

The network is the foundation of today's hyper-connected digital business. The evolution of this critical resource requires a new scalable approach to operations, including the key workflows of problem resolution, change management, and incident prevention.

# Modernizing Network Operations Through No-Code Network Automation

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## Introduction

The need for more efficient network operations is evident as reflected in IDC's survey research. This research consistently indicates that top business priorities for executives across all industries and regions are focused on operational efficiency along with customer satisfaction, worker productivity, and business innovation.

Digital infrastructure — encompassing the network, datacenters, cloud services, data, applications, and security systems — makes up the critical resources that run today's businesses. This infrastructure is responsible for delivering the vital services that enable the best possible experiences for users (e.g., workers and customers) and ensuring the needs of the business are continuously met. The infrastructure itself has dramatically changed over the years. It is now a combination of hardware and software systems, public cloud, and related communications services. Today's hybrid infrastructure must be able to accommodate shifting computing requirements, new applications, growing business demands, technology advancements, and dynamic staff requirements.

Over the past two decades, the outdated manual processes in place to maintain these complex hybrid networks have become the biggest hindrance to delivering network services successfully. The result is fragile networks with higher risk, reduced service levels, longer repair times, higher unplanned downtime, and wide-scale security vulnerabilities. So, while the networking staff must continue to incorporate new network technologies and more demanding applications, the network operations teams are falling far behind in their ability to support these infrastructures. They have been unable to make any significant operational efficiency progress as they are tethered to years of highly inefficient, manually executed, and often flawed ad hoc processes.

## AT A GLANCE

### KEY TAKEAWAYS

- » Service excellence, operational efficiency, and digital innovation are top business priorities for IT organizations.
- » The bulk of ongoing network operations can be expressed as the execution of three basic workflows: troubleshooting and diagnostics, change management, and outage/incident prevention.
- » Traditional network operations are labor intensive and ignore the fact that while volumes of problem tickets continue to rise, there are a small number of problem types, each of which repeats continuously.
- » The opportunity for network operations to become more efficient is to convert current manual, time-consuming processes into automated, machine-driven execution.
- » Network automation must become ubiquitous: a foundational element that can be created and utilized by every engineer, throughout each organization.

Complicating the matter, the pressure points in network engineering and operations are expanding in all directions. Meanwhile, the operational capacity of the networking team is slowing due to talent shortages, shrinking budgets, and the burden of these antiquated, ineffective processes.

There is now a critical need for network operations to be reimagined from the ground up. Network operations must transform the existing manual ad hoc processes into a more automated approach that enables operational expertise to be captured and then executed by the network "machine" at scale.

One of the simplest ways to achieve operational efficiency is to enable assessment to be automated. Assessment forms the core of all key operational processes, troubleshooting, change management, and even outage prevention. While these workflows may seem dissimilar, they all share the same common need to assess service delivery performance conditions in real time. Engineers assess operating conditions associated with service tickets to determine the root causes of reported problems. Network designers and application assurance engineers use assessment to ensure that operating conditions are maintained as new business services are deployed. Strategic IT planners and risk/compliance managers focus on using assessment continuously to prevent known issues from reoccurring and to look for vulnerabilities proactively. Efficient network operations is all about quickly assessing the network operating conditions and comparing the expected or desired results to guide next steps.

### ***Enterprises Are Searching for Operational Efficiency***

As the digital business infrastructure expands globally and into the cloud, optimized network operations become crucial for enterprises and service providers to be successful. The needs of the business continue to grow, expanding connectivity requirements, service delivery performance, and security compliance goals. All of this must be maintained, and the traditional ad hoc and labor-intensive approach is under stress.

IDC research consistently indicates that top business priorities for both business and IT executives focus on operational efficiency, customer satisfaction, work productivity, and business innovation, and all are strongly influenced by a highly performant, secure, and responsive hybrid network. For IT organizations, these business priorities increase engineering and operational demands on multiple fronts, leaving no room for failure, no tolerance for waste, and no limitations for experimentation. While nearly half of all computing has migrated to the public cloud, the need to maintain these hybrid cloud-connected networks is paramount to business success.

Automated network operations break down the operational barriers to network growth and innovation for both IT and business management including reducing risks, optimizing technical resources and expenditures, improving processes, and boosting revenue (see Figure 1). Efficient network operations are enabled by incorporating automation broadly into the operational plan, freeing up existing subject matter expertise to focus on the more complex issues.

FIGURE 1: **Prioritizing the Benefits of Network Automation**

**Q Please rate the importance of the following network automation benefits for your organization.**



*n* = 1,100

Source: IDC's Worldwide State of Network Automation Survey — Efficient IP Study, 2023

To meet these increasing demands, automated network operations must deliver critical gains in the following areas:

- » **Overall operational efficiency.** Enhancing mean time to resolution (MTTR), reducing human errors, and minimizing network outages empower organizations to provide an enhanced customer experience while establishing a resilient infrastructure.
- » **Faster service delivery.** Accelerated service deployments, standardized processes, and enhanced agility equip IT teams to achieve their business transformation objectives. The digital business model depends on a secure, dynamic, and efficient network. Keys to success include:
  - Deep network insights to continuously monitor infrastructure for consistent service, faster resolutions, and proactive threat mitigation
  - Automated safeguards to ensure service quality through automation for change validation, threat detection, and root cause analysis
  - Streamlined troubleshooting to minimize downtime and improve digital experiences with proactive testing and efficient workflows
- » **Operating cost reduction.** Network automation lowers IT operating costs and improves business productivity by reducing outages and faults. Operating near capacity — without going over — promotes resource optimization and prevents network overspending.

- » **Accelerating digital innovation.** Networks serving this hyper-connected digital business model must be resilient, performant, and responsive, requiring network management to be more aligned with the specific application and service needs. Without automation of network engineering and operations, businesses are left hoping for — versus driving — good outcomes as they accelerate their digital initiatives.

IDC survey research indicates that a strong majority of IT organizations want to reduce the "run" part of the IT budget to fund new "build" initiatives in 2024 and beyond. This drives changes in spending across both digital infrastructure and IT staff. On the hybrid infrastructure side, new technologies, solutions, applications, and data sets that support new business practices and initiatives are prioritized over patching and repairing legacy systems and services that support outdated practices. On the staff side, solutions and practices that allow IT workers to focus more time, energy, and expertise on strategic responsibilities (e.g., business analysis, technology innovation, and predictive modeling) will garner more attention and investment than those supporting traditional tactical duties (e.g., problem resolution, network deployments, and operational monitoring). Automation can improve the key metrics for operations, including:

- » **MTTR improvement.** The majority of problem resolution time is made up of establishing the context of each problem, followed by various assessments of current state and conditions. Automating the triage and assessment components of MTTR will reduce it.
- » **Reducing incidents.** When network trouble is reported, the time it takes for a network engineer to begin working on the issue may be hours or days, depending on the issue's severity. Automation can respond instantly and may be able to eliminate the reported incident altogether if the problem has resolved itself.
- » **Reduction of human errors.** Human error has become a primary contributor to network outages. It is usually due to incorrect changes that are applied or due to the application of changes that have unintended consequences.
- » **Security and configuration compliance.** Automating security compliance enables IT to consistently monitor the organization's protection posture, proactively detect and remediate vulnerabilities, and sustain a resilient defense against emerging cyberthreats. Automation can verify all expected protections are in force.
- » **Network capacity assessment.** Automated assessment of network capacity and performance qualities allows organizations to proactively address potential issues before they impact production services.
- » **Network outage reduction.** Network automation can verify the complete set of network performance goals proactively, preventing minor problems from becoming outages and service degradations. Automating the enforcement of network design principles and best practices protects the network from disruption.
- » **Process standardization.** By enabling the capture of existing network operations expertise to make it executable, processes can be repeated continuously any time the same set of conditions exist, and the resolutions will be applied consistently, from site to site and engineer to engineer.

With detailed knowledge of the network's state at any time, greater assurance of service integrity on a continual basis, and proven automation strategies, network engineering and operations can respond more agilely to anything that comes their way (e.g., new workloads, new processes, new connections, new users, and new threats) while reducing risk.

## Modern Network Operations: Simplifying Network Assessment

Network operations is primarily made up of three unique workflows that have historically been labor intensive. These are problem resolution, change management, and incident prevention. By applying automated assessment to these workflows, organizations can achieve reductions in MTTR and the labor costs associated with operations at scale, along with the realization of a tangible outage prevention strategy.

### Required Foundation for Automation

Heightened intelligence and automation deliver the following three major operational network gains:

- » **Comprehensive network intelligence.** IDC survey results indicate that improved IT staff productivity and teamwork is the number 1 advantage with a unified management approach. This unified view of management must be supported by comprehensive intelligence of the hybrid digital infrastructure. Everything including the device detail, how devices are connected, how traffic flows between devices, and even the expected results that support application delivery must be well understood in real time to provide the foundation for network automation.
- » **Safe change management.** Change is constant with the digital business model, and unfortunately, change is the root of most networking problems. Changing workloads, configurations, technologies, and even expectations drive network service failures, slowdowns, and dissatisfaction. Verifying the integrity of changes is a common practice in other IT domains (e.g., applications [performance testing], security [penetration testing], and datacenters [failover testing]). Due to the complexity, criticality, and cost of the network, evaluating the impact of changes in hardware, software, services, traffic, and so forth across the network remains a big challenge. But the payoff in reduced disruptions to services and staff has IT organizations making more use of continual testing, digital twins, and predictive modeling in their change management workflows.
- » **Reporting insights.** Working in concert, analytics and automation improve operational efficiency, bolster protection, and improve application performance. A worldwide 2023 IDC survey focused on digital infrastructure management practices indicates that most IT organizations believe laborious manual processes dominate workloads across IT teams. IDC survey results also indicate that 80% of respondents believe that intelligence and insights must be used to bolster automation efforts. Simplicity in design, deployment, and operations must be matched by sophistication of systems, tools, and practices.

### Resulting Benefits

Strategic gains and returns from adopting a ubiquitous network assessment capability are significant and widespread. The following are highlighted areas of network automation impact:

- » **Outage prevention and risk avoidance.** IDC examinations into the business value of network automation indicate that avoiding problems drives far greater returns than fixing problems faster. Of course, it is still imperative to identify and resolve problems as quickly as possible. Proven remediation practices and automated actions that lower MTTR values and restore services to users in a timely fashion drive the greatest benefit for everyone. Automated network assurance heads off problems altogether or, at the very least, before they result in service degradation that impacts end users. Given the foundational position of the network in the digital business model, a problem in a single network segment or service can have a sizable negative impact on the business.

- » **Expediting troubleshooting and diagnostics.** The digital business model centers on excellent service delivered at speed. However, service requirements change fast in response to shifting business demands. For the network, this can mean absorbing new technologies, systems, and services; connecting new sites, users, or devices; supporting new workflows, business applications, or connected resources; protecting against threats; and offering innovative ways to serve the business. All these increase pressure on the network infrastructure and the networking staff.

Meeting service requirements at scale, while ensuring consistent service levels across the entire network, requires ready and reliable adaptation of network engineering and operations. This adaptation must encompass the full life cycle of the entire network.

- » **Proactive and collaborative management.** IDC survey research shows that 65% of IT organizations indicate that unifying the management of their digital infrastructure — from core to edge, from private systems to public services, from WAN to LAN, from user to application, and from on-premises systems to public cloud services — is a top corporate initiative. As this unification thrust accelerates, organizations are moving toward a more proactive management approach. A 2023 IDC survey of 2,000 IT organizations worldwide indicated that predictive analysis of the digital infrastructure was as important to their success as faster problem resolution times. Unfortunately, resolving the complex and continual problems presented by fast-moving digital business demands and COVID-19-driven adjustments (e.g., remote work) have delayed management focus on prevention, prescription, protection, and prediction. While outside pressures persist (e.g., inflation, supply chain issues, staff shortages, and world conflicts), more IT organizations are turning to technology solutions that enable better preparation and validation for what is to come.

Both business and IT executives recognize the imperative for improved collaboration among IT staff from various technology domains. The network, serving all domains like applications, security, computing, desktops, and the cloud, plays a crucial role in unifying the overall digital infrastructure management. Network automation capabilities must extend beyond simple connectivity to maintain and protect the services that are needed by the business. Simply maintaining device health — with or without automation — is not enough for modern business. Instead, automation can be leveraged to continuously maintain the desired goals for the network.

## **Considering NetBrain for Network Operations Automation**

Founded in 2004, NetBrain Technologies Inc. is a pioneer in no-code network automation. More than 2,500 customers use its platform worldwide — both enterprises and service providers — to manage their service delivery goals. This sizable installed base presents many networking demands and environments, but all have the same common goal: to keep business services running in a consistent manner and at the levels designed by the architects.

NetBrain's platform delivers a no-code platform that enables every network engineer to quickly transform their troubleshooting, change management, and outage prevention ideas into executable automation. NetBrain's continuous network assessment technology is used throughout the platform and forms the basis of automation, since every network operations process starts and ends with assessing the status of current conditions as compared with known good points in time, enabling corrective actions to be taken at the precise point in the network where drift has occurred.

### **The NetBrain Next-Gen Platform**

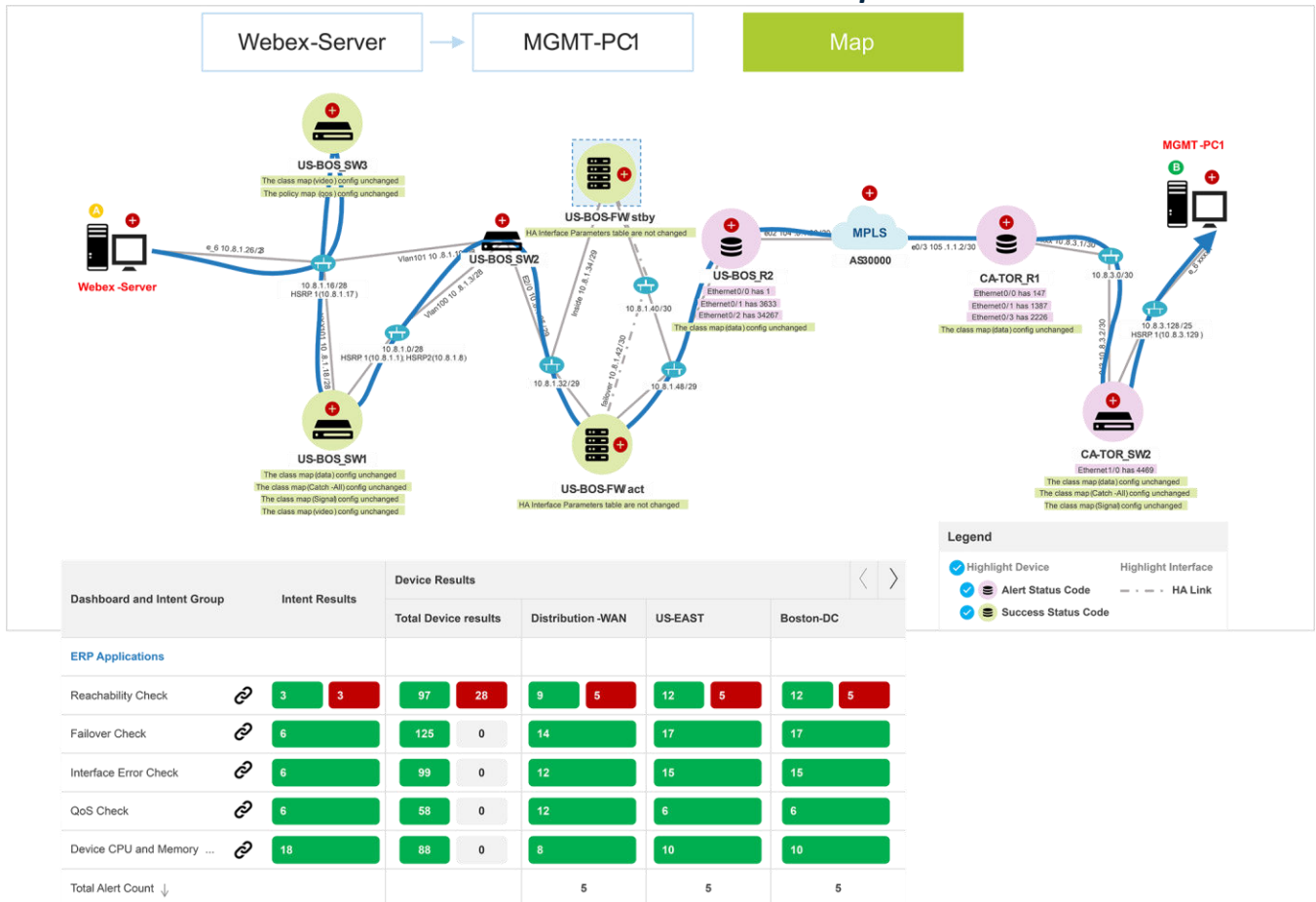
Enterprises and services providers have become highly skilled at handling the technical networking situations that present themselves, but they struggle to scale that expertise. NetBrain enables that expertise to be captured without the

use of code, shared across the organization, and executed by machine. The resulting automation "intents" provide that subject matter expertise to troubleshoot network problems and allow the continuous enforcement of the critical design criteria, security controls, and performance requirements. NetBrain's intent-based network automation can be used interactively by the engineering teams to power their hands-on tasks. IT staff can spring into action at the first report of problems to begin the service restoration problem instantly and also continuously run to prevent small problems from turning into product service outages.

### Automating Critical Workflows

NetBrain's no-code network automation platform automates critical network operations workflows (e.g., collaborative troubleshooting, protected change, and outage prevention) through continuous assessment. It provides deep support for the multivendor technologies already in place, including public clouds. NetBrain's Continuous Network Assessment technology and comprehensive live assessment dashboards show where problems are occurring, show the health of the network, and provide a drill-down to identify the precise reasons for any issues (see Figure 2).

FIGURE 2: **No-Code Automated Network Assessment and Map**



Source: NetBrain, 2024

Key NetBrain capabilities include the following:

- » **Automation by everyone in minutes.** Rigid manual network management, development-led automation projects, and hierarchical support processes have prevented operations teams from keeping pace with the needs of the business. An IDC survey focused on NetOps priorities indicated that IT organizations strongly favor practices and toolsets that allow less experienced networking and IT staff to diagnose and resolve more problems without escalations. NetBrain embraces this by enabling every network engineer to become a network automation engineer and transform their daily operational needs into reusable network automation that can be shared with everyone. In minutes, every engineer can automate the tasks that are repetitive and utilize the tasks previously created by other subject matter experts. Reusable no-code automation reduces service times, escalations, errors, and interruptions of senior staff to help drive greater productivity and efficiency (and higher staff satisfaction and retention).
- » **Assessing network conditions at scale.** With NetBrain, every conceivable network condition can be assessed either as part of an ongoing ticket/remediation approach or proactively to prevent outages before incidents occur. Device status, service delivery, performance detail, and resiliency can easily be assessed through NetBrain automation. This wide-scale assessment can also be used before, during, and after change management processes to ensure that the services that traverse the topology involved in such changes are operating properly after the changes have been applied. All of this is done without code.
- » **Continuous network assessment.** Proactively monitoring and assessing network health, security, cloud, change, application performance, drift, capacity, and hardware life cycles with automated insights help identify and address potential issues before they impact business operations. Using NetBrain's Continuous Network Assessment technology, any number of conditions and assessment points can be defined and continuously assessed to determine whether network services are being delivered accurately. Assessments are visualized on easy-to-navigate drill-down summary dashboards to offer the most complete view of real-time network conditions. Sample assessments include network change, configuration drift, network health, security posture, and hardware life cycle.
- » **Collaborative troubleshooting.** NetBrain automates root cause diagnosis and analysis to transform it from manual, labor-intensive troubleshooting tasks to machine-executed automation. Automating the bulk of troubleshooting tasks minimizes downtime, reduces escalations, and lowers MTTR. The no-code automation platform can auto-open, auto-close, auto-prioritize, and auto-populate service tickets, streamlining the service desk process and providing engineers with critical information at their fingertips. When an incident arises, automation immediately assesses the problem to see if it is known, determines its impact on applications, and assigns it a priority level.
- » **Protective change.** NetBrain's triple-defense approach protects the network from unintended consequences throughout change management windows:
  - **Prechange:** The impacts that new changes would have on existing service delivery are identified, along with any configuration drift or deviations that would jeopardize the production network.
  - **During change:** Validation of the impact of new changes on existing networkwide production services occurs.

- **Postchange:** Verification of the continued successful delivery of business services along with updating of goals and performance criteria with the latest modifications takes place to protect the network during future changes.
- » **Digital twin.** NetBrain's live digital twin data model of the network infrastructure offers a contextual and real-time view into network devices, connections, traffic flows, and business outcomes or intents. This capability enables accurate mapping of the existing network for views and insights across IT. Extending the use of the digital twin to network automation allows operations to auto-discover and map the entire network in minutes and verify accuracy and impact when changing the production network. When examining both small and severe network outages, testing on a digital twin would have exposed points of failure or slowdown, ensuring a more successful network assessment effort.
- » **Dynamic map and path.** This capability visually renders the output of the live digital twin for any multivendor, multidomain network at the site and device group level from the edge to the cloud, including SDN (ACI and NSX) and SD-WAN networks. The dynamic map provides a user interface to visualize, navigate, investigate, and troubleshoot network issues in real time, in a consolidated view. It then overlays real-time diagnostic assessments as intents directly on a map or path for fast troubleshooting.

### Scalable Automation

In studying network automation initiatives within IT organizations, it all starts with empowering network engineers to create automation themselves. NetBrain is built upon a no-code interface that allows operational ideas to be captured in minutes, readily repeated, and continuously leveraged for all operational workflows. IDC's consulting engagements with IT organizations indicate that much greater gains are made when network automation solutions extend beyond automating repetitive tasks and focus on improving ongoing network operations and optimization efforts. NetBrain's no-code automation platform with its continuous assessment technology drives agile automation by promoting protected change management, outage prevention, threat detection and defense, network design compliance, and rapid problem remediation.

NetBrain's digital twin technology also bolsters network automation by providing more than a topology representation of the network. Instead, it incorporates the device and topology details, along with the flow of traffic in real time and a list of desired outcomes expected of the network. Couple this comprehensive twin technology with no-code development, and the NetBrain platform promotes the application of automation throughout the network operating plan, enabling IT organizations to solidify their network service delivery plan.

### Conclusion

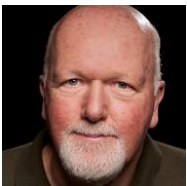
Operational efficiency is a key success factor in the digital business model. The network, functioning as a service delivery foundation, must move in lockstep with the business and its applications. Yet constant change due to shifting business requirements endangers not only the networks but also the ability of organizations to compete and thrive. While innovation encourages experimentation and even failure at times, the network must always provide consistent service levels and capabilities, in all locations, to all users, and for all workloads. The pressure to always meet connectivity, performance, and security requirements forces the network, associated

Network operations must move in lockstep with the needs of the business, including specific support for key performance and compliance goals.

management systems, and IT staff to deliver fully resilient and responsive connectivity — no matter the site, service, scale, or situation.

To achieve this level of service, operational systems and IT staff must be armed with the most accurate information about network conditions and components and the most in-depth real-time analysis and insights into problems, threats, and trends to take the most precise and proper actions to remedy service challenges and react to new service demands. The more automated information gathering, diagnostic insight development, and assessment actions are, the more performant, resilient, and responsive the network infrastructure will be.

## About the Analyst



### ***Mark Leary, Research Director, Network Analytics and Automation***

Mark's core research coverage focuses on network observability solutions, network automation projects and tools, and related predictive analytics, AI/ML-driven insights, digital experience management, and "programming" technologies as they apply to a resilient, dynamic, and secure network infrastructure.

## MESSAGE FROM THE SPONSOR

NetBrain, the leading no-code network automation platform, accelerates troubleshooting collaboration by emulating network engineers' tasks. It ensures continuous assessment of hybrid networks, safeguards change operations, and prevents unplanned downtime. The platform features an extensible automation library with pre-built intents for common IT issues. NetBrain's no-code automation enhances operational workflows, prioritizing business results for applications, not just device health. Trusted by over 2,500 enterprises and service providers, NetBrain automates network problem diagnosis, real-time documentation, troubleshooting, and enforces architectural rules. Explore how NetBrain Next-Gen can revolutionize your multi-vendor, multi-cloud infrastructure operations.

Learn more at [www.netbrain.com](http://www.netbrain.com).



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