

# Advanced Network Analytics: The Future of Network Engineering and Operations

---

An ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) White Paper  
Prepared for LiveAction

January 2018



IT & DATA MANAGEMENT RESEARCH,  
INDUSTRY ANALYSIS & CONSULTING

## Table of Contents

- Executive Summary .....1
- Introduction .....1
- Network Analytics: Why Now? .....1
- How You Can Apply Network Analytics Today .....3
  - NetFlow and QoS Data: Essential to Network Analytics .....3
  - Machine Learning and Other Technology Priorities.....4
  - Using Network Analytics .....4
- EMA Perspective.....4
- About LiveAction .....5



## Executive Summary

As enterprises adopt new technologies to thrive in the digital economy, IT organizations must deliver high-performing and agile networks to support them. Yesterday's network engineering and operations tools aren't adequate for this new reality. Network teams need advanced analytics solutions that can glean more insight and value from network data and streamline and optimize networking tasks. This whitepaper, based on a survey of 200 involved in advanced network analytics initiatives, offers insights from a forthcoming research report from Enterprise Management Associates (EMA), "Advanced Network Analytics: Applying Machine Learning and More to Network Engineering and Operations."

## Introduction

For years, network managers and engineers have lacked the tools for efficient operations. Traditional network monitoring tools excel at alerting network operators to potential problems, but not every alert represents a true problem. Instead, network managers spend much of their time sorting through alerts to find the ones that point to an actual outage or service degradation. In fact, network managers catch only 60% of network problems before end users are affected and report them to the service desk.<sup>1</sup> In today's digital economy, this inefficiency is untenable. Ride-sharing services will fail to connect passengers with drivers and ecommerce companies will fail to close revenue-generating transactions.

Furthermore, network monitoring tools rarely point directly to the root cause of a problem. Network managers rely on a broad set of tools to isolate and diagnose trouble, which leads to inefficient workflows. Consequently, network managers spend nearly 71% of their time fixing problems.<sup>2</sup> This situation will only get worse as networks get more complex and enterprises adopt new solutions, such as software defined networking (SDN), software-defined WAN (SD-WAN), the Internet of Things, network virtualization, software-defined data centers (SDDC), and public and hybrid clouds.

Network operations needs to apply more sophisticated analytics to network data to derive meaningful insights into complex issues. EMA has observed a movement in this direction. Network operations software vendors have increased investment in analytics technology over the last few years. Moreover, in 2016, EMA research found that 49% of network managers were applying advanced analytics technology to network data. These network managers used analytics to enhance network security monitoring, optimize networks, proactively predict network problems, and even optimize business processes. In new EMA research published this January, EMA surveyed 200 network analytics initiatives to gain a full understanding of how an enterprise can leverage analytics to transform network operations.

## Network Analytics: Why Now?

Network managers often operate as human middleware. They extract data and insight from multiple monitoring tools, correlate and analyze that data manually, and try to take action. This process could be accelerated and improved through advanced analytics that would present them with insights about network trends and problems and offer suggestions on what actions to take. Among other things, network analytics solutions should help network managers predict problems, optimize infrastructure, and automate tasks.

Such analytics would improve a network manager's ability to detect network problems before end users are impacted, free up time to work on more important projects, and provide him the tools and insight needed to support new technology initiatives efficiently. In fact, as seen in **Figure 1**, the most commonly cited benefits of a network analytics initiative align quite closely with these requirements. First and foremost, network teams accelerate their ability to repair network problems.

<sup>1</sup> EMA, "Network Management Megatrends 2016: Managing Networks in the Era of the Internet of Things, Hybrid Clouds, and Advanced Network Analytics," April 2016.

<sup>2</sup> EMA, "Network Management Megatrends 2016: Managing Networks in the Era of the Internet of Things, Hybrid Clouds, and Advanced Network Analytics," April 2016.

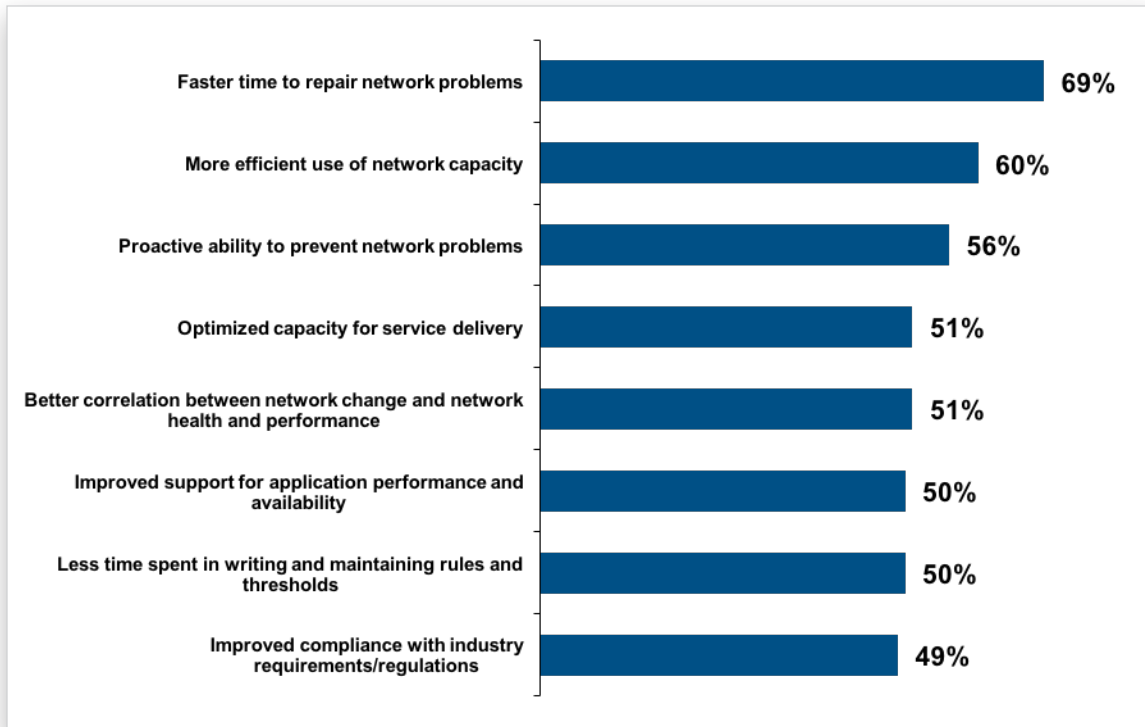


Figure 1. Top 8 organizational benefits of network analytics

Many initiatives also enable more efficient use of network capacity and proactive network problem prevention. Finally, slight majorities use analytics to optimize capacity for service delivery and improve correlation between network change and network health and performance.

With so many technology initiatives driving digital enterprises today, the transition to network analytics is unavoidable. **Figure 2** reveals the technical initiatives that primarily drive advanced network analytics projects today. IT automation is most common, but data center consolidation, external cloud services, digital transformation, digital experience management, and private cloud/software-defined data center initiatives are also significant drivers.

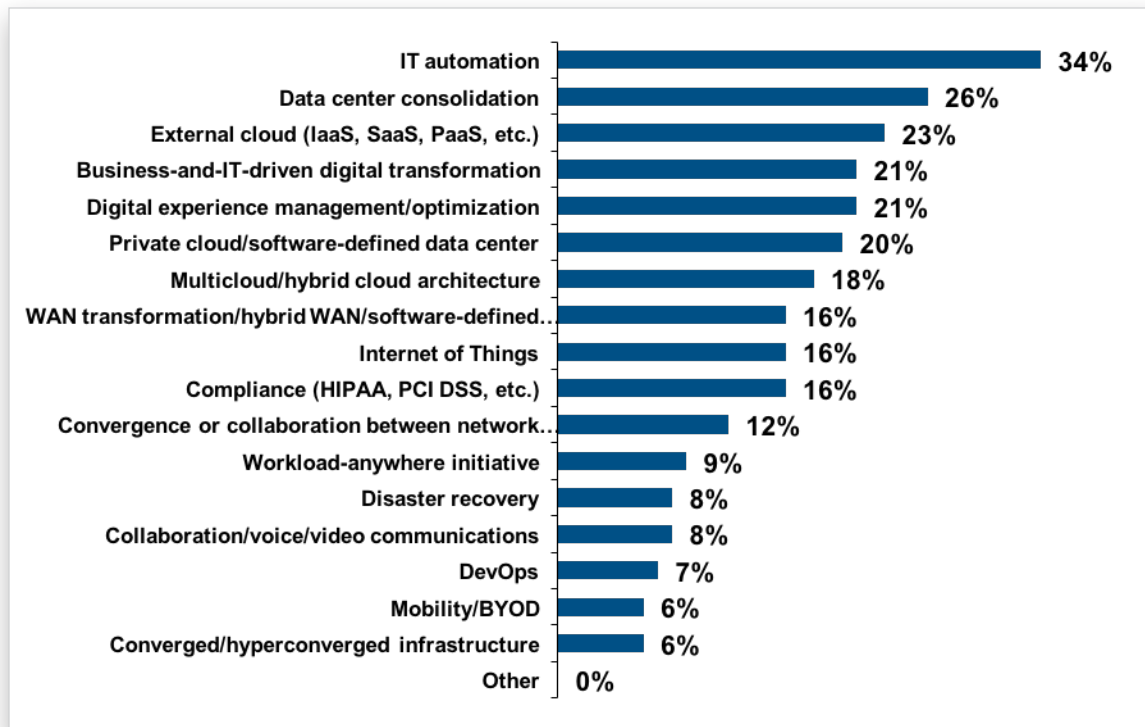


Figure 2 Technical initiatives primarily driving network analytics projects

Collaboration is essential to IT organizations today. As IT services become strategically critical to digital enterprises, the IT organization must be able to work across silos to ensure timely delivery of new services and to maintain the health and performance of those services. EMA research found that network analytics enhances the network infrastructure team's ability to collaborate with several other groups within IT. The most common point of collaboration is the IT service management group (76%). This collaboration focuses on asset discovery, service modeling and the implementation of best practices for IT service delivery. The majority of network teams also use analytics to enhance collaboration with the application management team (52%) and security operations (52%). Half of network teams use analytics to collaborate with the DevOps and application development teams, and 44% use analytics for collaboration with cloud engineering and operations.

## How You Can Apply Network Analytics Today

Cutting-edge enterprises are taking a multipronged approach to advanced network data analytics, but a plurality (40%) say their primary strategy is the use of advanced analytics features embedded in network monitoring and management solutions. More successful analytics initiatives are even more likely (54%) to identify network monitoring solutions as their primary analytics approach. As mentioned above, EMA has observed significant investment in analytics research and development within the network management solution provider industry. Network managers should be talking to their vendors about analytics roadmaps.

## NetFlow and QoS Data: Essential to Network Analytics

Network flow records -- including NetFlow, sFlow, and IPFIX -- are the most common type of data included in today's network analytics initiatives. Forty-four percent (44%) of such projects involve NetFlow and similar formats. Network performance metrics (40%), QoS data (38%) and network test data (36%) are also popular. Also, 29% use proprietary deep packet inspection data generated by network infrastructure (e.g. Cisco NBAR2, Medianet, AVC), examples of data that often supplements or enhances a network flow record.

EMA also asked these enterprises to identify the one class of data that was most important to their network analytics initiatives. The top two responses were QoS data (20%) and network flow records (12%). Analytics

solutions can glean a variety of insights from network flow records, including a broad view into how traffic is flowing over the network. When analytics technologies combine network flow records with QoS data, they can correlate traffic with error rates, packet drops, and other events to gain insights into the overall quality of the network. This opens up opportunities for network optimization, predictive network analysis, and more.

## Machine Learning and Other Technology Priorities

Machine learning has emerged as a critical analytics technology for the future of network operations. Machine learning involves the use of specialized algorithms to enable a computer system to develop insights from data without being explicitly programmed to do so. Machine learning is a field of research that sits at the intersection of data analytics and artificial intelligence. It is still an emergent technology, but many solution providers are applying machine learning to network data today. In fact, 54% of advanced network analytics initiatives apply machine learning to network data now, and 36% are in the midst of implementing machine learning network solutions. Network teams are roughly split on how they plan to use machine learning. A slight plurality (44%) plan to primarily use it to automate low-level, repeatable tasks, but another 41% expect to automate complex, unique networking tasks.

Beyond machine learning, enterprises want to apply a wide variety of analytics heuristics to their network data. The most important one is process analytics (29%), which points to a desire in the network organization to discover and establish best practices on the network. EMA's research also found that three out of four network analytics initiatives enable better collaboration between the network team and the IT service management team, the group most responsible for discovering and modeling an IT organization's best practices. Other important heuristics in use today include real-time predictive analytics (24%), predictive trending (24%), stream analytics (21%), and anomaly detection (19%).

## Using Network Analytics

EMA explored the general use cases that enterprises pursue with their advanced network analytics initiatives, as well as the individual network engineering and operations tasks that these projects support. The research found that eight use cases are supported by a majority of these projects. End user experience monitoring (69%), network operations optimization (65%), and network security operations optimization are the most popular. In addition to network operations optimization, 53% are also supporting predictive network analysis and 52% are supporting network infrastructure optimization.

Given the large majority that is optimizing network security operations, security is an important use case for network analytics. In fact, 53% are also pursuing predictive security analysis. Many of these projects also support business operations. Specifically, 53% apply analytics to business process monitoring and 51% apply it to business process optimization.

EMA observed the trend toward supporting network operations and security operations when we look at the specific tasks supported by network analytics. The most popular tasks for network optimization (46%) and security incident detection (43%). Network capacity planning (41%), cost optimization (39%), fault and performance remediation (38%) and security incident response (38%) were also important tasks.

Finally, network analytics in general is a key enabler of network automation. Ninety-eight percent (98%) of network analytics projects surveyed include plans to leverage analytics for network automation. The top networking tasks targeted for automation are network optimization (58%), cost optimization (51%), network problem diagnostics/troubleshooting (43%), and change management (42%).

## EMA Perspective

EMA research has consistently found that network engineering and operations teams need better solutions for network problem detection and remediation. Existing tools just can't get the job done given the resources available to network managers today.

EMA research has found that cutting-edge enterprises are applying analytics to network data to improve support of technology initiatives, optimize network engineering and operations, and collaboration with other teams within IT

The core strategy of most enterprise initiatives today is to leverage analytics technology embedded in network management and monitoring software. Machine learning is a particular area of focus in analytics, although

a wide variety of heuristics are targeted. Enterprises view analytics as an opportunity to optimize operations and infrastructure. Network security is also a big opportunity. Overall, automation will also support network automation, enabling network managers to do more with less well into the future.

## About LiveAction

LiveAction simplifies the network for a better digital experience by providing continuous insight, service assurance and control of enterprise networks. Our award-winning network performance analytics platform, LiveNX, offers a deep understanding of networks and applies situational awareness to accelerate employee productivity and boost customer satisfaction. Learn more about [LiveAction](#). Start your free trial of [LiveNX](#).

## About Enterprise Management Associates, Inc.

Founded in 1996, Enterprise Management Associates (EMA) is a leading industry analyst firm that provides deep insight across the full spectrum of IT and data management technologies. EMA analysts leverage a unique combination of practical experience, insight into industry best practices, and in-depth knowledge of current and planned vendor solutions to help EMA's clients achieve their goals. Learn more about EMA research, analysis, and consulting services for enterprise line of business users, IT professionals, and IT vendors at [www.enterprisemanagement.com](http://www.enterprisemanagement.com) or [blogs.enterprisemanagement.com](http://blogs.enterprisemanagement.com). You can also follow EMA on [Twitter](#), [Facebook](#), or [LinkedIn](#).

---

This report in whole or in part may not be duplicated, reproduced, stored in a retrieval system or retransmitted without prior written permission of Enterprise Management Associates, Inc. All opinions and estimates herein constitute our judgement as of this date and are subject to change without notice. Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. "EMA" and "Enterprise Management Associates" are trademarks of Enterprise Management Associates, Inc. in the United States and other countries.

©2018 Enterprise Management Associates, Inc. All Rights Reserved. EMA™, ENTERPRISE MANAGEMENT ASSOCIATES®, and the mobius symbol are registered trademarks or common-law trademarks of Enterprise Management Associates, Inc.

### Corporate Headquarters:

1995 North 57th Court, Suite 120  
Boulder, CO 80301  
Phone: +1 303.543.9500  
Fax: +1 303.543.7687  
[www.enterprisemanagement.com](http://www.enterprisemanagement.com)

3700.010918

