.2.1   New business models

- Different service and content providers

- Multiple subscription plans

- Voice, data, content, usage, pre-paid

➔ A service management solution needs to cope with the complexity of the IPMS value chain providing a clear picture of boundaries of responsibilities through dedicated key indicators measuring each contribution to the delivery and maintenance of services.

1.3.2.2   Handling increase in complexity

- New services

- Multi-vendor

- Multi-technologies

➔ A service quality management solution needs to hide that technical complexity to Operators

1.3.2.3   Integrate multiple domains and operational models

- Access networks (cable, broadband)

- Content Delivery Networks

- Core networks

- Data centers, Voice, Video applications

- Voice NOC <> IP NOC

➔ A service quality management solution needs to include and combine different technologies and domains in one single exhaustive and consistent view that will be shared by all players.

1.3.2.4 Leveraging OSS applications

- Customer & service centric

- Service impact management (end to end view)

- Root-cause analysis

- Task automation

- Scalability & availability

➔ A service quality management solution should help leveraging different layers of Operational and Business systems already existing by taking various specialized levels of contribution from each system to help providing a consolidated view of the operations.

1.3.3 Use cases

1.3.3.1 eTOM and QoS management

The following table illustrates how a solution build on a product like OV SQM help addressing different needs from different organizations in Service Provider companies.
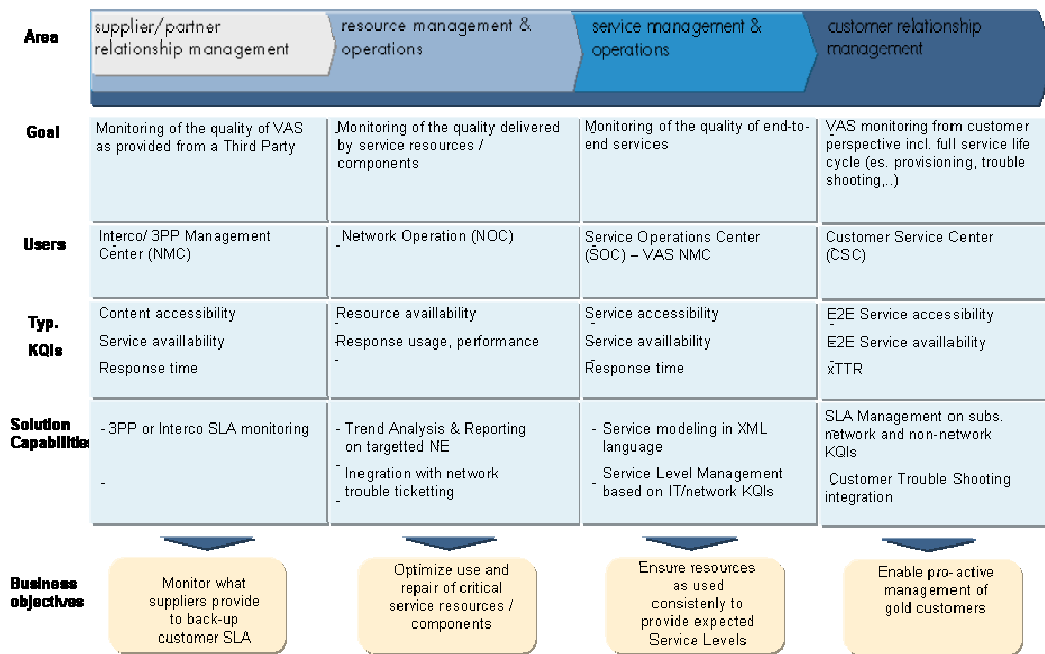

Figure 7 – OV SQM solution users

1.3.4 OV SQM IP Multimedia Services Value Pack software add-on

The OV SQM IPMS Value Pack comes with the following software add-on:

1.3.4.1 Service Models

The IPMS value pack contains a service model that can be deployed for the monitoring of SLAs for Voice (VoIP), Video (IPTV, Video on Demand) or data services over IP Networks.

The Service model combines and organizes a set of service components that all together provide an end-to-end view of triple play services over IP.

The service components include:

- The Multimedia delivery infrastructure that can be organized in geographies

- Security Servers

- DNS

- Video Servers / caching servers

- Call Servers

- Application servers (POP3, SMTP, FTP, HTTP)

- Servers / Cluster of Servers

- IP Phones

- Charging Gateways

- Subscribers private networks (like corporate sites)

With there respective KQIs, as further defined in 1.3.5.

1.3.4.2 Service Levels and basic SLAs

The IPMS value pack allows the definition of Service Levels that correspond to the various use cases described above.
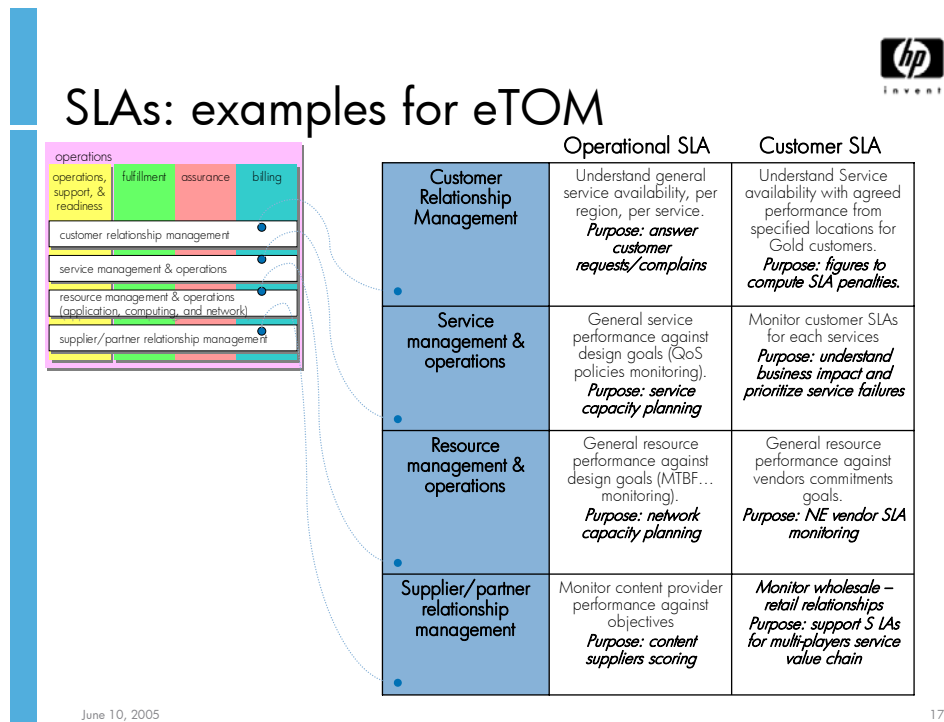
Figure 8 – OV SQM Value Pack: data collection through a mediation database

Some typical SLAs for Corporate IP Telephony, Video download and IPTV are provided as examples with the value pack. Those sample SLAs with associated demo data can be used for demonstration or education purposes:

- Those scenarios demonstrate service quality management of triple play services using HP OV Service Quality Manager IPMS value pack

- The scenarios are based on IPTV Services —Video Downloading and Broadcast TV-- and IP telephony services that are delivered to end users over an IP network

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- They highlight the role of each player in the value chain with simple business model scenarios and different types of SLAs that can be deployed

- They highlight the complexity of the service infrastructure to support new applications and the need for the overall integration within a full OSS environment.

Example 1: Sample business model for User/Corporate IP Telephony SLA

- The service provider wants to offer a SLA to large corporations that have multiple premises and offer IP Telephony services

- The requirement to manage and report on multiple customer enterprise SLAs is necessary.

- SLA will have objectives that consist of service quality, service availability, unsuccessful calls, time to repair, time to provision, etc.

SLA name: *Corporate Gold IP Telephony Class of Service*

- Service: IP Telephony

    - IP Telephony is provided over a corporate IP VPN between the corporate locations

    - HP Headquarters location is more weighted than other locations

- Service level (gold) metrics:

    - Average MOS (voice quality) across all (weighted) sites: target is average MOS value > 4

    - Ratio of unsuccessful calls (%): target is ratio <2%

    - Service Availability: calculated by OV SQM from voice quality and successful calls over monthly periods (5x7, Office hours): target service availability is 99%

    - Time to Repair: target is 95% of customer calls cleared within 2 hours

- SLA results need to be reported monthly and weekly
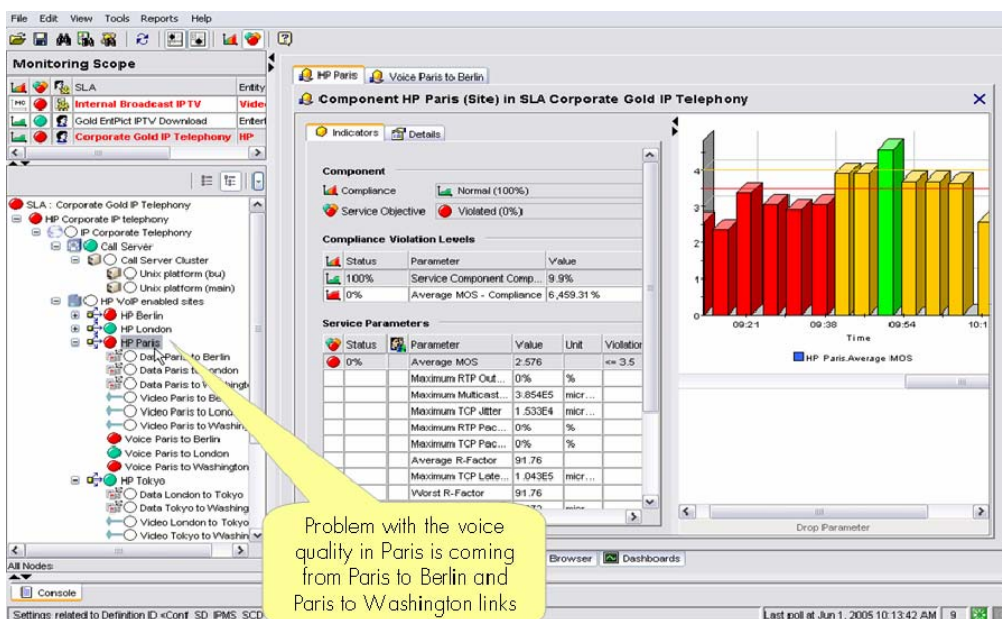
Figure 9 – OV SQM real time monitoring user interface

Example 2: Sample business model for IPTV QoS Internal SLA

- Customers have expectations on service quality and marketing establishes the requirements as Service Level Objectives (SLOs)

- Service provider is not bound legally to pay penalties if objectives are not met

- Business requires that an internal user SLA be set and measured to ensure customers are satisfied

- Operators need to monitor in live the whole IPTV deployment. Among the items to monitor there is the delivered video end to end quality.

- Operators needs to know the impacts on the quality of experience of video quality degradation. For this QoS components aggregate indicators over customizable duration.

SLA name: *Service Provider COS Objectives w/customer*

- Name: Service Provider Service Objectives

    - Property: Content type = TV

    - Property: Access method = IP Multicast from POP

- Service level objective are set for the following parameters

    - V-Factor (video quality as perceived by the end user) degradation

    - Jitter
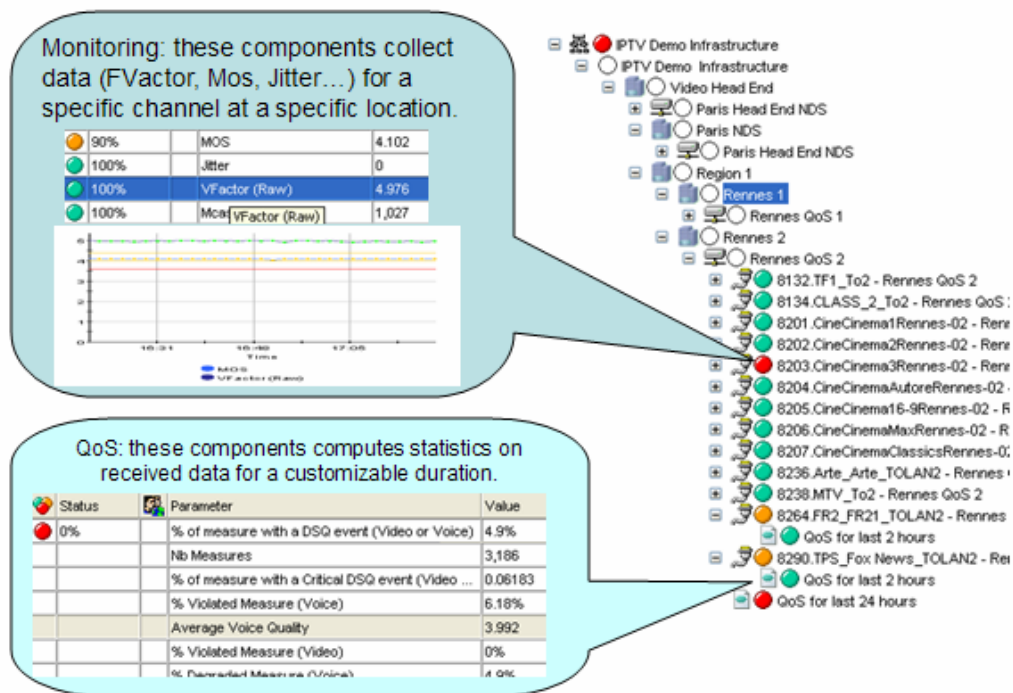
    - time to change/zap channels

Figure 10 – OV SQM real time monitoring user interface: IPTV Operational SLA

Example 3: IPTV Infrastructure monitoring SLA

- Operators have to monitor in live the whole ITPV infrastructure (Encoder, Video Server, VOD server, Core Network, Access network).

- Have all the information accessible from the single OSS in order to be able to correlate problems and prioritize problem resolution.

SLA name: **IPTV Infrastructure monitoring** and **Network monitoring SLA**

Service level objective set for all key performance indicators of the infrastructure elements (i.e. CPU Queue, Free Memory for Server, Free Space for Disk, Response time for HTTP probe…).

- Degradations and Violations are reported to the user in real time.

- The impact is propagated in the SLA tree

- Associated Key performance indicators can be visualized.

- "Launch" permits to start external application to focus on encountered problems.
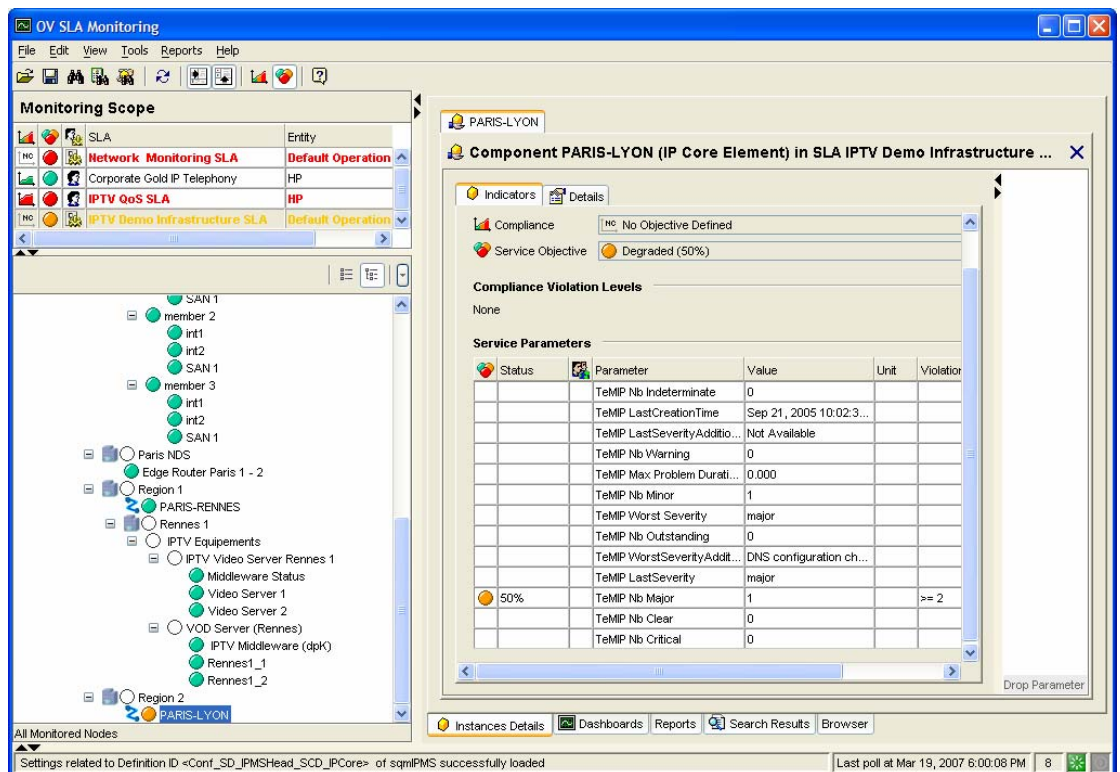
Figure 11 – IPTV Infrastructure monitoring

1.3.4.3   BO Universe/Reports

1.3.4.3.1.   OV SQM standard reports

The OpenView Service Quality Manager produces a variety of predefined reports on historical quality of service and statistical information. Reports creation can be scheduled or on-demand.

The OV SQM reporting module relies on an open datamart that is pre-integrated with a best-of-breed reporting tool. The objective of the OV SQM Datamart is to store in one place all QoS indicators that have been collected and aggregated from all sources.

Several types of information are available in dedicated reports. Reports are organized in multiple categories:

- SLA Compliance reports

- Service Health reports

- Status History reports

- Inventory reports

1.3.5 OV SQM IP Multimedia Services Value Pack: Key Quality Indicators

1.3.5.1 Need for high level Key Quality Indicators

Ideally, only a small set of end-to-end historical and real time Key Quality Indicators should be enough to get an instant view of services and SLA health and status. Those high level KQIs are composite indicators build from primary performance or quality indicators each of them coming from various domains and/or different geographies.

Even though the primary input indicators would be different as coming from different contexts (technology, vendors…), whatever the use case, the same categories of KQIs can be defined (ITU-T Rec. I.350, Eurescom P806 GI) to characterize the different aspects of service management. Those KPIs will be either Technical KQIs or Non Technical KQIs.

Technical KQIs:

- **Speed** characterizes the temporal aspects of QoS associated with a function, like data transfer or user authentication, showing time related efficiency characteristics. Speed parameters are defined on the basis of statistics made on sets of "duration times". However, the function may, or may not, be realized with the desired accuracy.

- **Accuracy** characterizes the degree of correctness with which a given function is realized. Accuracy parameters are defined on the basis either of the ratio of incorrect realizations on total attempts, or of the rate of incorrect realizations during an observation period.

- **Compliance** characterizes the percentage of the time, within a contractual period of time, when an objective for a KQI is not met.

Those technical KQIs will be available for both the service access ("access") phase and the actual service consumption ("information transfer") phase.

Non Technical KQIs

- **Service provisioning** KQIs refer to parameters attached to the processed involved in providing services or changing services to customers**.**

- **Service Repair** KQIs refer to parameters attached to the processed involved in restoring services to customers**.**

1.3.5.2 Multiple data sources

The following tables list most parameters that are collected from the various systems mentioned as data sources in the service models:

1.3.5.2.1. Customer Trouble Ticketing System

Collected Indicator(s)	Comment
Number of Cust TT opened:	Number of tickets currently opened against a specific item or area (region). Depending upon the information included in the tickets, this indicator can help measuring MTTR, Time to

close customer calls …	

1.3.5.2.2. End-to-End Performance System (active probes)

For each of the DNS, ICMP, RADIUS and MediaSteam server:

Collected Indicator(s)	Comment
DNS: **Availability** **Response Time** **Resolved**	Please refer to the "HP OpenView Internet Services - User's Reference Guide" about OVIS related indicators.
ICMP: **Availability** **Response Time** **Throughput** **Min Response** **Max Response** **Packet Loss**	Please refer to the "HP OpenView Internet Services - User's Reference Guide" about OVIS related indicators.
RADIUS: **Availability** **Response Time (DNS Setup Time + Data)** **Transfer Time** **Setup Time** **Throughput** **Transfer Time**	Please refer to the "HP OpenView Internet Services - User's Reference Guide" about OVIS related indicators.
MediaStream **Availability** **Response Time** Total response time for the Streaming Media service (Setup Time + Connect Time + Server Response Time + Transfer Time). **Setup Time** **Throughput** **Connect Time** **Server Response Time** **Transfer Time** **Packets Received** **Packet Loss** **Latency** **Congestion** **Stream Setup Time**	Please refer to the "HP OpenView Internet Services - User's Reference Guide" about OVIS related indicators.
IPPM Probe: **Min, max, mean latency** **Latency standard deviation** **Min, max mean jitter** **Jitter standard deviation** **Number of packets lost** **Latency histogram** **Latency underrun** **Latency overrun** **IPDV histogram**	KPIs defined in the IPPM RFC: - RFC 2330: Framework for IP Performance Metrics - RFC 2679: One-way Delay Metric for IPPM - RFC 2680: One-way packet loss metric for IPPM - RFC 2681: Round-trip delay Metric for IPPM - RFC 3393: IP Packet Delay

Collected Indicator(s)	Comment
IPDV underrun **IPDV overrun** **Number of bad timestamps** **Number of received frames** **Number of received bytes** **Latency 10th percentile** **IPDV (Ipdv10th) percentile** **Latency inverse percentile** **IPDV inverse percentile** **Number of packets out of order** **Number of duplicated frames** **Min, max, mean TTL**	Variation Metric for IPPM - RFC 3432: Network Performance Measurements with periodic streams

VoIP Probe:
    MOS
    R-Factor
    Mean Jitter
    Network loss probability
    Nb packets out of sequence
    Receive rate
    RR packets Lost
    Current send RTP data rate
	End to End VoIP KQIs based on RTP RTCP unicast probes.

Video Probe:
    Number of packets in sequence
    Jitter maximum
    Jitter minimum
    Maximum lost episode length
    Video Multicast first time
    Video multicast join time
    Nb frames out of sequence
    Jitter discards
    Cumulative B frame Count
    Cumulative I frame count
    Cumulative episodes of packet loss
    Network loss probability
    Cumulative P frame count
    Video Perceived Quality Indicator
	End to End Video KQIs based on MPEG2 probes

1.3.5.2.3.   Application servers

Collected Indicator(s)	Comment

CALL SERVER:
    Worst Dial Tone delay
    Worst Post Dial delay
    Average Dial to ring delay
    Worst Dial to ring delay
    Average Call duration
    Average Dial Tone delay
    Average Post Dial delay
    Worst Call Release duration
    Average Call Release
	KPIs can alternatively be collected from mediation servers or Servers MIBs/Log files.

Computed Key Quality Indicator(s)	Comment
duration **Percentage successfully established calls** **Ineffective Call Attempts Ratio** **Number of active calls** **Average Post-pickup delay** **Worst Post-pickup delay** **Nb Rejected Unauthorized Call** **Average Call setup duration** **Customer average call duration** **Customer Average dial tone delay** **Number of customer active calls** **Customer unsuccessful calls ratio** **Customer Average call setup duration**	

Video Server:
    Successful download ratio
    Unsuccessful download due to network ratio
    Unsuccessful download due to server ratio
    Customer successful download ratio
	KPIs can alternatively be collected from mediation servers or Servers MIBs/Log files.

1.3.5.3   Additional Computed /aggregated Key Quality Indicators

Example of Key Quality Indicators as aggregated for a site (as a collection of destinations) or for the Multimedia infrastructure (as a collection of multimedia servers / functions):

1.3.5.3.1.   Instance Aggregation

These parameters are spatial aggregation of source parameter. All child values are used to produce the aggregated indicators.

Computed Key Quality Indicator(s)	Comment

VoIP Site:
    Maximum TCP Jitter
    Maximum TCP Latency
    Maximum TCP PacketLoss
    Maximum TCP OutOfOrder
    Average MOS
    Average R-Factor
    …	

IPTV Probe: **VFactor Average**	
Cluster:	

Average CPU Queue Average Page Out Rate Average Network Packet collision …	

1.3.5.3.2.   Time Aggregation

These parameters are time aggregation of source parameter. They are very useful to measure the quality of service (QoS) of a given service.

| Computed Key Quality Indicator(s)	Comment
IPTV Probe: **VFactor Average**	

Cluster:
    VFactor Avg (Running Hour)
    % of measure with a DSQ event
    (Video or Voice)
    % Degraded Measure (Voice)
    % Degraded Measure (Video)
    …	

HTTP Probe
    RespTime Histogram Status
    (Running Hour)
	Status of the Response time based on Histogram analysis for running hour.

1.3.6 Solution in use

The following sections show how HP OpenView Service Quality Manager can help its users to be more efficient in their daily activities monitoring network resources, end-to-end services, or customer SLAs.

1.3.6.1   Service Level management

The HP OpenView Service Quality Manager real-time monitoring interface provides a quick and simple way to investigate service problems, as shown in the following figure.
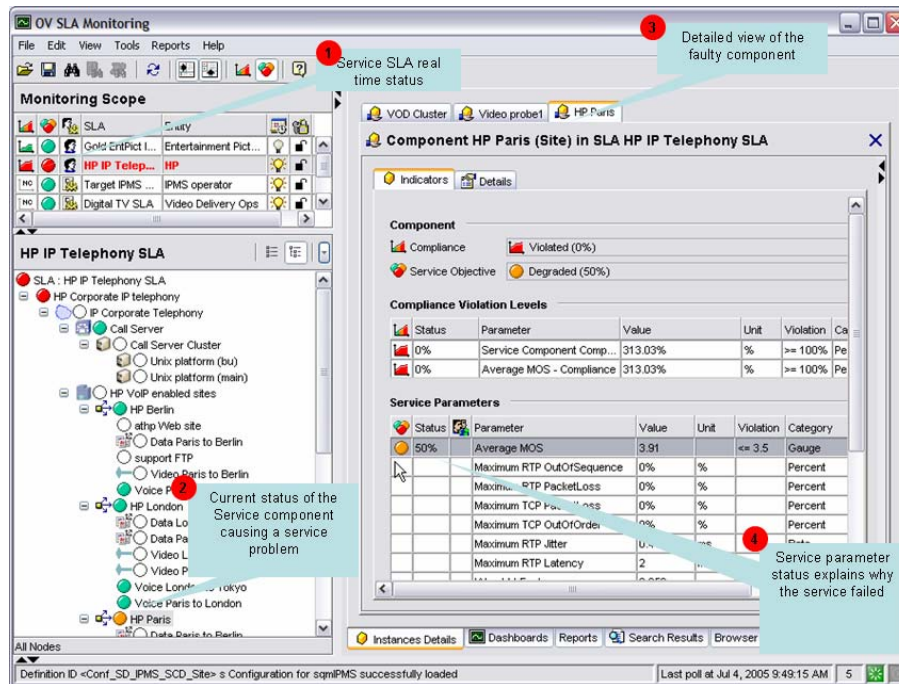
Figure 12 – HP OpenView Service Quality Manager interface

This window displays the following information, as numbered in the figure above:

The Monitoring Scope window showing the current status of each monitored service.

1. By selecting one of the monitored SLAs, Operators see a detailed view of that SLA or service. They can define filters to focus on faulty (degraded or violated) components that impact the SLA or service status.

2. A detailed view of the selected component lists the current values of all indicators attached to that component.

3. Parameter statuses, enabling the Operator to see which conditions caused a service failure.

Once they have used HP OpenView Service Quality Manager to find out which service component is causing the problem, the Operator can use a contextual menu to identify each SLA potentially impacted by the service resource concerned, as shown in the following figure.
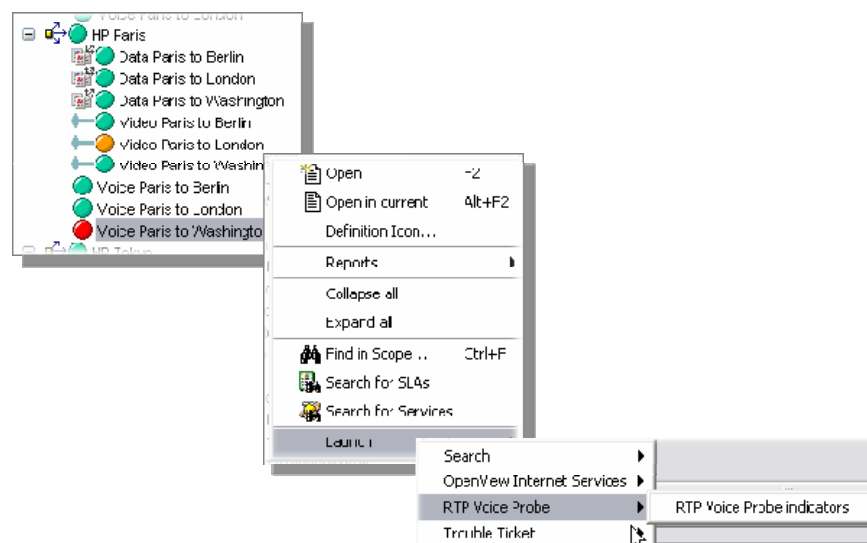
Figure 13 – Service component tree contextual menu

1.3.6.2 Customer SLA management

HP OpenView Service Quality Manager enables those interfacing with customers to meet customer expectations better, by giving them a comprehensive, end-to-end view representing how those customers perceive service utilization, as shown in the following figure.
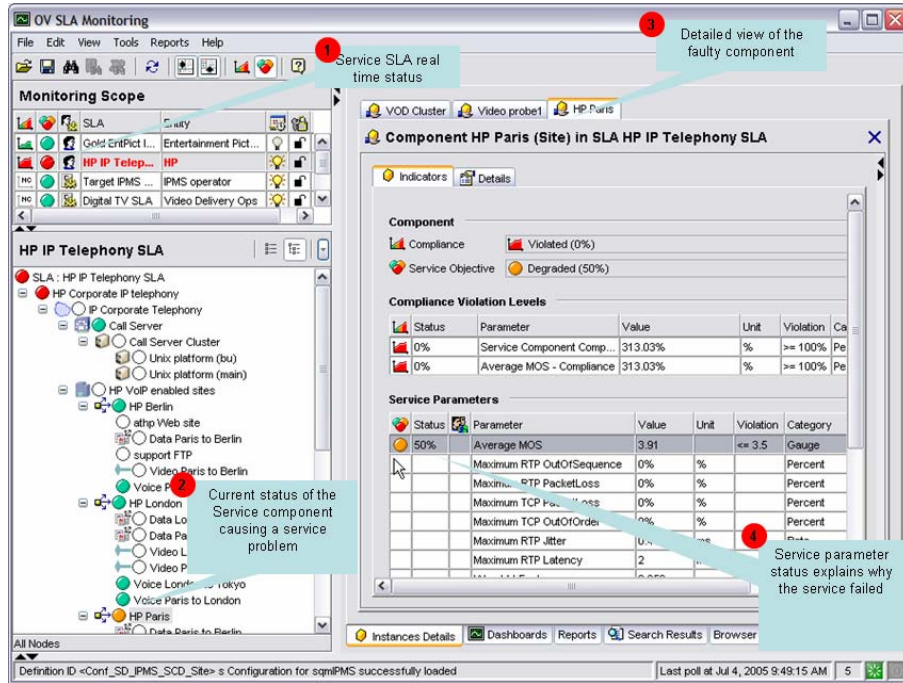

Figure 14 – Monitoring Scope example window

The Monitoring Scope window displays the following information, as numbered in the figure above:

The Monitoring Scope window shows the current status of each monitored SLA.

1. A detailed window of the service linked to that customer SLA lists all Key Quality Indicators included in the customer contract and best describing the customer experience regarding the service.

2. The current status of each indicator relative to the objectives set for that customer helps the Operator to understand what problem the service user is currently facing: in this example, there is a problem in accessing the service.

The Operator can use various dashboards to investigate the details behind the *Average_MOS* aggregate indicator, by looking at the history and current status of each primary indicator used in calculating the high-level *Average_MOS* aggregate indicator, as shown in the following figure.
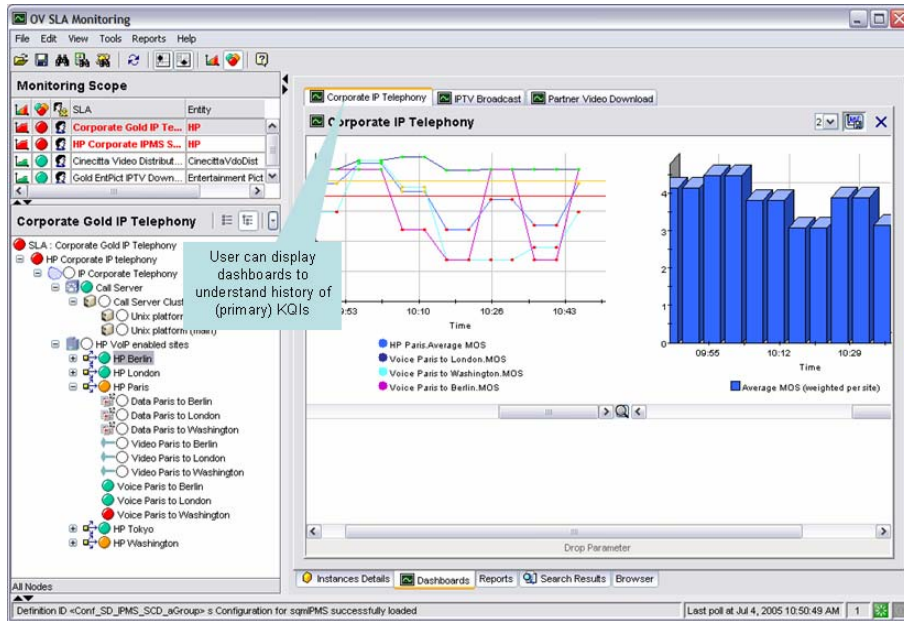
Figure 15 – Average_MOS dashboard

Operators can display predefined reports providing summary information on service availability over various timescales. End users can display similar reports using a Web-based interface, as shown in the following figure.
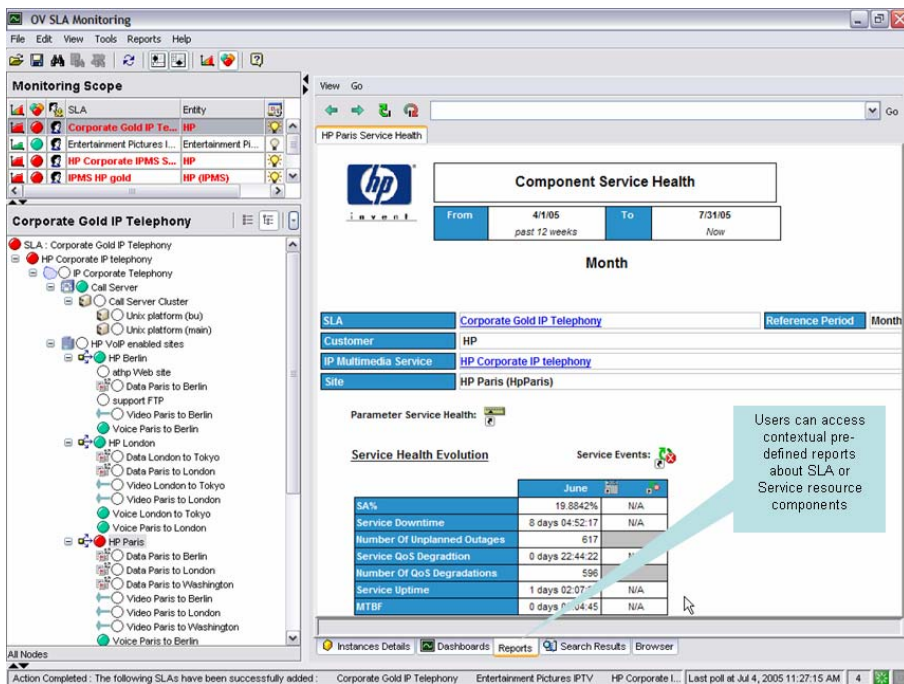

Figure 16 – OV SQM SLA reports window

1.3.6.3   Resource management

HP OpenView Service Quality Manager provides resource managers and network planners with a better understanding of how service resources are performing against expectations, and enables them to proactively plan resource updates to meet business expectations while reducing the effect on the customer experience.

Its Monitoring Scope window shows the current status of each SLA attached to specific monitored resources (such as IT network components, for example), as shown in the following figure.
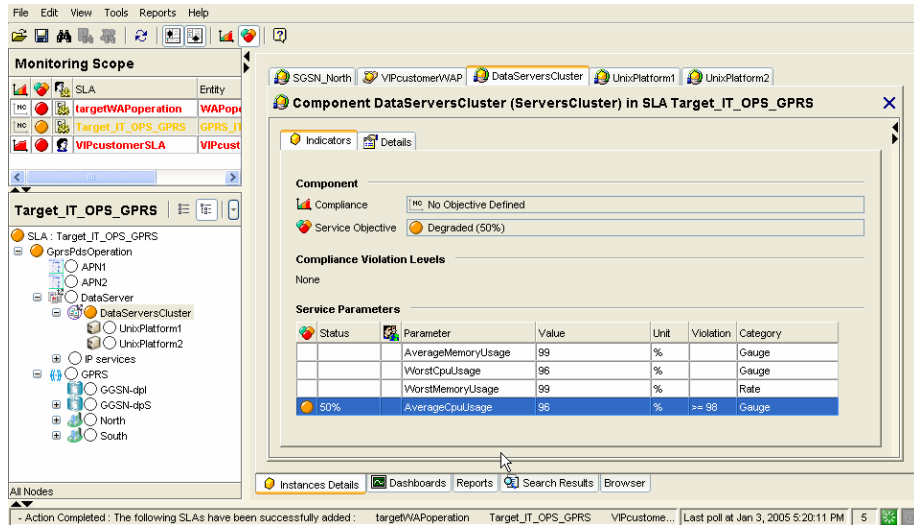
Figure 17 – Service component parameter window

HP OpenView Service Quality Manager's real-time monitoring dashboards help you to analyze complex or aggregate indicators (such as the average CPU usage, for example) through changes in the primary indicators (such as system CPU usage on specific network components, for example), as shown in the following figure.
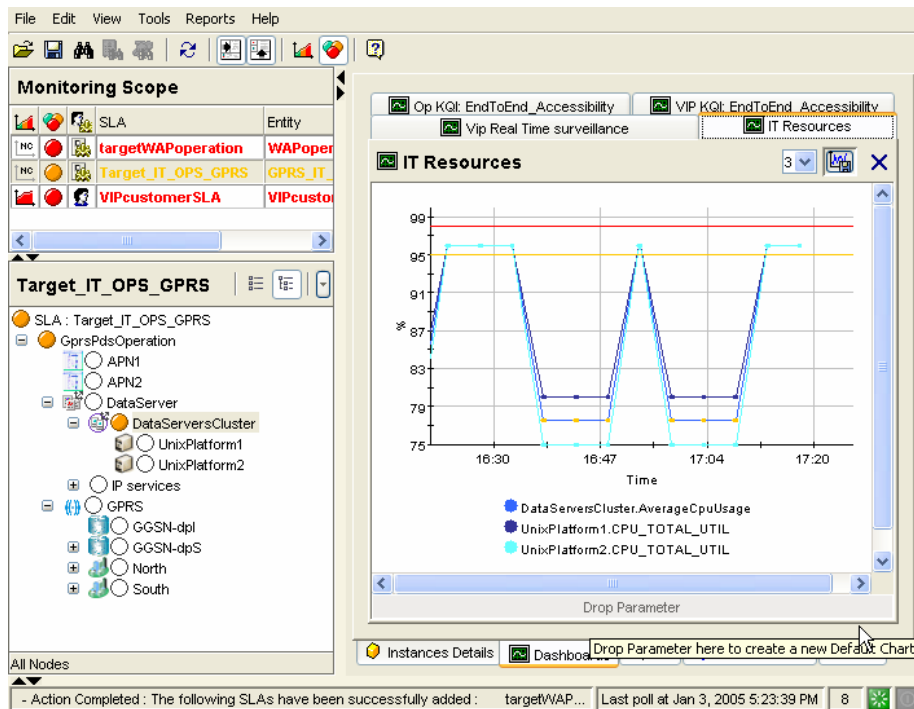
Figure 18 – IT Resources window

Predefined historical reports provide a comprehensive view of the Quality of Service each service component provides. HP OpenView Service Quality Manager's real-time monitoring interface enables you to access and navigate through reports directly from the service tree structure, as shown in the following figure.
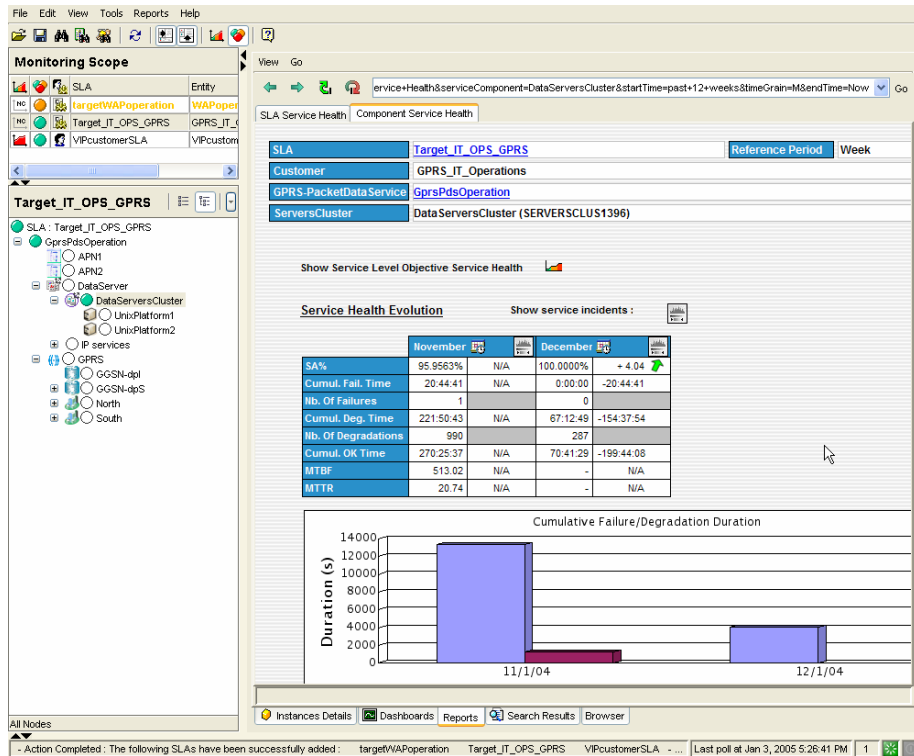
Figure 19 – SLA Service Health window

You can also use additional contextual or user-defined menus to simplify operator related tasks. The following figure shows a user launching troubleshooting tools to test a faulty component from within HP OpenView Service Quality Manager's real-time user interface.
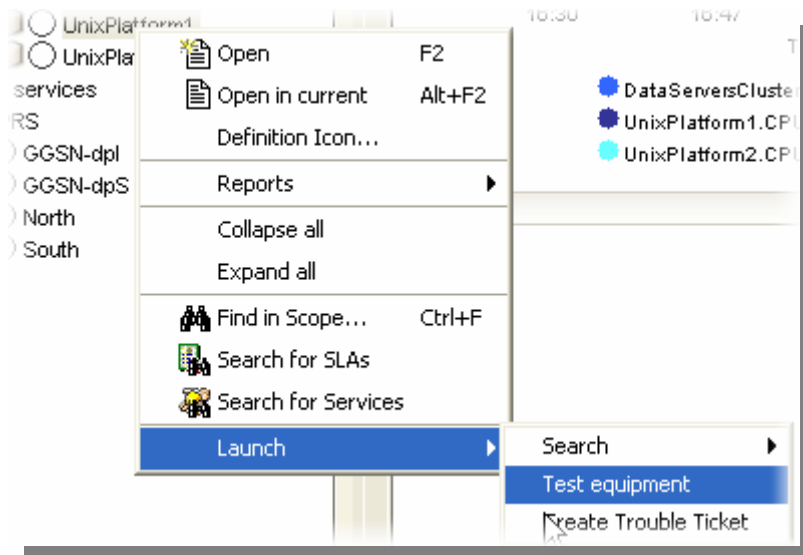

Figure 20 - 'Launch' contextual menu

Chapter 2

Setting up the OV SQM IPMS Value Pack

2.1 Software and hardware requirements

On HP-UX

The Value Pack must be installed on an HP OpenView SQM 1.4 software platform running on an HP-UX hardware platform. An Oracle database must be available on the server that is to hold the mediation database. The OpenView SQM platform must include the following elements:

- slmonitoring director

- SA Common V1.4 (SQMSAGTWCOMMON), and the SQL Service Adapter Runtime V1.4 (SQMSADB)

- slreporting director

- The SQM SNMP Action Executor, if you want to send SNMP traps when an SLA is degraded or violated.

- SQM Value Pack Development Kit.

- The QoSmetrics Service Adapters (Optional)

For details of the OpenView SQM software installation procedure, see the *HP OpenView Service Quality Manager Installation Guide*.

On Windows

Once you have installed the Value Pack, you must install at least the SL Monitoring graphical interface and the SL Administration graphical interface.

If you wish to develop your own Service Model based on the Service Model defined in the Value Pack, you must also install the Service Designer tool on top of the Rational Rose® software.

The OpenView SQM platform must include the following elements:

- SQM Value Pack Development Kit.

2.2 Value Pack contents

The Value Pack contains two installation kits for installation on the two platforms:

- Unix kit, for installation on an HP-UX platform

- Windows kit, for installation on a Windows NT, 2000, or XP platform

The following data are installed on the system::

- Value Pack documentation. (*.doc)

- Service Model project files (*.mdl, *.cat) used as input for the Service Designer.

- Source code of the Custom Expressions (*.plsql,*.java) used by the Service Model.

- The scripts and data used to populate the mediation database.

- The SQL SA toolkit projects (*.sqltk) and the generated kits (*.zip)

- The scripts that deploy and create the SQL SA, and load definitions and instances into SQM. `$TEMIPS_C_HOME/ValuePacks/setup`

- The scripts and data that only register service definitions and instances, together with the Service Levels and SLAs, into the SRM.

2.3 Installation

2.3.1 Installation on an HP-UX platform

Logging on

Log on to the HP-UX system where you want to install the HP OpenView Service Quality Manager IP Multimedia Services Value Pack, as **root** user.

Installing the kit

To install the Unix portion of the IP Multimedia Services Value Pack kit, do the following.

- If the OpenView SQM kernel is not already installed on the server, do so by following the procedure described in the *HP OpenView Service Quality Manager Installation Guide*.

- If the OpenView SQM Kernel is not already initialized, you must set up the environment variables by entering the following commands. For further details, see the *HP OpenView Service Quality Manager Installation Guide*.

```
# cd $TEMIP_SC_VAR_HOME
# . $TEMIP_SC_VAR_HOME/temip_sc_env.sh
```

- Check that SQMVALUEPACKDEVKIT is installed.

- Check that the DISPLAY environment variable is correctly set.

- Insert the IP Multimedia Services Value Pack CD-ROM into your CD-ROM drive, and then execute *SQMVALUEPACKIPMS-1.40.00.bin* and follow the instructions.

2.3.2 Installation on a Windows XP platform

To install the Windows portion of the HP OpenView Service Quality Manager IP Multimedia Services Value Pack kit, do the following.

1. Check that SQMVALUEPACKDEVKIT is installed.

2. Insert the IP Multimedia Services Value Pack CD-ROM into your CD-ROM drive, and then open the `SQM-1.40.00\Windows` folder.

3. Run the *SQMVALUEPACKIPMS.exe* installer and follow the instructions.

2.4   Setting up the Value Pack

The IPMS Value packs is delivered with several solutions that can be deployed on the platform. Reefer to Chapter 4 for details on delivered solutions.

To deploy a solution, you have to use the script $TEMIP_SC_HOME/ValuePacks/setup/temip_sc_setup_solution.

Before setting up a solution, you must create the **sqlsa** mediation database.

Note

You must perform each of the following steps under the **root** account. You must do so in order to set up each SQL Service Adapter and set up the **oracle** and **sqmadm** users as necessary.

2.4.1   Creating the mediation database

The mediation database, *sqlsa*, must be created before the Value Pack is set up. It can be created either on the local HP-UX server or on a remote HP-UX computer, using the Oracle scripts provided with SQM to deploy and delete the Oracle databases used by the *OpenView SQM* applications. For more details of the installation procedure, see the *Service Adapter for HP OpenView Operations Installation, Configuration and User's Guide*.

2.4.1.1   temip_create_database sqlsa

This tool is used to deploy all databases used by the HP OpenView SQM system. You must invoke this tool to create the *sqlsa* database on the HP-UX computer that will host it.

Note

You can display help text for this tool by invoking the tool as follows:
$TEMIP_SC_HOME/oracle/scripts/temip_create_database -h

To create the mediation database, run the *temip_create_database* tool by doing the following.

Enter the following command:

```
$ TEMIP_SC_HOME/oracle/scripts/temip_create_database
```

By invoking the tool without specifying parameters, you run the tool in an interactive mode that asks you to choose which database you wish to create and guides you through the installation process by asking you basic questions.

The *temip_create_database* tool first displays a choice of available databases, as shown below.

```
temip_create_database will deploy a database for one of the
following OpenView SQM products:

        - TeSC logger                (logger)    [1]
        - TeSC SPDM                  (spdm)      [2]
        - TeSC SRM                   (srm)       [3]
        - TeSC Datamart production   (dmprod)    [4]
        - TeSC Datamart staging      (dmstag)    [5]
        - TeSC SQL SA                (sqlsa)     [6]
        - TeSC BO repository         (borepos)   [7]
```

```
        - Exit    (terminate the session)        [e]

              Please enter the database you want to install:
```

1. Select `sqlsa [6]` to create the mediation database.

   The *temip_create_database* tool next asks you which predefined size of database you wish to create (*SMALL*, *MEDIUM*, *LARGE* or *USER*).

2. Select *SMALL*. This size is sufficient to hold the mediation database.

2.4.2   Setting up an IP Multimedia Services Value Pack solution

Once you have created the mediation database as described in the previous paragraph, execute the following script on the HP-UX computer hosting the OpenView SQM platform:

```
# $TEMIP_SC_HOME/ValuePacks/setup/temip_sc_setup_solution
```

This script does the following:

- Look for delivered demonstration scenario/solution and ask you to select the one to deploy.

- Load the required definition (DFD/SD)

- Load the instance for the scenario (DFI,SI)

- Load the simulation data

- Setup the required service adapters

- Discover the DFI

```
root#cd $TEMIP_SC_HOME/ValuePacks/setup/
root#./temip_sc_setup_solution
List of Available Solution:
- IPTV: Sample IPTV Deployment with QoSmetrics probes.
- VoIP: Sample VoIP Deployment.
Enter the solution name to deploy:
VoIP
Do you want to load-reload definitions [Y]|N
Y[Enter]
….
Do you want to load-reload instances [Y]|N
Y[Enter]
…
Do you want to load-reload simulation data [Y]|N
Y[Enter]
…
Do you want to setup Service Adapters [Y]|N
Y[Enter]
…
************** Please enter the JDBC connection parameters. **************
Please enter the database URL
[jdbc:oracle:thin:@habit.vbe.cpqcorp.net:1521:sqlsa]:
[Enter]
Please enter the database JDBC Driver [oracle.jdbc.driver.OracleDriver]:
[Enter]
Enter the required DB connection for SAI: [2]
[Enter]
```

```
Do you want to discover DFI [Y]|N
Y[Enter]
…
```

Note

In case a Service Adapter instance has already been setup by a previous
temip_sc_setup_solution execution, you may see the following error. It's not an issue
for the solution deployment.

```
Error: application already exist (platform: slmv14, director:
acquisitionIPMS, application: dpSTB)
WARNING: No file has been processed while invoking
temip_sc_setup -addOn.
        Process stops ...
Setup failed.    (1)
```

2.4.3 Configuring the IP Multimedia Services Value Pack Runtime license

Before you run the HP OpenView Service Quality Manager IP Multimedia Services
Value Pack, you must configure the SQM-VPACK-IPMS license.

The IP Multimedia Services Value Pack is supplied with a temporary license, under
which it can be used for a trial period of 90 days. This license is activated when the
application is executed for the first time.

For details of how to use the *temip_sc_license* utility to retrieve HP OpenView SQM
licenses and import them into Autopass, see the *HP OpenView Service Quality
Manager Administration Guide*.

2.4.4 Running the IP Multimedia Services Value Pack

Once you have executed the *setup_solution* script, you can run the acquisition
director. The IP Multimedia Services Value Pack director is called *acquisitionIPMS*.

Note

Before you invoke the *temip_sc_start_director* command described below, you must
ensure that the *setup_solution* script has set the JDBC 'CLASSPATH' environment
variable in the SQM environment file *$TEMIP_SC_VAR_HOME/temip_sc_env.sh* if
this has not already been done. In this case, you must also source this file, and then
stop and start the kernel by executing the commands temip_sc_stop_kernel and
temip_sc_start_kernel. You do not need to restart the OpenView SQM platform
itself.

The final message displayed when the *setup_solution* command is executed shows
whether or not it is necessary to re-source the
$TEMIP_SC_VAR_HOME/temip_sc_env.sh OpenView SQM environment file before
you restart the OpenView SQM kernel and start the *acquisitionIPMS* director.

To run the HP OpenView Service Quality Manager IP Multimedia Services Value
Pack director, do the following.

Log on as **sqmadm** user.

1. Execute the following command.

```
# temip_sc_start_director –plat slmv14 –direc acquisitionIPMS
```

This enables you to monitor the statuses of Services and SLAs provided by the IP Multimedia Services Value Pack, using the SL Monitoring graphical interface.

SLAs, Customers, Service Instances, and Service Level management tasks are performed using the SL Administration graphical interface, however.

2.4.5 Configuring the SQM platform to run the IP Multimedia Services Value Pack

2.4.5.1 Predefined monitoring user profile

The IP Multimedia Services Value Pack provides a predefined user profile for the HP OpenView Service Quality Manager real-time monitoring interface. The user name associated to this predefined user profile is *sqmIPMS*. The HP_UX administrator has to create this user before you can login to the HP OpenView Service Quality Manager real-time monitoring interface using this identity.

2.5 Uninstalling the IP Multimedia Services Value Pack

There is no specific un-installation procedure. If you have to clean-up a platform you have to perform the following actions:

- Delete IPMSHead service definition.
  sqmadm> temip_sc_delete IPMSHead -force

- Delete the application and the acquisitionIPMS director
  See temip_sc_delete_application and temip_sc_delete_director command.

- Delete the DFD that are not needed anymore. Be careful to not delete DFD used by other model for your platform.

- Delete the $TEMIP_SC_HOME/ValuePacks/IPMS directory

- Delete the required directory in $TEMIP_SC_HOME/ValuePacks/Vendors

Chapter 3

IP Multimedia Services Value Pack model design

The IPMS_V2.doc in-line document provides the detailed information on IPMS model. Install the Windows kit to access this document (located in %TEMIP_SC_HOME%/ValuePacks/HP/IPMS directory).

Chapter 4

IPMS Solutions content

The IPMS value pack comes with several **solutions** that can be deployed on the platform. A solution is a set of definition (model), instance, service adapter instances that will be deployed on a platform in order to provide a demonstration scenario. Two solutions are delivered with IPMS V2.0:

The first one is a demonstration of a Voice over IP deployment.

The second one is a demonstration of an IPTV deployment.

4.1 VoIP Solution

This solution loads the "Corporate Gold IP Telephony" SLA in charge to monitor the quality of service of a Data/VoIP deployment.

The dpQ V1.0 package is used to collect network and voice QoS indicators.

A custom IUM Service adapter is used to collect customer information about given calls (Call Server SCI).

An Ovis SA is used to collect QoS indicators for FTP and HTTP applications.

The Servers of the infrastructure are monitored by a Glance SA.

SLO are set for VoIP QoS components and for the Call Server.

4.1.1 Solution Setup

To setup this solution, run the temip_sc_setup_solution script and select VoIP.

Follow the script indications.

Once the setup is completed, start the acquisitionIPMS director.

Open the "Corporate Gold IP Telephony" SLA in the UI Monitoring.

4.1.2 Solution cleanup

The clean-up has to be done manually and depends on what you want to remove and what is installed on the platform.

4.2　IPTV-QoSmetrics

This solution loads a set of SLA focus on specific perspective to monitor the Health, the QoS and the QoE of a sample IPTV deployment.

- IPTV Demo Infrastructure SLA: Real time monitoring of the ITPV infrastructure. This is achieved by setting SLO on major KPI of the infrastructure elements.

- Network Monitoring SLA: Real time monitoring of the network infrastructure.

- IPTV QoS SLA: Provide global QoS indicators from a service provider point of view. This is achieved by setting SLO on all QoS data collected by QoSmetrics probes.

- IPTV QoE SLA: Video Quality and IPTV interactive service usage is monitored and QoE indicators from an end-user point of view are computed.

4.2.1　Solution Setup

Ensure that the QoSmetrics service adapter is installed on the platform. If it's not the case, install it (See QoSmetrics service adapter user guide).

To setup this solution, run the temip_sc_setup_solution script and select IPTV-QoSmetrics.

Follow the script indications.

Once the setup is completed:

- start the acquisitionIPMS director

- start the QoSmetrics SA with following command. It will collect data in the archive database in the past but publish them with current timestamp.

```
root# cd $TEMIP_SC_HOME/ServiceAdpaters/Jython_Sa/qosmetrics_sa/bin
root# nohup ./qossa.sh -Q <mysql server name> --discover --period 120 --
resolution 120 --manage_state --starttime 1151114649 --timeshift &
```

- If you have a set of HPUX machine, you can monitor them in the solution. For this, you have to create new DFI and start the Glance simulation :

```
root# cd $TEMIP_SC_HOME/ValuePacks/HP/Common/Glance/Simulation
root# ./declare_glance_dfi.sh <hosts to monitor list>
root# nohup ./glance_publish.sh dat/IPTV.list <hosts to monitor list>
```

- You have to change the SCI/DFI binding for some SCI components (The one in the rounded box) with DFI previously created from your host list. You can also create new host SCI bound to some of your host.
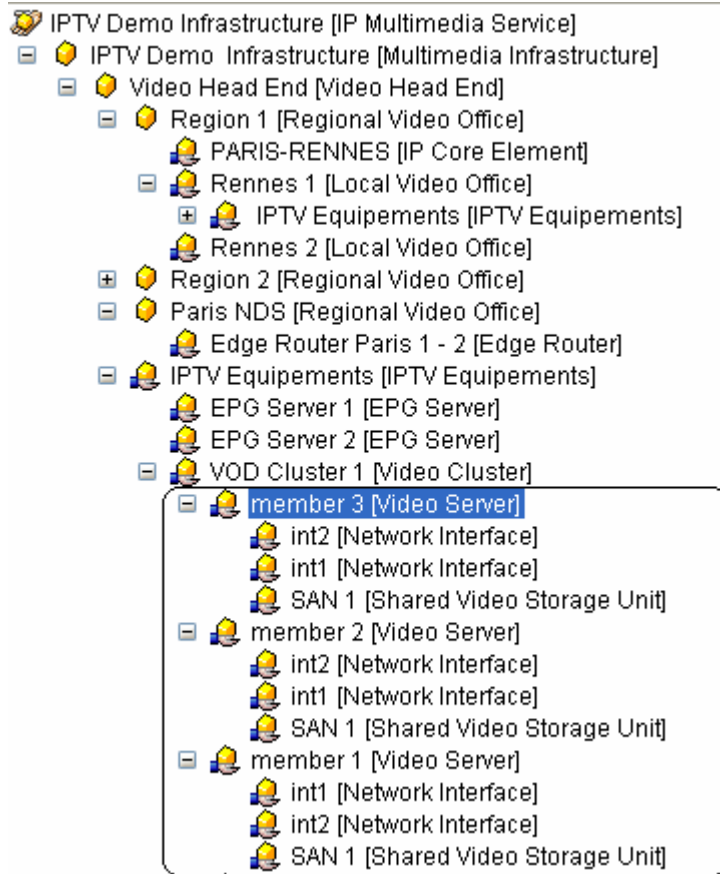
- Open the SLA listed in previous section in the UI Monitoring

4.2.2 Solution cleanup

The clean-up has to be done manually and depends on what you want to remove and what is installed on the platform.

4.2.3 Solution Highlight

First demonstrate real time monitoring of the IPTV Infrastructure by browsing the Network Monitoring SLA and the IPTV Demo Infrastructure SLA. It's important to notice that data come from several 3rd party products (Ovis, Glance, TeMIP) and that statuses are updated in real-time. Demonstrate how to add host in monitoring scope using the Glance simulator (see section 4.2.1 Solution Setup).
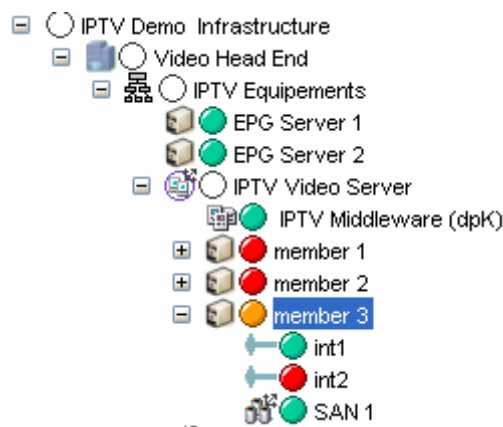
Then switch to the IPTV QoS SLA. Since this SLA is closely linked to QoSmetrics probes, it is advised to present the QoSmetrics system and associated Service Adapter.

With this SLA you can monitor in real time the quality of the delivered video service and also have QoE indicators for custom time frame (QoS components).

At last, you can focus the "IPTV QoE SLA". This SLA aggregates IPTV usage data (IPTV, EPG, nPVR, PayPerView…) for a choice of customer or customer group and measure the Quality of experience of the IPTV service for these customers.

Chapter 5

IPMS Solutions building guidelines

5.1 Introduction

You can use the Value Pack as a starting point from which to develop your own solution.

In all cases, you must do at least the following when you transform the Value Pack into an operational solution:

- You must adapt the SQL Service Adapters provided by the IP Multimedia Services Value Pack in order to collect from real datasource and not from the simulation views. You will also have to populate the table of the mediation database with your collected data.

- You must use the SQM Administration Graphical User Interface to create the appropriate Service Instances and groups, customers, and SLAs for your own case.

If necessary, you can modify the Service Definitions via the Service Designer, and then load the new model into the SRM before instantiation. You may also need to redefine the Service Levels for your own case, using the SQM Administration GUI.

5.2 Modifying the Model

You may want to modify the IPMS model for several reasons:

- Simplify it because you are not using a given 3rd party product in your infrastructure (TeMIP, Ovis)

- Replace a data source by another (TeMIP replaced by OVO).

- Simplify the model because your are not interesting in an IPMS domain (Data,Voice, IPTV)

- You want to rename SCD/parameter label for internationalization purpose.

- …

For all these actions, you need to use the SQM Service Designer and needs to be familiar with model design and also with IPMS model.

There are several ways to modify the IPMS model depending on the case:

1. Unload a package. This will remove all the component of this package from your model, and thus simplify the model. In the example bellow, the VoIP package is removed from IPMS model. In IPTV domain, you can for example, unload either the PsyTechnics Integration or the QoSmetrics Integration package since you will probably not use both probes in your infrastructure.
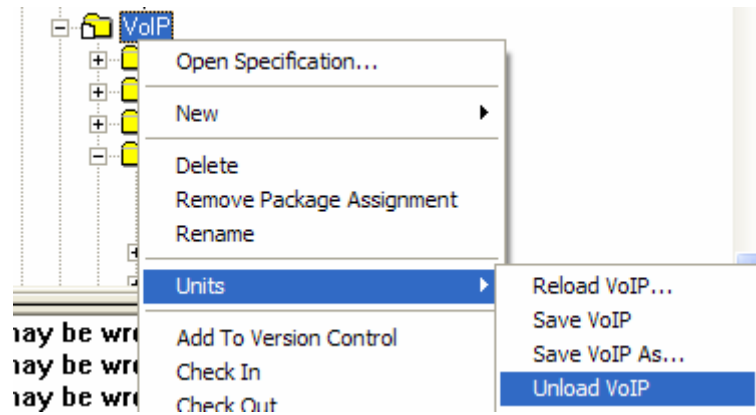
2. Use the model customization wizard to remove parameter or component from the model (See SQM Service Designer user guide).

3. You can also create your own model from scratch and use the IPMS.cat and the Common.cat control units to benefits from generic and IPMS component. See SQM Value Pack Development kit for usage of common component. Component from IPMS.cat can be use in the same manner.

4. You can also extend your existing model with component from IPMS.cat and Common.cat

Each time a modification is done in the IPMS model, the IP Multimedia Service service definition must be regenerated using the "Custom Definition & model documentation" tool (see SQM Service Designer user guide) and loaded in SQM.

5.3 Modifying the IP Multimedia Services Value Pack SQL SA

There are two categories of SQL Service Adapters: the ones that are real SQM products (OVO Service Adapter, OVIS Service Adapter, TeMIP Fault Statistic Service Adapter…) and the ones that use a mediation database to collect data.

For OVO, OVIS and TeMIP Service Adapter you have just to follow the related installation guide to deploy a new Service Adapter instance connected to you r production system. Then you have to run the discovery phase to create the associated DFI and use the UI Administration to bind these DFI to your service instance.

Other service adapters are collecting data from a mediation database and it is integrator responsibility to feed this database with data collected from your production environment. Thus the following steps must be completed to collect production data:

*   Write dataload script in charge to publish production data into the mediation database

*   Change the views used for data collection

*   Perform the discovery

*   Instantiate the SI with newly discovered DFI

Step one and two are very dependent of the Service Adapter. Full details on how to switch form simulation to production collection is given in associated in-line document provided with IPMS or Value Pack Development toolkit package.

Appendix A

Troubleshooting Guide

This appendix describes basic methods you can use to check the condition of Value Pack components.

A.1 Installation

You must check that the following Value Pack components are set up correctly on the Service Quality Manager platform:

- The mediation database must be populated and accessible.

- The Service Adapter provided by the Value Pack must be running.

- The Service Definitions and Service Instances must be registered in the Service Repository Manager.

In addition to checking these components, you can verify the contents of the following setup log file created when the Value Pack is set up:

```
$TEMIP_SC_VAR_HOME/trace/Setup_SolutionSet_IPMS.log
```

A.2 Service Repository Manager

Diagnostic check

You can check whether the Service Repository Manager has correctly registered the Service Definitions delivered by the Value Pack, by entering the following commands. Each command must return the required definitions. Alternatively, you can use the SL Administrator graphical interface to browse these definitions.

- To check that all definitions required by the IPMS Service Definition have been registered, enter the following command:

```
temip_sc_get_sd –sd IPMSHead
```

- To check whether the Service Repository Manager has correctly registered the Service Instances, Service Levels and SLAs delivered by the IP Multimedia Services Value Pack, you can either enter the following commands or use the SL Administrator graphical interface to browse the SLA:

```
temip_sc_get_sla –sd IPMSHead
```

This command must return the contents of *Cinecitta Video Distribution CoS Objectives*, *Innovative Entertainment Video Download Service* and *HP Corporate Gold IP Telephony* SLAs.

A.3 IP Multimedia Services Value Pack Service Adapters

Diagnostic check

To check that the Service Adapters delivered by the IP Multimedia Services Value Pack have been set up correctly, enter the *start director* command as follows:

```
temip_sc_start_director –plat slmv12 –dire acquisitionIPMS
```

Next, check that all Service Adapters are running by entering the following command:

```
temip_sc_show_director –plat slmv12 –dire acquisitionIPMS
```

The *IPMS* and *dpQ* applications must each be running.

A.4 Mediation database

Diagnostic check

Use an SQL browser to check that the following *VIEW*s of IPMS schemas are not empty. Check also that timestamp are correct (GMT TIME).