InfoVista
Your Success Starts Here

Self-Optimizing Solution for 2G, 3G and 4G Mobile Networks

Dynamically maximizing the performance and Quality of Service (QoS) of current and future mobile infrastructures

VistaSON®

The Challenge of Controlling RAN's OPEX

MNOs are struggling to manage, optimize and upgrade multiple legacy infrastructures. As ARPU decreases, CAPEX and OPEX rise and revenue stalls, increasing EBIDA margins have never presented such a challenge.

According to US analyst firm Infonetics Research, the worldwide OPEX-to-revenue ratio amongst MNOs is 70 percent. With revenue growth slowing down and CAPEX increasing due to the deployment of more cost-effective networks, it's no surprise that controlling and reducing OPEX is a key strategy to increase margins.

The radio access network (RAN) is the most costly domain of every MNO. This is in part due to the complexity of the RAN infrastructure, which incorporates tens of thousands of cell sites, hundreds of thousands of miles of transport networks, hundreds of third-party vendor and providers contracts and hundreds employees. The extent of the RAN's impact on OPEX was recently quantified by Yankee Group, who estimated that 80 percent of MNOs' network OPEX can be attributed to the RAN. Based on these figures, it's clear that the RAN, as a domain, offers MNOs one of the biggest opportunities to increase and protect their profit margins.

According to Yankee Group, approximately 26 percent of MNOs' OPEX budget is spent on network operations. To put this in perspective, a leading US tier1 MNO needs to spend as much as 9 billion USD annually to operate, manage and optimize its network.

Reducing or controlling OPEX is not a simple task. Each network domain poses unique challenges and OPEX reduction opportunities that MNOs can take advantage of. In addition, many opportunities are present at each functional layer, including maintenance, O&M service delivery and assurance, connectivity leasing, support and energy, etc.

The solution to release RAN Organization's Pressure

It's no surprise why the pressure from RAN organizations has drastically increased over the last decade. On one hand, they are being asked to control and reduce OPEX by maintenance, management, power consumption, staff, etc.; and on the other, they have to keep improving and assuring QoS and QoE KPIs. Furthermore, RAN organizations have to also deliver in a timely manner a host of network upgrade projects

Many of these projects also bring new technologies. For many, the arrival of LTE and IP backhauls are further extending the RAN's challenge of reducing OPEX and achieving KPIs. These new infrastructures introduce new network elements and thousands of parameters that RAN organisations will need to configure, monitor, assure and optimize in parallel of the "legacy" activities. New technologies also equate to new equipment vendors in the network, translating into more management systems, proprietary parameters and interfaces. - It's no surprise that RAN organizations need quick answers to the following questions:

1. Is there an easier way of **sensing the performance and quality** of our network?
2. Is there a more efficient way to **detect and compensate for service outages?**
3. Is there a more efficient way to **optimize our coverage, capacity and performance?**
4. Is there a more efficient way to **mitigate traffic load hotspots?**
5. Is there a way to **reduce power consumption?**

At InfoVista we believe the key to next-gen network optimization relies on how much time RAN engineers have to perform high-value network management and optimization tasks while redefining and prioritizing RAN best practices.

Workflow automation is an important capability to utilize to provide engineers with additional time. Automating the management and optimization of 2G, 3G and 4G networks provides RAN experts with the time necessary to plan, design and deploy faster and more cost-efficient networks. Therefore, the resulting networks are proactively optimized and efficiently managed. - Critical enablers for OPEX reduction and QoE assurance.

A Solid Foundation for SON Automation – From Manual to SON

InfoVista's solution for enabling SON automation is not just a tool; it's the combined result of a process, an enabler and a platform. InfoVista's SON approach consists of a step-by-step framework. This framework enables MNOs to safely transition from a manual network optimization practice with maximum human decision-making involvement to a full, closed-loop dynamic network optimization practice where users approve automations that can be triggered by pre-defined network conditions.

PROCESS

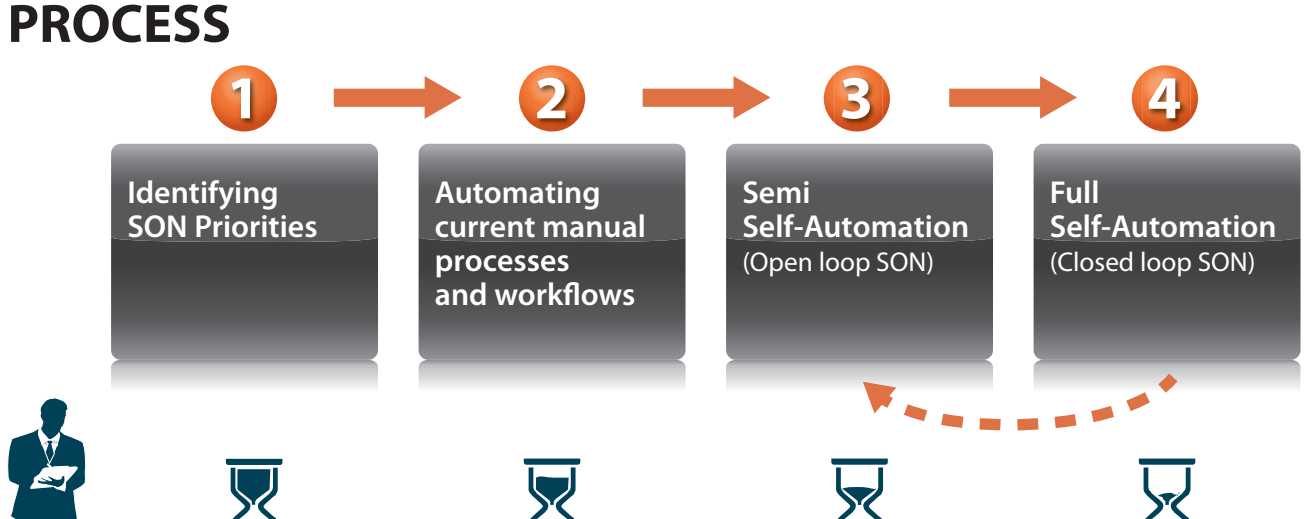


***Figure 1** – InfoVista's Step-by-step approach to SON*

Step 1 - Identifying SON Automation Priorities

To deploy a SON solution that guarantees a quick return on investment (ROI), MNOs need to be able to easily identify the areas of optimization that would provide the maximum benefit. VistaSON includes unique network analytics and reporting engines which allows MNOs to proactively identify 2G, 3G and 4G "SON-hotspots". VistaSON analyses key performance indicators to identify coverage holes, performance degradations, network overload and mobility patterns in handover and utilization.

Step 2 - Automation of Routine Optimization and Management Tasks

Perhaps the most important step towards fully automated networks, InfoVista's VistaSON is equipped with a unique open script framework. This framework allows RAN engineers to automate daily or yearly repetitive RAN maintenance and optimization workflows. Once implemented, this critical functionality (not defined by the NGMN) enables the creation of "pre-SON" customized use cases that free up engineers' time, allowing them to focus solely on higher value, more complex SON features.

Step 3 - Semi Self-Automated Actions / Open Loop SON

The next step toward a fully automated network is deploying "approval-needed" self-automated actions in the network. VistaSON leverages the NGMN concept of open loop, allowing MNOs to control the automatic activation of key optimization actions as different SON engines and algorithms detect them. VistaSON also provides the right level of visibility to enable engineers to measure the impact of such actions with a unique set of before and after performance visualizations.

Step 4 - Fully Self-Automated Actions

This is the final destination of a fully automated SON action. By leveraging the concept of closed-loop, as defined by the NGMN, VistaSON allows RAN engineers to configure and deploy "pre-approved" SON actions. Once engineers have monitored and validated the positive effect of a particular open-loop action, they can use this feature to automatically apply a pre-defined action to a set of network resources or "management clusters" defined by the user.

Key Benefits

In contrast to equipment vendor manufacturers who focus mainly on self-configuration ANR and plug-and-play features for LTE, InfoVista's VistaSON platform allows MNOs to automate the management and optimization of multivendor, multi-technology radio access networks. VistaSON not only enables automation for LTE, but is also capable of introducing automation and use cases to the overloaded 2G and 3G environments. VistaSON's open scripting framework and out-of-the-box use-cases provide the following benefits:

- Containing OPEX and managing network complexity –VistaSON eliminates unnecessary work by automating network configurations and disaster recovery. Overall, this reduces the amount of time required to efficiently manage multiple networks.
- Improving customer experience – By increasing the usage and reach of cell towers currently in place and automating outage compensations, MNOs are able to implement higher data throughput rates and service availability for subscribers. This allows them to offer a more consistent, high quality user experience.
- Maximizing service usage – Dynamic load balancing and hotspot mitigation help identify recurring network congestion and suggest configuration templates that can be automatically applied in a proactive and recurring manner to help limit performance degradation. This improves QoS and prevents problems from recurring within the same network.

VistaSON is not only able to reduce the amount of human involvement required to manage tomorrow's single RAN environments, but is also capable of measuring the performance impact of network automations via an updated SON visualization engine.

Platform Features

VistaSON is powered by a robust, centralized vendor-independent platform; an open scripting framework and a series of unique algorithms with technologies derived from 60+ RAN optimization patent applications. Since its early development stages, VistaSON technology has been closely aligned with the self-organizing network requirements defined by the NGMN and adopted by 3GPP.

SON Visualization

A particularly unique feature of VistaSON is its advanced automation and optimization visualization engine. VistaSON leverages InfoVista's award winning analytics and 2.0 reporting engines to provide a holistic view of the impact and status of optimization actions in the network. This feature provides all the necessary measurements to validate the solution's impact to the business.

Before and After Visibility

VistaSON includes a powerful dashboard that enables RAN managers and engineers to quantify the positive or negative impact of individual SON actions as well as the combined daily, weekly and monthly impact of a group of actions carried in the network. This critical feature also provides high-level to low-level drill-down capabilities, starting from monthly saving reports all the way to per cell, per cluster, and per region market impact.

Figure 2 *– SON performance impact analytics dashboard*

SON Performance Metrics

VistaSON is also equipped with a proprietary set of SON compound KPIs, such as multi-cell load imbalance metrics and the identification of under-performing cells based on metrics correlations. In addition, VistaSON provides visibility into dominant mobility path prediction metrics by processing handover metrics to identify mobility and congestion propagation paths in the network.

SON Optimization Notifications and Historical Action Logs

The VistaSON management console includes a notification engine that alerts the user of SON optimization opportunities. This feature is a critical enabler of semi-self automated SON actions (step 3 of the InfoVista framework). In addition, the VistaSON visualization engine is able to keep track of all actions performed in the network. This allows engineers to monitor the operation of the platform, which is especially important when running actions in closed-loop mode.

Open Scripting Framework

Open SON scripting allows network management teams to develop customized SON solutions driven by their unique operational needs. In addition to the sophisticated SON algorithms delivered with this product, operations teams have all the flexibility they need to build their own business logics and script routines needed to automate simple, yet time-consuming recurring tasks such as parameter audits and bulk parameter updates (e.g. what are the current RET settings for all cells in a certain market?). In more sophisticated use cases, Operators are able to source in near real time KPI analytics within their scripts to react to network events that they are otherwise reacting to manually. Built with cell locking mechanisms, script priority management and manual over rides, this offers a SON Development Platform for Operators who aspire to innovate SON algorithms and work flows themselves or have a good degree of control on the automation modules delivered by InfoVista.

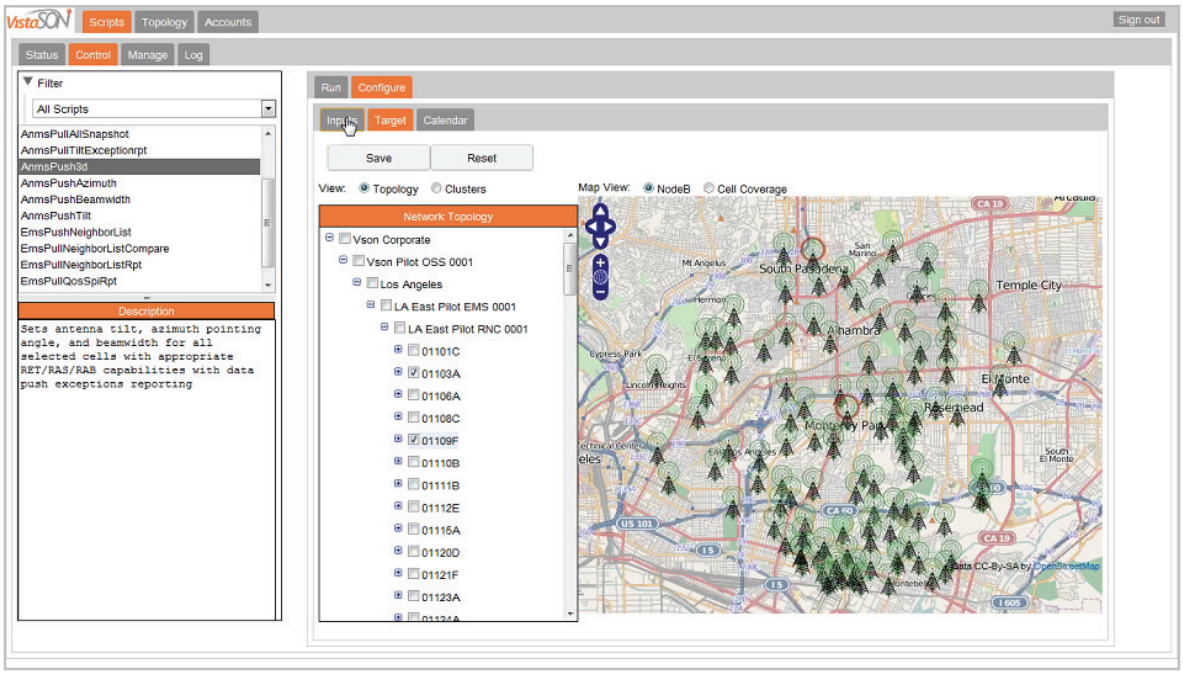


Figure 3 *– Open SON Scripting Engine = Topology View*

Workflow Automation Profiles

Furthermore, engineers can build tailored automation profiles defined by the combination of:
Objects: NodeBs, Cells, RNC, EMS, antenna controller
Actions Scripts Examples: RAN bulk parameter pushes to effect remote antenna tilts (up/down, pan, fan), TX power, etc, Bulk Parameter audits and exception reports, busy hour configurations, energy saving "plan" enforcement /recalls.
Triggers: High/low threshold, Time-of-day/week/month, up/down runs, max delta, manual alerts

OPEN Vendor-Independent RAN Automation

The VistaSON platform is equipped with an open performance-sensing layer that monitors and correlates the utilization and QoS of multiple RAN equipment vendors. It also collects radio parameters and topology data from multiple planning tools.

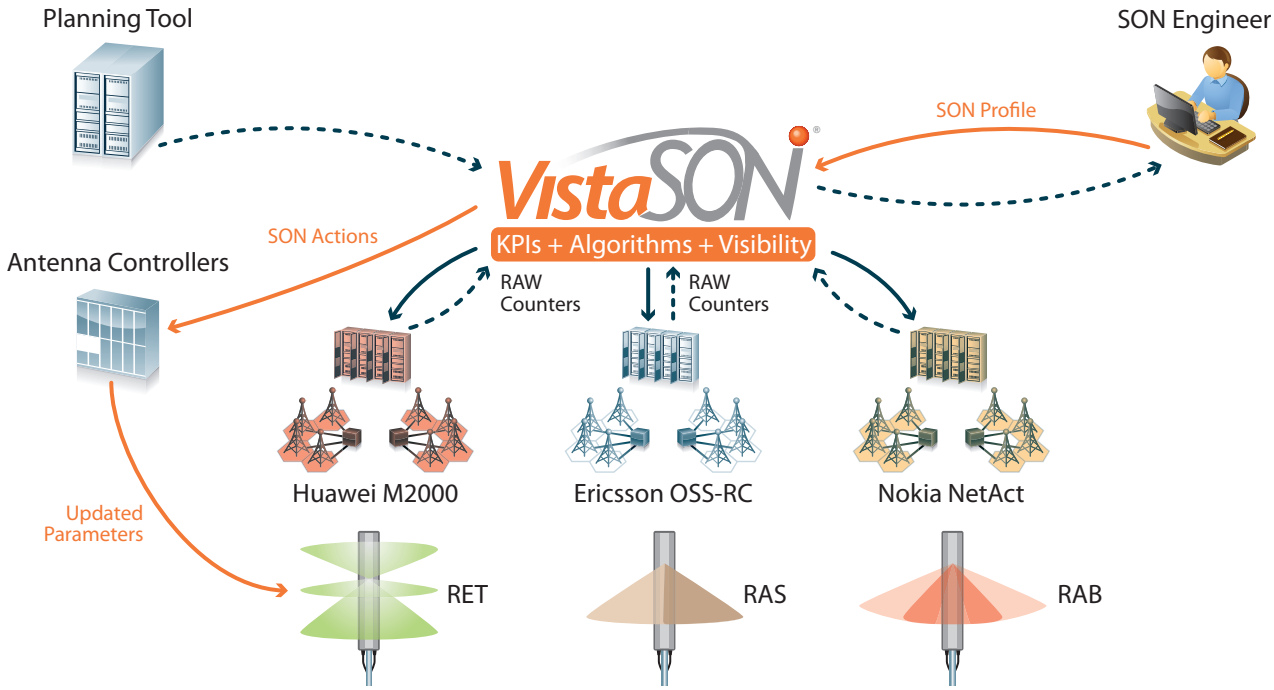
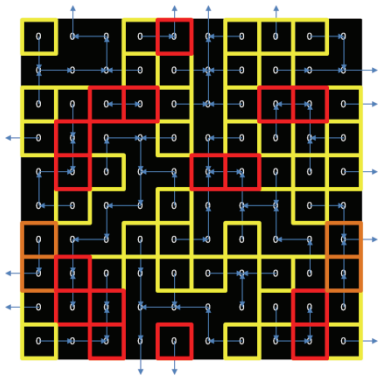
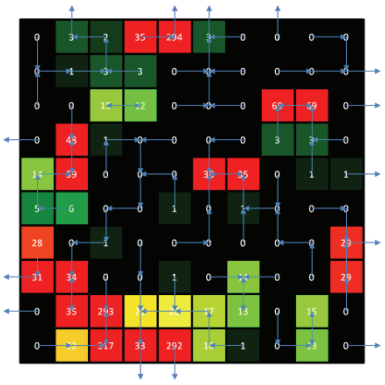


***Figure 4** – VistaSON Functional Overview*

Intelligent Pattern Recognition and Trending

VistaSON goes one step further from near real-time optimization. It includes a set of learning capabilities, which allow the detection and recognition of recurrent mobility, QoS and traffic load patterns. This capability is critical for identifying and mitigating daily, weekly or seasonal hotspot scenarios such as rush hours, sporting events or popular holiday destinations. In addition, VistaSON incorporates a powerful trending and base-lining engine, which provides the "SON brain" with accurate forecasted views of radio network KPIs, including utilization, call drops and hand-over failures.

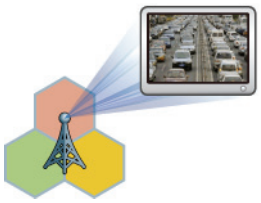




> "SON augments capacity and reduces the human involvement required to cope with increasing RAN complexity."

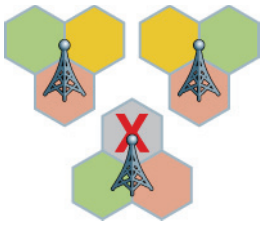
Out-of-the-Box Modules

As defined by the NGMN, use cases for self-organizing networks aim to alleviate the need for human intervention in the four key stages of the LTE network lifecycle – planning, deployment, optimization and maintenance. VistaSON includes a set of out-of-the-box 2G to 4G use cases that are designed to rapidly enable the automation needed to fulfill requirements defined in the optimization and maintenance lifecycle stages.



Dynamic Load Balancing

This use case continuously monitors the RAN infrastructure to detect network overloads (hotspots) and identify mobility traffic patterns throughout the day. With this insight, VistaSON algorithms can proactively adjust the RET, RAS and RAB antenna settings of a cluster of cells to facilitate load management between neighboring sectors to provide overall gain in effective capacity during congestion hours.

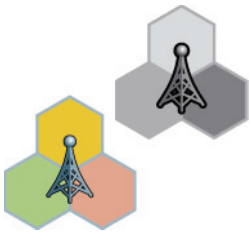


Automatic Outage Detection & Compensation

Known as a 'self-healing' capability, this use case is comprised of a set of algorithms that constantly monitor the radio network infrastructure for cell outages. On detection of a cell failure, VistaSON leverages the remote control capabilities available in RET, RAS and RAB neighboring antennas to automatically adjust their settings and provide coverage compensation during the outages saving the operator substantial revenue losses and customer churn that they would normally incur through their current manual remedial processes.

Green Networks Power Savings

This energy saving use case intentionally places under-utilized network cells into a 'sleep mode' during periods of very low traffic and temporarily adjusts neighbor cell antenna RET, RAS and RAB settings to assure area coverage during sleep mode operation. Substantial power and cost savings may be achieved in part due to the power associated with biasing the linear power amplifiers (LPAs) utilized by 3G and 4G (HSPA, LTE) broadband technologies. Cost savings apart, this also allows Mobile Operators to market themselves as "green" and environment friendly.



On-going Coverage & Capacity Optimization

This use case constantly monitors actual performance metrics for RAN parameters and network planning data to identify weak coverage and capacity spots that can be optimized to improve QoE. This is a gradual fine-tuning process that optimizes RAN parameters in response to metrics such as handover success and failure rates, CQI distributions, recurring cell overloading and dropped call rates, among many others. This is a closed-loop and ongoing optimization use case that runs in the background.

Summary

Realizing these benefits requires a comprehensive approach to fine-tune existing processes. It is therefore critical that MNOs' SON framework offers capabilities in the four key pillars: the ability to automatically detect which optimization will have the best impact within a given area of network; algorithms that can be leveraged and tailored to successfully suggest the optimum configuration of a network; capabilities to work in an open- or closed-loop system; and access to 'before and after' dashboards to demonstrate and confirm the realized benefits and successful impact on network performance and the optimization process.

The combination of InfoVista's step-by-step SON approach, supported by a unique open scripting framework, open collection and reporting platform, and extensive set of proprietary optimization algorithms enables the transformation of RAN management and optimization practices from manual to fully self-automated.

About InfoVista

InfoVista is the leading provider of service performance assurance software solutions for IP-based network and application services. We empower communication service providers and large IT enterprise organizations to transform their IT infrastructure into a distinctive asset for revenue generation, customer loyalty and business agility by adopting a quality centric approach to expedite the launch of differentiated and performing services ahead of the competition. InfoVista's unified network and application performance management platform equips 80% of the world's largest operators and a roster of global enterprises. Our solutions provide them with the actionable visibility they need to ensure a high-quality user experience end-to-end, by effectively assuring the performance and quality of their converged network and IT services, while keeping operational costs as low as possible. InfoVista can be found online at **www.infovista.com**.

For more information, please visit *www.infovista.com*
For sales inquiries please email: *marketing@infovista.com*

World and European Headquarters
InfoVista S.A.

6, rue de la Terre de Feu
91952 Courtaboeuf Cedex
Les Ulis, France
Tel +33 (0) 1 64 86 79 00
Fax +33 (0) 1 64 86 79 79

Americas Headquarters
InfoVista Corporation

12950 Worldgate Drive
Suite 250
Herndon, VA 20170
United States
Tel +1 703 435 2435
Fax +1 703 435 5122

Asia-Pacific Headquarters
nfoVista (Asia-Pacific) Pte Ltd

Block 750C, #03-16/17
Chai Chee Road
TechnoPark @ Chai Chee
Singapore 469003
Tel +65 6449 7641
Fax +65 6449 3054