

[TEMS™ PRODUCTS]

TEMS™ VISUALIZATION ENTERPRISE BRIDGING THE OPTIMIZATION GAP




SEE YOUR NETWORK IN A WHOLE NEW WAY

TEMS Visualization is revolutionizing the optimization of wireless networks. It post-processes event-based data generated by the network infrastructure, analyzing and organizing the information for radio network troubleshooting, optimization, and functionality verification.

For mobile operators that are serious about delivering ubiquitous quality and availability, traditional network performance management tools simply aren't enough. To home in on problems that were impossible to pinpoint before (those in difficult-to-drive-test spots or related to individual subscriber or phone model issues), operators must complement their network performance management and drive-testing tools with advanced network visualization and optimization capabilities.

Breakthrough network optimization tools like TEMS Visualization use event-based data from the infrastructure side to bridge the critical gap between performance management systems and drive testing. While performance management tools provide high-level key performance indicators (KPIs) from counter data, and drive-testing tools capture thin slices of network traffic, TEMS Visualization derives detailed information from large volumes of live network traffic.

The General Performance Event Handling (GPEH) application for WCDMA and CellTrace application for LTE (both available in Ericsson networks) enable the TEMS Visualization Enterprise edition to collect, retrieve, store, and analyze event data from large areas of the network, in greater volume and detail, and more cost-effectively than is possible using external probes. Event data logfiles are generated in the radio network elements and collected in the Ericsson OSS-RC file storage for post-processing by TEMS Visualization Enterprise.



TEMS Visualization bridges the gap between traditional performance management solutions and drive-test solutions

This enterprise-grade solution gives RF engineers the most effective way to troubleshoot and optimize WCDMA and LTE networks. Benefits include:

- **Faster troubleshooting and mean time to repair (MTTR)** – TEMS Visualization’s diagnostics features help engineers more quickly find root causes for RF and network capacity problems, enabling them to enhance quality of service.
- **Improved decision making** – The large volumes of decoded event data and smaller volumes of calculated statistical data are stored separately. Thus, statistical data can be stored and analyzed over longer time periods – giving operators actionable information that fosters better decisions.
- **Reduced OPEX, thanks to support of existing and next-generation wireless standards** – Ensure that your OSS tools can evolve to meet the needs of your complex infrastructure by exploiting TEMS Visualization’s support for WCDMA and HSPA/HSPA+, and LTE technologies.

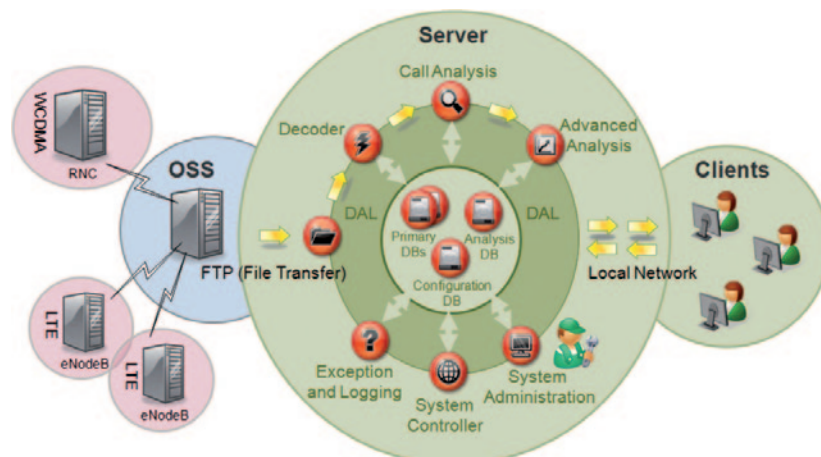
The TEMS Visualization Enterprise edition consists of **servers** and **clients**.

The servers collect, process, and store all data. A powerful data processing engine, designed from the bottom up with 64-bit and multi-core/CPU support in mind, keeps pace with increasing data volumes.

The clients send queries to the server, collect the results, and depict them visually. TEMS Visualization users install the client software on their own machines without the need for added remote access software.

TEMS™ Visualization Enterprise is a true client/server solution, providing processing, storage, and remote access for large volumes of data.

System Overview



POWERFUL, UNIQUE FEATURES

RF TROUBLESHOOTING – QUICKLY PINPOINT THE ROOT OF NETWORK PERFORMANCE DEGRADATIONS

To troubleshoot performance degradations in today's complex networks, RF engineers often need more information than is available from basic KPI counter data, alarms and trouble-tickets. To help them get to the root causes of problems efficiently, TEMS Visualization processes, organizes and visualizes large volumes of calls generated by real subscribers and allows:

- Performance problems such as dropped and blocked calls to be attributed to specific cells, subscribers or phone types – with KPIs aggregated from the event data
- Approximate locations of performance problems to be identified with geo-location features for WCDMA
- Basic RF and capacity issues, which are causing performance degradations, to be easily identified using the automated diagnostics features for WCDMA
- Direct drilldown from all features, enabling engineers to analyze in detail the data from individual calls and messages so they can trap, track, and eradicate problems based on message sequences and specific phone models



Cell, Phone Model, and Subscriber KPIs

TEMS Visualization enables quick identification and troubleshooting of poorly performing cells and clusters, as well as poorly performing WCDMA phone models and individual subscribers. In addition, groups of subscribers can be created to allow engineers to investigate performance problems uncovered by TEMS Automatic units, or affecting important corporate customer groups, or VIPs.

Statistics for accessibility, retainability, mobility, and packet-switched data performance are aggregated from WCDMA GPEH and LTE CellTrace data with direct drilldown to detailed call analysis for problem calls.

High-speed packet data analysis provides average throughput statistics in all KPI views and throughput to be tracked for an individual call. In addition, channel switching statistics are provided for WCDMA.

WCDMA dropped call analyzer efficiently identifies common components in dropped calls: For example, if all of the dropped calls in one call are caused by the same subscriber or at the same geographic location, or if all of the dropped calls for one phone model are on the same cell or are the same radio access bearer (RAB) type.

WCDMA cell capacity analysis identifies cells with resource issues by using peak usage statistics for key resource types. Problem cells can then be examined in detail with charts showing the usage of resources such as channel elements, power, and active high-speed users in high resolution.

WCDMA RF diagnostics automatically highlight cells with RF issues. Analysis of measurement reports identifies cells with problems such as out of coverage, high DL interference, high UL interference, or UL/DL imbalance. Further analysis identifies the potential causes of these issues, such as missing IRAT/IFHO handovers, UL path losses, overshooting cells, or pilot pollution. The MRR-W feature in the Ericsson OSS-RC is required.



OPTIMIZE YOUR NETWORK

WCDMA event geo-location enables dropped calls to be geo-located, with the number of dropped calls in each geographical bin displayed on the map. Clicking on a bin presents details for the drops in that bin and allows further drilldown. Engineers can draw a polygon around a road and analyze the dropped calls from real subscribers as “virtual drive tests.”

Detailed event analysis allows engineers to search for specific exceptional events and to send calls containing those events to call analysis. In WCDMA, they can analyze time delays between pairs of GPEH messages and send outliers, which indicate network performance issues, for detailed investigation. NAS signaling between user equipment (UE) and the core network is also possible. There is no more effective way to find the root causes of network problems.

Call analysis sends calls highlighted in any feature to call analysis for in-depth examination. Sequences of signaling messages are shown, and the reasons behind problems such as blocked and dropped calls can be investigated in great detail. Engineers can follow radio measurements per call, view detailed content for individual messages, retrieve distance and quality information, and analyze large groups of calls for patterns.

RF OPTIMIZATION – PROACTIVE KPI MAINTENANCE AND IMPROVEMENT

TEMS Visualization Enterprise also includes features that increase efficiency in the most important day-to-day RF optimization tasks. Utilizing the live subscriber traffic, engineers can make the most well informed optimization decisions and positively impact subscriber perceived network quality.

WCDMA neighbor optimization makes it possible to easily optimize the neighbor plans, which are crucial for network performance. Missing neighbors and non-utilized existing neighbors are identified for both intra-frequency and, uniquely, inter-frequency relations. Per-IMSI statistics allow the exclusion of individual subscriber specific issues – and the engineer to focus on true network issues. All of this information is linked to the map view for easy analysis. Changes can be made and saved to a Bulk CM format file for import into the OSS-RC.

WCDMA coverage area optimization allows overshooting cells to be quickly identified and down-tilts adjusted. An algorithm calculates an overshooting distance for each cell. During processing, statistics are calculated for the number of overshooting calls and the number of calls established in poor quality. Detailed investigation of the calls established in each distance band and the quality of those calls can also be shown in charts and on the map.

WCDMA geo-location of pilot pollution allows areas where several cells are involved in overlapping coverage to be geo-located on the map, enabling engineers to determine if:

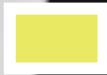
- Cells are providing coverage in unwanted areas and causing pilot pollution
- Wanted cell coverage will still be good if, for example, the polluting cells are down-tilted
- The reason behind pilot pollution is simply poor coverage

GENERAL FEATURES

- TEMS Visualization Enterprise can take in the Bulk CM format directly from the Ericsson OSS-RC and store the required information in the project database. This includes neighbor cell relations and selection priorities and other cell parameters that the features require
- Any missing information, such as latitude, longitude and antenna direction, and beam-width, can be taken from a reference file
- TEMS Visualization includes the most widely used map engine in the world, MapInfo’s MapXtreme®. This makes it possible to reuse all of the maps currently used in TEMS™ Investigation and MapInfo
- The functionality in the map view includes thematic mapping display from all of the advanced TEMS Visualization Enterprise features
- TEMS Visualization Enterprise makes it easy to differentiate on the map cells between different WCDMA carriers (UARFCN) at the same site location. Separate display filters are automatically created
- TEMS Visualization uses the Microsoft® SQL Server 2008 R2 Enterprise database solution



All information is graphically displayed on a map for easy analysis



Network Requirements

Ericsson WCDMA GPEH data source

- Ericsson WCDMA P7FP-W11A with GPEH
- MRR-W in OSS-RC also required for the RF diagnostics feature

Ericsson LTE CellTrace data source

- Ericsson LTE L11A with CellTrace

A REVOLUTIONARY SOLUTION

TEMS Visualization Enterprise is:

- **Powerful** – This is a true client/server solution. Large volumes of data can be processed, stored centrally, and accessed remotely through the client application.
- **Efficient** – Data processing can be completely automatic so that information is always ready to be analyzed when needed.
- **Intelligent** – Statistical data can be stored and analyzed over longer time periods, giving operators more confidence in their decisions.

TEMS Visualization Enterprise is ideal for both troubleshooting of network problems and for regional optimization. The tool gives operators the information they need to get the optimal performance from their network in the most efficient manner possible.

NEW IN RELEASE 8.0

Ericsson LTE CellTrace Module

- RF charts – analyze RF and throughput performance per cell

Ericsson WCDMA GPEH Module

- Support for Ericsson W11A release
- Phone model KPIs – find and analyze worst performing phone models
- Dropped call analyzer – identify common factors behind dropped calls
- Cluster based analysis – import or define geographic cell clusters and troubleshoot performance per cluster
- Geo-located maps – plot and analyze maps of dropped calls and pilot pollution for a selected geographic area, use subscribers as virtual drive tests
- Sequence delay histogram – analyze delays in message signaling
- Call search – find calls based on specific search criteria
- NAS message decoding – investigate signaling between UE and core network
- Scanner ID filter – ensure only messages for the TEMS Visualization profile on the OSS-RC are processed