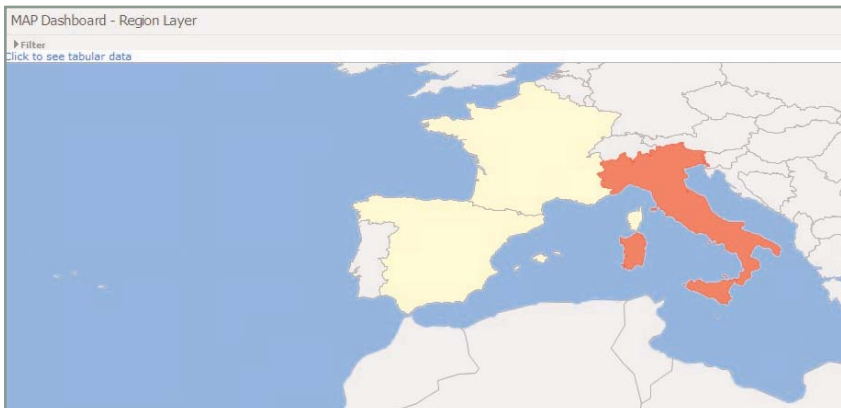


APM™ | Voice

Network Assurance for Converged Networks



Optional map views provide at-a-glance notification of breached quality thresholds suitable for NOC wallboard display.

Proactive Network Management

Through continuous monitoring of signaling session control and media packets sent between network elements, APM provides near real-time visibility of signaling and media performance.

Establish alarm thresholds on Key Performance Indicators (KPIs) to indicate an emerging problem when network performance starts to degrade—before your customers experience problems with their service.

Proactive network performance management helps reduce the number of customer complaints, minimizes the time and costs associated with troubleshooting and repair and has a positive impact on customer satisfaction and churn. Combining proactive network management with periodic quality reporting enables you to capture and retain more revenue from your customers.

Core Voice Network Protocol Support

- **Signaling:** ANSI, ITU: ISUP, IUP, NUP, TUP; SIP; H.248; MGCP; DNS; ENUM; ISDN (DSS1, DASS2, DPNSS); H.323 FS (H.225 CS and H.225 RAS); EGCP; BICC; GSM/UMTS MAP; IS41
- **Media:** RTP, RTCP, H.248 EOCQ, H.248 XNQ

Multiple Organizations Benefit from APM

- **Network Operations:**
Proactively monitor and automatically correlate the various customer and network traffic used in delivering network services spanning different networks and comprised of different protocols.
- **Network Engineering/Planning:**
Optimize capacity and manage just-in-time deployments. Network usage reporting enables carriers to judiciously plan for growth with minimal Capex.
- **Marketing and Sales:**
Leverage network performance indicators to draw quantitative inferences regarding issues and outages. Develop targeted campaigns and monitor the success of new service uptake by region.
- **Product Management:**
Ensure hop-by-hop performance of the network from rollout to revenue with information based on actual customer traffic.

Complete KPI Customization

Customers may elect Cognos' Event Studio* functionality.

- Combine and correlate available KPIs to create overall network KQIs
- Fine-tune existing KPIs with custom parameters and user-defined formulas

**future, optional feature*

Signaling Performance

- Call Attempts
- Call Answers
- Call Completions
- Call Failures
- Call Failure %
- ASR
- NER
- Abnormal Calls
- Average Call Setup Time
- Average Post Dial Delay
- Total MOU
- Average MOU
- Average Disconnect Time
- Average Hold Time
- Average Call Time
- Average Dial Tone Delay
- Short Calls
- IUP Calls
- Dual Seizures
- Circuit Resets
- Command Attempts
- Command Failures
- Command Failure %
- Average Command Latency
- Command Timeouts
- H.248 Overload

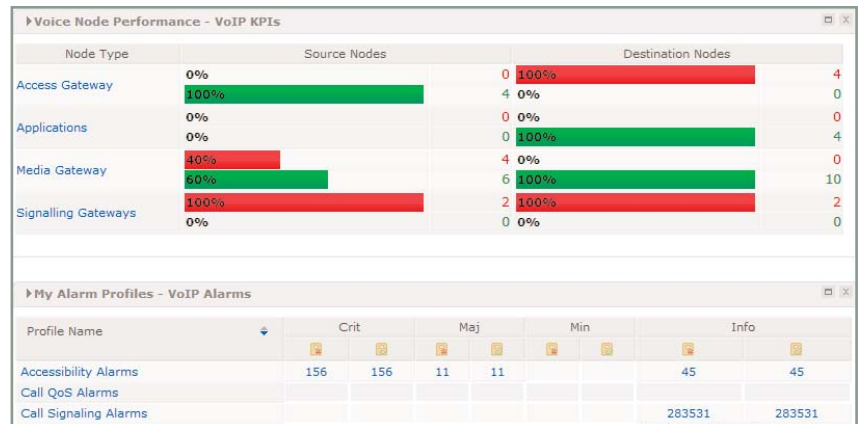
Integrated, Multi-technology Network Solution

Designed to support the monitoring of data, voice and video applications, Tektronix' Unified Assurance for Converged Networks (UACN) platform delivers comprehensive views of network, service or customer performance across multiple technology types (Mobile, IP and SS7).

- Flexible portlet GUIs enable personalization and customization for dashboards and report displays
- Standardization of data models and open web services design accommodate OSS integration with third party applications.
- Tight integration between applications reduces "swivel chair management" issues faced by multi-service converged network operators

As the foundation for the next-generation of Unified Assurance applications, UACN offers notable enhancements over traditional UA mobile and fixed network solution suite silos.

- Web-based presentation, no client software installation needed
- End-to-end correlation of signaling and media, across all monitored interfaces
- Interactive, intuitive dashboards, graphs and reports that drill down to individual calls
- Enhanced management of alarms, user profiles and security functions
- Enhanced reporting structures



Drag and drop portlets allow each user to focus on specific areas of responsibility. In this example, Node performance is reported against user-defined thresholds while a running tabulation of VoIP alarms and severity is featured in the portlet below.



Network Hierarchy View

Filter

Site Details Controlled Site Details Controlled Node Details Node Details

Node	ASR		Abnormal Calls		Average Call Setup Time (msec)		Average Disconnect Time (msec)		Average Hold Time (min)		Average Call Time (msec)		Average Dial Tone Delay (msec)		Average Command Latency (msec)	
	src	dest	src	dest	src	dest	src	dest	src	dest	src	dest	src	dest	src	dest
MS Node AG 21	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MS Node MGW XNQ12	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MS Node MGW XNQ15	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MS Node MGW XNQ22	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MS Node MGW XNQ24	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MS Node SG XNQ1	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
VIM CDR Node 1	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
APMV10	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
APMV100	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
APMV2	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MS Node AG 22	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MS Node MGW XNQ14	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MS Node MGW XNQ23	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MS Node SG XNQ2	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
APMV200	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
APMV3	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
APMV4	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
APMV5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
APMV6	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Site video+voice	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TEST	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
UNKNOWN	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Optional network hierarchy views accelerate the association of under-performing sites and nodes with specific regions and sub-regions.

Intuitive Dashboards Enable Customized Focus

Display real-time and historical performance metrics.

- Configure top-level views with drag-and-drop portlets.
- Drill-through paths and pass-through filters guide users to relevant details and troubleshooting tools.

Site/Node Type Summary Portlets offer source, destination and nested combination performance against KPIs grouped by site or node type.

Site/Node List Summary Portlets display source and destination KPIs for a selected node or site type by individual or specific protocols. These views may be augmented with charts showing performance over time

Protocol Reports feature source and destination KPIs grouped by protocols.

Site/Node Detail Reports focus on the KPIs for a selected Site/Node and protocol.

Procedure Reports group counters by procedure with drill-through to Response Code Category and Response Code Reporting, associated failed call logs and, with the optional CDR Browser, full record details. This path also offers a direct link to GeoProbe® through Web Call Trace capabilities.

Map Dashboards (optional) offer geographic representations of monitored regions and sub-regions with access to a hierarchical view of sites and nodes.

Media Performance

- Attempts
- Session Completions
- Session Failures
- Session Failure %
- Session Duration
- Total Packets Sent
- Total Packets Received
- Total Octets Sent
- Total Packets Lost
- Packets Lost %
- Average RTP Delay
- Average RTP Jitter
- Average Kilobits Sent
- Average R-Factor
- Minimum R-Factor
- Average MOS
- Minimum MOS
- Bin Count % (Excellent, Fair, Good, Good, Poor Unacceptable)

Extended Media Performance

- Sessions
- Cycles
- IPDV Sum
- IPDV Max
- IPDV Range
- Jitter Adaptations
- Jitter Degraded
- Network Degraded
- Network Degraded Seconds
- Severely Degraded Count
- Packet Loss
- Round Trip Delay

Node Failed CDR Summary Report

CDR Detail	Src Address	Src Node	Det Address	Dst Node	Protocol	Procedure	Response Code	Calling Number	Called Number
	23.6.150.1	MS Node SG XNQ1	5.4.150.2	MS Node AG 21	H.248	Context	401 - Protocol Error	12345678	12345678
	23.6.150.2	MS Node MGW XNQ12	5.4.150.2	MS Node AG 21	H.248	Context	401 - Protocol Error	12345678	12345678
	23.6.150.3	MS Node MGW XNQ13	5.4.150.2	MS Node AG 21	H.248	Context	401 - Protocol Error	12345678	12345678
	23.6.150.4	MS Node MGW XNQ14	5.4.150.2	MS Node AG 21	H.248	Context	401 - Protocol Error	12345678	12345678
	23.6.150.5	MS Node MGW XNQ15	5.4.150.2	MS Node AG 21	H.248	Context	401 - Protocol Error	12345678	12345678
	23.6.150.4	MS Node MGW XNQ14	5.4.150.2	MS Node AG 21	H.248	Context	401 - Protocol Error	12345678	12345678
	23.6.150.4	MS Node MGW XNQ14	5.4.150.2	MS Node AG 21	H.248	Context	401 - Protocol Error	12345678	12345678
	23.6.150.4	MS Node MGW XNQ14	5.4.150.2	MS Node AG 21	H.248	Context	401 - Protocol Error	12345678	12345678
	23.6.150.4	MS Node MGW XNQ14	5.4.150.2	MS Node AG 21	H.248	Context	401 - Protocol Error	12345678	12345678
	23.6.150.1	MS Node SG XNQ1	5.4.150.2	MS Node AG 21	H.248	Context	401 - Protocol Error	12345678	12345678

Simplify troubleshooting efforts with failed CDR summary reports for failed call-legs matching selected filter criteria.

Flexible Reporting and Analysis Capabilities Support Network Planning and Quality Initiatives

Analytics and Planning: Interactive trending and historical analysis capabilities are fueled by predefined OLAP data cubes.

- Cubes include Signaling Call Control, Signaling Command, Media QoS and Extended Media XNQ and Extended Media XR (*future*)
- Slice, dice and drill through cube data based on performance dimensions.

Management Reports (*future*): While dashboards and OLAP cubes may be configured to display any combination of available KPIs, pre-defined reports will be available for plug-and-play functionality and more routine information sharing.

- Entry, hourly, daily, weekly and monthly resolutions supported
- Menu-driven filters enable output customization of collected data

Ad hoc Reports (optional): Cognos Query Studio allows direct access to the Oracle RDBMS for the most complex reporting scenarios.

About Tektronix:

Tektronix Communications provides network operators and equipment manufacturers around the world an unparalleled suite of network diagnostics and management solutions for fixed, mobile, IP and converged multi-service networks.

This comprehensive set of solutions support a range of architectures and applications such as LTE, fixed mobile convergence, IMS, broadband wireless access, WiMAX, VoIP and triple play, including IPTV.

For Further Information:

Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology.

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