



BEYOND SYSTEM LOGS

USING ADVANCED ANALYTICS
TO IMPROVE SYSTEM PERFORMANCE





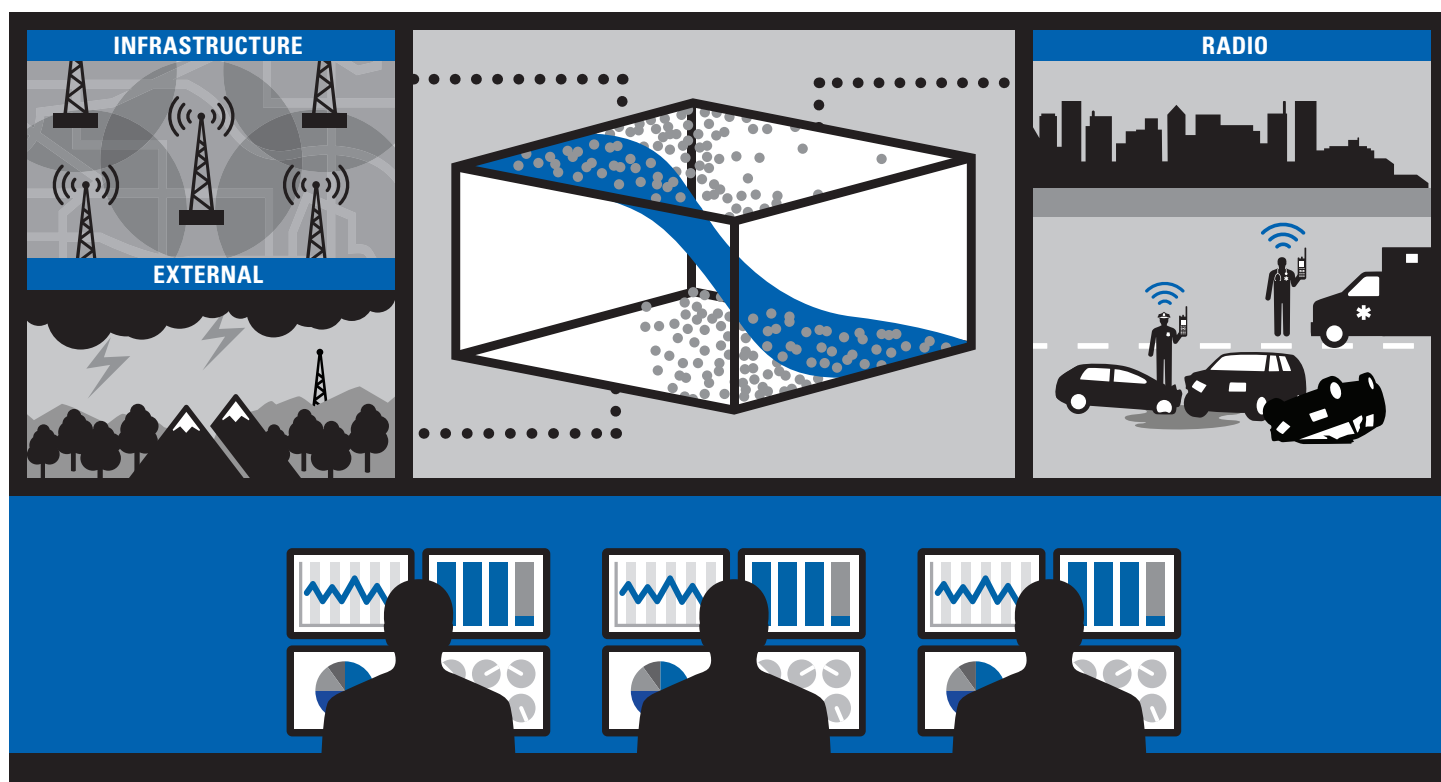
BIG DATA ANALYTICS FOR NETWORK CONTINUITY

The use of big data analytics has skyrocketed over the past decade. A Center for Digital Government survey noted that 66 percent of state and local government decision-makers are turning to big data analytics to inform their decisions.¹ As these organizations and agencies learn how to harness data, their ability to improve performance and address operational problems is accelerating and shifting from a reactive to a proactive approach. The proliferation of big data analytics has led to improved techniques for aggregating data and, more importantly, refined processes for deriving intelligence that companies can act on. With access to the right data sources and expertise, you can use your Land Mobile Radio (LMR) system data to maximize your investment, minimize network downtime and improve system performance like never before.

DATA REQUIREMENTS FOR PROACTIVE LMR PERFORMANCE INSIGHTS

Your LMR system contains an abundance of machine data. Understanding and improving your network performance hinges on being able to access this data. However, it can take hours—if not days—to extract data from the multiple sources needed for effective analysis. Without the right expertise and tools, your team may have to manually sift through system data to gain actionable network performance insights—an effort that can amount to thousands of hours each year.

What should you be looking for? You need access to three core data sources to take full advantage of analytics for LMR network performance improvements. The first two are contained in your system and devices. The third is from external sources. With these data sources, you will be able to discover trends as well as identify and resolve the variables that impact network failures and performance.



NETWORK INFRASTRUCTURE

The different components of your infrastructure provide data that allows you to evaluate coverage and performance from your base station to backhaul, core and much more. System logs, air traffic, link statistics such as jitter or latency, signal strength and network fault data are a few examples of LMR system data that can help inform you of needed network configuration changes.

DEVICES

Data on device and accessory usage, device health and signal strength from inbound and outbound calls help you understand usage behavior and how your devices are interacting with the network. You are better able to detect entropy and identify a problem with a device even before it is reported by users.

EXTERNAL SOURCES

External data from a variety of sources provides important insights into network performance and availability. Information about geographic terrain and weather, for example, can provide insights about network performance issues, such as poor coverage.

SHIFTING FROM REPORTING TO ACTIONABLE INTELLIGENCE

Most mission-critical agencies have some access to system data sources and are able to generate canned reports to understand system performance. These reports can expose certain issues, but subsequent insights may be limited. To shift from a reactive to proactive approach for improving network performance, you need advanced analytics capabilities to help make sense of all the disparate data being collected. This involves correlating data sets, identifying trends and conducting statistical modeling with historical and real-time data. In time, you will be able to understand performance issues stemming from your infrastructure, devices, other external factors or some combination of them to gain valuable insights.



COMPREHENSIVE APPROACH TO NETWORK MANAGEMENT

When data is applied effectively, you get a comprehensive view of network issues such as:

What is wrong in the system, enabling you to respond effectively and rapidly to critical performance issues

Why the issue occurred, using access to all potential data sources with the analytics capability to conduct root cause analysis

How to improve your ability to understand systemic issues from trends and historical data

All three are iterative and will become more accurate as your data and advanced analytics acumen matures. With this view of performance, it becomes possible to:

ADDRESS UNDERLYING CAUSES OF CRITICAL NETWORK EVENTS

Instead of attempting to patch a network fault alarm, performing a root cause analysis allows you to make a permanent fix. For example: When a channel goes out, the reactive approach would be to fix whatever is not working. But it is equally important to pinpoint what caused the channel to go out. A root cause analysis can determine this and reveal a solution to the underlying problem. It can identify factors leading to the issue as well as whether there is a cycle or pattern to the issue. Using this approach, you can even predict what may go wrong in the future—and fix that root cause in the present.

Let's take the channel outage example further with a real incident that involved an illegal carrier on a network we managed. Initial analysis of historical and real-time trends provided a complete view of hardware-related failures that may have contributed to the outage. Using advanced analytics methods, our network performance team discovered that although these failures might have been related, none were ultimately responsible. Instead, a radio user that was not assigned to the channel—known as an illegal carrier—was the primary cause of the outage. Historical data revealed channel disruptions whenever the illegal carrier was on the channel. This continued use eventually led to the channel outage. With the identification of the root cause, our team worked with the channel license holder on actions that should be taken to address the illegal carrier's channel usage authorization or permanent removal.

OPTIMIZE DEVICE MANAGEMENT

Your device data, combined with system data, can help you identify devices in need of service instead of routinely checking every device. If you're operating thousands of radios, this can save months of full-time resources.

With sophisticated analytics tools and expertise, you can leverage information such as the radio's relative signal strength, bit error rate and frequency error data to pinpoint which radios are in need of maintenance. Applying advanced analytics to device performance can free your team from an antiquated, device health analysis approach and endless rounds of manual performance checks.

PREDICT AND PREVENT FUTURE OUTAGES

Your data also can help you identify and avoid network failure. For instance, if your network historically experiences outages during a particular time of the year, correlating that pattern with historical weather trends may reveal that the outages are related.

Here is an example: Using trends analysis and statistical modeling, our network performance management team identified that a site went down every time it rained and the majority of the outages were backhaul-related. Upon further investigation, which included an onsite inspection, we discovered the pedestal supplying power to the backhaul was located in a low-lying area. Power loss occurred every time it flooded from rain or snow melt. The problem was resolved by establishing a redundant backhaul and diversifying the backhaul configuration for the site.

By identifying the affected links, site and network elements, our team was able to address the changes needed to the network in advance of future storm seasons. They were able to prescribe system upgrades and best practices to improve network uptime.





THE FORMULA FOR OPERATIONAL VALUE FROM BIG DATA ANALYTICS

Motorola Solutions provides proactive network performance management leveraging LMR systems and external data sources for our Premier Services customers. These sources of data provide a complete view of the network and are being used for operational improvements, which include:

- An industry-leading analytics platform to securely capture and store data from all sources
- A team of data scientists with mission-critical communication expertise working to understand the most valuable network performance insights inherent to public safety and enterprise operations
- Working with the LMR network management community to understand current and future operational needs to make evidence-based recommendations for network improvements or optimizations efforts

With this investment, big data analytics and the intelligence it produces ensure optimal system performance.

SOURCE

1. Big Data and Analytics in Government, 2015

For more information, please visit us at – www.motorolasolutions.com/services



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