

# NetBrain Modernizes Network Operations of Major Metropolitan Fire Department to Better Service Emergencies

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The mission of one of the largest and busiest municipal fire departments in the world is not just to fight fires when they happen but to prevent them. In addition to being a highly skilled emergency response agency, its personnel are continually educating the public in fire, life safety and disaster preparedness, along with enforcing public safety codes.

When emergencies do happen, the department's main dispatch handles all the medical and fire calls for the densely populated, geographically dispersed metropolitan region. With lives on the line, main dispatch must quickly take the information and locate the nearest medical facility or fire station to route the emergency. The system automatically routes the incident to the Decision Dispatcher (DD), and the FireCAD system automatically routes the incident to the DD for the precinct that reported the incident.

The department's IT infrastructure is managed by a network infrastructure support team of 300-400 staff consisting of security, applications, and network teams. Specifically, their Network team of 25 administrators maintains and implements routers, switches, firewalls, and load balancers while the Security team has an array of tools to scan for malware and intrusions along with implementing required patches.

## The Challenge of Day-to-Day Network Operations without Automation

Managing such a large and complex network requires a wide range of tools to maintain operations and execute all of the required and frequent changes. One of the critical responsibilities of the network support team and its leadership is to choose the right technologies. Keeping the network up and running is essential for enabling 10,000 firefighters and 4,300 paramedics to keep millions of people safe. At that scale, downtime and an inefficient network can have a far greater impact than it does in most organizations.

When troubleshooting slow application complaints from users, "it was extremely difficult and time-consuming to find the root cause and it took many engineers," says Manager, Network Engineering when discussing the pain his team lived each day before selecting NetBrain. They had to find the affected part of the network and then group conditions (CPU, memory, bandwidth) from a device and ultimately create and run a script to see if anything changed. It was an arduous process, repeated time and time again.

The team uses DX Spectrum for network event and network fault management capturing alarms every day and can see changes using the traps. In the past, when anomalies generated priority alarms, they had to SSH into the neighbor device to troubleshoot.

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Even with this technology, finding the part of the network where the issue was happening was very difficult. And they did this over and over across the city. They needed a better way to see network conditions at it relates to application performance which includes ancillary data including device CPU, memory, and link utilization condition metrics.

As with most large networks, constant change meant there was no way to get an accurate picture of the network in real-time, an essential requirement needed to efficiently troubleshoot operational issues. Even worse, it took hours to generate daily audit reports showing network configuration changes. There was no contextual understanding within reach for things like BGP peering between datacenters and keeping up with BGP changes via scripts, and device groups and condition changes.

In addition, documenting and diagramming the network – an essential need for subsequent operations – was nearly impossible to keep current. The team was spending a lot of time documenting the network even as the network kept changing. As a result, “the maps and documentation were constantly outdated, which was slowing down troubleshooting, impacting audits, and sucking up a lot of the team’s time,” according to Manager, Network Engineering.

## Using NetBrain to ensure the network can support life-saving operation

To solve these challenges, the department turned to NetBrain to shift from a tactical and brute-force approach to a more planned and strategic one. They would rely on a digital twin and network automation to power their ongoing Day-2 network operations.

The department has a complex network, with over 2,000 devices from lots of vendors, including Fortinet firewalls, Firemon for firewall policy management, Cisco ASA routers, Palo Alto firewalls, F5 load balancers, VMware NSX and Juniper VPN cloud, NetScout for packet capture, ExtraHop for performance managing, ServiceNow for workflow and ticketing, Broadcom DX Spectrum for network event and network fault management.

Approximately 5 years ago the department’s Manager, Network Engineering was introduced to NetBrain. Knowing that they needed a better strategy for managing the network, he immediately saw its potential. “NetBrain was the ideal solution for us.”

## Better Network Visibility

“NetBrain digitized our network discovery and allowed us to pull real-time network documentation on demand.” With NetBrain, the network support team can visualize the entire hybrid network – VRRP, public cloud, LAN, and WAN – and continuously stay up to date with changes to the network. “NetBrain saves time finding network changes by generating a daily network configuration change report. Before, it took few hours, now takes mere minutes with NetBrain to produce an up-to-date network inventory report.”

What’s more, NetBrain automatically updates the frequent network changes they make; there’s no need to manually updates documentation to reflect the updates after every change. “We can generate real-time dynamic maps of any part of the network and export them to Microsoft Visio when needed in a single click.”

And while working with NetBrain, the department realized that there was more value to be gained from having the network and device data all in one visual platform, and so they began to expand the application of NetBrain across the broader IT organization.

## Reducing MTTR Across Network Operations

The department now uses NetBrain as their “primary network troubleshooting tool” to troubleshoot faster and more accurately. The department is taking advantage of a broad array of additional capabilities. At the core, NetBrain collects large amounts of network data quickly and accurately and presents it in different ways for troubleshooting events. Using ServiceNow integration it’s possible to react instantly to network alerts and events when they occur and to get to the root cause much faster, something that the department’s network support team and the wider business are utilising as part of their standard operating procedures.

## A-B Paths – Helping to visualise the network between two points

One network support team’s primary troubleshooting use cases is the A-B path creation that shows the journey that applications packets take from one end point to another, bi-directionally. Getting visibility of packet flows, along with each device involved in those paths and layering diagnostics on top of the map has helped troubleshoot an array of events as well as make necessary updates faster and more accurately.

One example of how A-B path helps is in making required changes to a firewall in order to allow a new application to traverse that path properly. “We have close to 100 firewalls so going through them to find the correct one(s) within the path is time consuming. With NetBrain, all I need to do is create the application path (identify the endpoints) and NetBrain shows me the firewall(s) we need to update.”

“Before NetBrain, identifying the correct firewall may have taken 15 – 20 minutes, which has now been reduced to less than a minute,” says Manager, Network Engineering. That’s a 175% improvement for an operation that occurs regularly. What’s more, that savings accumulates due to frequent jobs and continuous reductions in MTTR that add up to even bigger time and overhead savings.

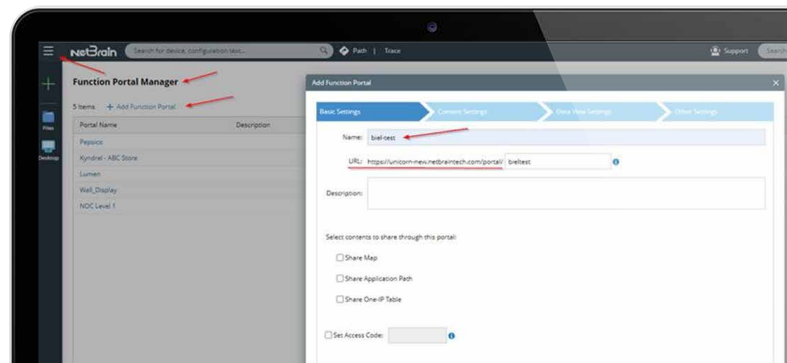
## Faster device location with One-IP Table

For security benchmarking and network discovery, the department uses NetBrain’s popular One-IP Table feature to capture all IPs from all devices and see where hosts or end stations are physically located and how they are connected. The One-IP Table displays the IP addresses and physical connections of each device in the workspace. Finding addresses and their connections in their dynamic workspace was a laborious, daily task for the network team. Other IT teams, such as security and desktop, would reach out regularly asking to locate an IP address or the switch or switch port it was connected to.

Now they can quickly identify which PC is generating a lot of traffic, for example, and once they know the IP address, easily see which switch it's connected to in NetBrain’s One-IP Table and shut down the port(s) to contain potentially costly malware and ransomware threats without having to do time-consuming MAC address lookups.

In addition, the network team would constantly spend significant time on IP lookup requests from other IT teams. “It would take us five or six steps, usually 10 – 15 minutes each time to answer every request. With the One-IP table we can provide these details in seconds.” The result is NetBrain is enabling significant reductions in MTTR leading to big cumulative impacts for frequent activities.

The collaboration-oriented Functional Portal is great for our non-NetBrain-licensed users because it allows us to share views for One-IP Table and maps so they can see right away where a host is connected and located. The portal allows information to be shared without the need for back-and-forth questions and answers including derivative questions and additional details. The portal allows everything to be handle in “one call.”

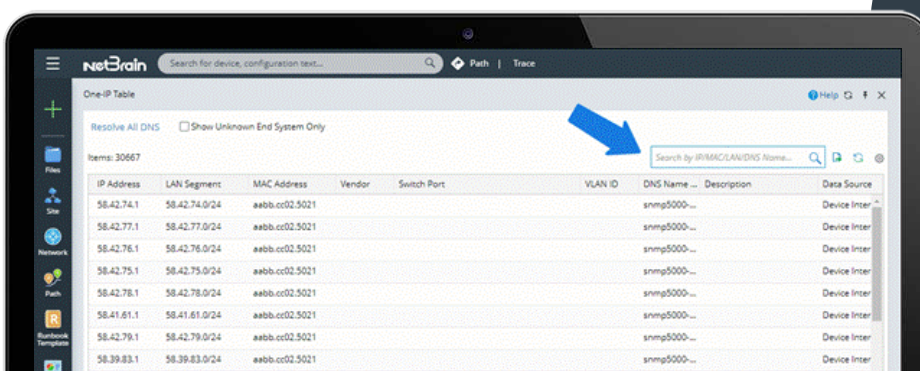


## Keep Application Paths Healthy with Dynamic Pathing

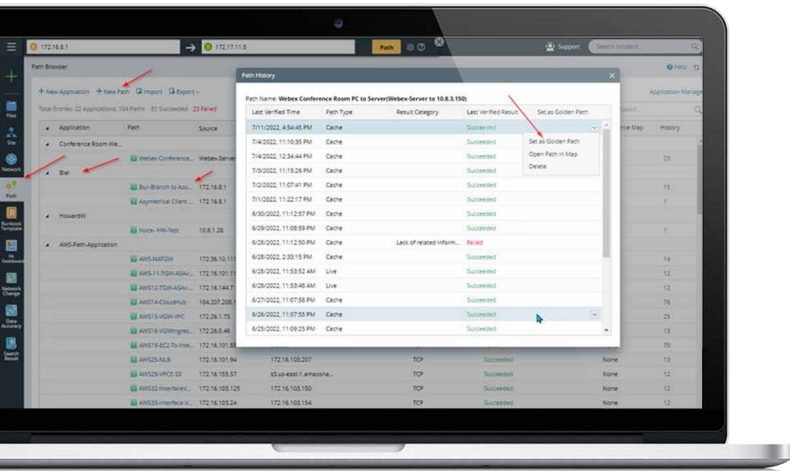
With NetBrain, the NetOps teams can automate much more intelligent route tracing to check paths from sources to destinations for hosts in their data center or traffic and lookup any CRC errors, port errors, and usage easily. The Golden Path feature allows them to conduct application path health checks to see any deviations from their baseline critical application paths. Golden Baseline helps monitor their network and its devices against ‘healthy’ parameters and training the wider team so they can access the One-IP table and perform other troubleshooting activities themselves.

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Once the department's NetOps team builds out any Golden Path, it's easily accessible to see against the current path to visually identify changes from the baseline.



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## Future Plans

NetBrain has provided many efficiency gains for the network support team within the department's network, but they know that they still have a lot more to learn about NetBrain's capabilities. The expectation and plan are to grow their use of NetBrain both in depth of adoption and empowerment of the wider team across the department.

This means venturing into further development of troubleshooting with deeper ServiceNow and Splunk integration and looking at logs in NetBrain as a unified portal to help with troubleshooting instead of having to log into each separate platform.

The department is excited to be using NetBrain's intent-based automation proactively to continuously monitor network designs and behavior, along with intent-based performance monitoring in the background for anomalies. The organization will also be working with NetBrain engineers to deploy NetBrain's Automation Library and tailor those automations to their needs.

## Making More Accurate Changes

The department is also using NetBrain to help make network changes with greater accuracy and security. Creating simple runbooks, including intent-based automations in the platform, makes defining network changes across their hybrid network faster because NetBrain now ensures the enforcement of design-intent policies with intelligence to prevent potential problems from impacting the business. Previously, new network changes many times affected existing applications. By enforcing design intents, the department assures complete transparency on network performance of all applications.

In one example, the NetOps team pushed out a configuration change to 282 remote devices simultaneously. The team was able to see what was happening live, the post change and draw comparisons to make sure everything went according to plan. This eliminated the kinds of human errors which would have been expected previously and had been one of their biggest causes of network downtime. Having such fine control of the change process heavily reduces their level of risk associated with frequent changes.

## About NetBrain Technologies

Founded in 2004, NetBrain is the market leader for NetOps automation, providing network operators and engineers with dynamic visibility across their hybrid networks and low-code/no-code automation for key tasks across IT workflows. Today, more than 2,500 of the world's largest enterprises and managed service providers use NetBrain to automate network problem diagnosis, generate real-time documentation, accelerate troubleshooting, and enforce enterprise architectural rules.