



# **Observability and Supporting Disparate Network Systems**

White Paper  
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### Introduction

In today's rapidly evolving technological landscape, the reliance on digital infrastructure has become paramount for businesses and organizations of all sizes across various market segments. Modern Infrastructure which consists of enterprise networking (EN), data center (DC), and cloud platforms, are increasingly complex. With diverse architectures, disparate systems and technologies, managing and supporting infrastructure can be quite challenging.

Legacy systems consisting of older network infrastructure components that may use outdated technologies, protocols, or hardware; Multi-vendor environments that incorporate equipment and technologies from different vendors, such as routers, switches, firewalls, and access points from various manufacturers; Hybrid cloud environments with networks that span across on-premises data centers and public or private cloud environments utilizing different cloud service providers and technologies;

Distributed networks that consist of geographically dispersed locations, such as branch offices, remote sites, or facilities, each with its own networking equipment and configurations; Coordinating and ensuring interoperability among all these diverse components is extremely difficult!

The concept of infrastructure observability has emerged as a critical cornerstone in ensuring the reliability, performance, and security of these complex environments. It has become essential in helping organizations manage this complexity by providing comprehensive visibility and actionable insights across the entire technology stack. As enterprises continue to embrace digital transformation and migrate towards cloud-native architectures, the need for an understanding into the inner workings of their infrastructure has never been more pronounced.

Observability, in the context of infrastructure and network systems, encompasses a holistic approach to monitoring, analyzing, and deriving actionable insights from the vast array of data generated by these systems. It transcends traditional monitoring paradigms by emphasizing not only the collection of metrics and logs but also the correlation of data points, the tracing of transactions across distributed environments, and the contextualization of events to provide a complete picture of system behavior and performance.



### What is Observability

At its core, observability refers to the ability to gain insight into the behavior, performance, and health of various components. In the realm of infrastructure these components include servers, networking devices, databases, applications, and microservices. These insights are gained through the monitoring, collection, analysis, and visualization of relevant data.

Unlike traditional monitoring, which primarily focuses on collecting predefined metrics and alarms, observability emphasizes the exploration of system behavior in real-time, enabling operators to uncover unexpected patterns, anomalies, and dependencies that may impact performance or reliability. It involves monitoring and understanding all the components and interactions within a network to ensure optimal performance, troubleshoot issues proactively, and make swift, informed decisions. Observability solutions employ AI, advanced analytics, machine learning, and data science techniques to process and analyze large volumes of data from a multitude of sources, enabling organizations to extract actionable insights both in historic context as well as real-time. Observability solutions are utilized across the IT organization of enterprises including operations, engineering, cloud and platform teams, application developers, and product owners.

### Key Components of Observability

Observability comprises several key components that collectively contribute to its effectiveness in providing comprehensive insights into infrastructure and disparate network systems:

- 1. Monitoring:** The continuous collection and analysis of data from various sources, including metrics, logs, traces, and events, to track the health, performance, and availability of system components.
- 2. Metrics:** Quantitative measurements that describe the behavior and performance of infrastructure and disparate network systems, such as CPU utilization, memory usage, network latency, and error rates.
- 3. Logs:** Structured records of events and activities generated by system components, applications, and services, which provide detailed insights into system behavior, errors, and operational activities.
- 4. Traces:** Distributed traces that capture the flow of transactions across interconnected services and microservices, enabling the identification of performance bottlenecks, latency issues, and dependencies.
- 5. Events:** Notifications and alerts triggered by specific conditions or thresholds within the system, indicating potential anomalies, failures, or security incidents that require attention.



### Common Challenges Observability Can Solve

Observability addresses several challenges for organizations. With the proliferation of distributed systems and cloud-based services, traditional monitoring approaches may not provide enough visibility into network behavior. Observability tools are designed to handle the complexities of distributed systems and provide comprehensive insights regardless of the network's architecture. We've identified four key, common challenges our clients seek to solve for their infrastructure environments: Scalability, Reliability, Security and Visibility.

Scalability is a common pain point experienced today. As networks grow both in size and complexity to meet growing demands, monitoring and managing them at scale becomes a significant challenge. Ensuring scalability and elasticity while maintaining performance becomes paramount. Observability solutions are designed to scale with the network, providing real-time insights even in large and dynamic environments.

Reliability and uptime of infrastructure is crucial for business continuity. Outages and unavailability of services are costly. Observability allows for early detection, preventative monitoring with fault isolation and mitigation, rapid incident response with targeted remediation, and overall performance optimization. These capabilities reduce mean time of identification to repair ensuring optimal uptime assurance.

Visibility across disparate network systems is difficult. Organizations need visibility across the entirety of the network (LAN/WAN, Internet, cloud, Data Center, IoT devices, applications). End-to-end visibility reduces mean time to identification and repair and enables faster problem resolution by instantly identifying, and isolating problems (root cause identification, outage detection, anomaly detection).

The ability to monitor for cyber threats is critical for safeguarding data assets. Observability tools provide insights into system behaviors and user activities, enabling organizations to detect suspicious patterns, identify security vulnerabilities, and respond to threats in real-time.

### Business Benefits and Value Gained Through Observability

We've identified the table stakes of scalability, reliability, security, and visibility. We understand now that observability reduces risk, leads to a more predictable, reliable, and measurable infrastructure. Let's now explore in more detail, further positive business outcomes.

First let's double click on scalability. Observability provides insights into how the network scales with increasing demand or changes in infrastructure. This allows organizations to plan for future growth with increased efficiency and accuracy. This simplifies capacity planning and management. By providing insights into resource utilization trends and workload patterns, observability solutions can help predict the future capacity requirements.



This information helps organizations scale infrastructure components up or down as needed, adjust resource allocations to meet fluctuating demands, and ensure optimal performance with great elasticity. Efficient IT scalability has numerous benefits to organizations including cost efficiency, flexibility to adapt quickly to changing market conditions, improved performance and reliability, and facilitates growth allowing the IT infrastructure to scale in tandem with business growth.

Efficient IT scalability is crucial for modern organizations looking to remain competitive, agile, and resilient in an ever-evolving business landscape and observability unlocks that scalability efficiency driving overall positive business outcomes.

The value of observability doesn't stop at scalability. In an increasingly hostile cyber landscape, monitoring for security threats and detecting anomalies is critical for organizations to safeguard sensitive data, protect against cyber-attacks, and meet regulatory compliance requirements. Observability enhances network security by allowing organizations to detect and respond to security threats more effectively by monitoring for suspicious activity, identifying vulnerabilities, and implementing appropriate security measures. This allows organizations to take a proactive security posture with Protect, Detect, and Recovery (PDR). In general, these three stages need to be carefully considered and included in your total security plan. Addressing and coordinating these stages paves the way for your organizations best path to protect against and if needed, recover from a cyber-attack.

Monitoring for security is essential, however observability also monitors for performance and reliability. Observability provides performance assurance. By continuously monitoring network traffic, latency, and other performance metrics, organizations can identify and address bottlenecks and inefficiencies to improve overall network performance. Performance is also improved through optimized resource allocation. By understanding how resources are utilized within the network, organizations can optimize resource allocation, ensuring that critical applications and services receive the necessary bandwidth and resources to perform at full potential whenever they are needed. Finally, with real-time visibility into network behavior and performance, IT teams can quickly identify and diagnose issues, reducing downtime and minimizing the impact on business operations. This allows for proactive gains versus reactive that only applies break-fix after an issue has already occurred.

When issues do occur, observability tools powered by machine learning algorithms and anomaly detection techniques, provide valuable data for troubleshooting. Administrators can analyze metrics and logs to identify the root cause of issues and take appropriate corrective actions, whether it involves adjusting configurations, rerouting traffic, or deploying patches. Observability also allows administrators to track key performance indicators (KPIs) across disparate network systems. By analyzing these metrics, administrators can identify areas for improvement, such as optimizing network traffic, enhancing resource utilization, or fine-tuning application performance.



Lastly, when issues occur within the infrastructure, observability solutions facilitate root cause analysis by correlating data from different sources such as metrics, logs, and traces. This helps operators pinpoint the underlying cause of problems and implement targeted fixes to prevent recurrence.

Another significant outcome of observability is data. The value of data is multifaceted! However, the value of your data is only as good as your data. Good data leads to informed decision-making enabling business leaders to make informed choices based on evidence rather than guesswork. By leveraging data, decision makers can assess risk, evaluate alternatives, and optimize strategies to achieve better outcomes. Data driven approaches enable organizations to streamline processes, optimize resources, and improve overall operational efficiency. Most organizations with large, complex and disparate infrastructure systems have a treasure trove of data sitting there ripe for the taking, however sifting through that data to find truly valuable, actionable data, especially in large complex networks is a significant challenge. The sheer volume, velocity, and variety of data generated by infrastructure devices and systems can overwhelm traditional monitoring tools. Observability solutions on the other hand, provide an excellent way to mitigate against data sprawl and data overload. Observability provides real, valuable, actionable insights and analytics that allow for informed, data-driven decision making. The data is available through visualization tools and dashboards that present the data in a meaningful way. Observability also provides cross-system data collection and monitoring enabling administrators to aggregate data from multiple sources into a single, unified view. This integration facilitates holistic monitoring and analysis, allowing administrators to correlate events and identify cross-system dependencies that may impact performance and reliability of the overall network...good data...valuable data...actionable data!

Observability can also help reduce the IT burden of your infrastructure. It can provide managed operations through programmable microservices as an example. More so, it is about automation and orchestration. Observability data can feed into automation and orchestration workflows, enabling administrators to automate routine tasks, such as provisioning resources, deploying updates, or responding to incidents. Observability enhances automation and orchestration in infrastructure by providing real-time insights into system behavior and performance, enabling organizations to automate remediation, dynamically scale resources, build self-healing systems, enforce compliance, streamline deployment processes, and foster collaboration between development and operations teams. By integrating observability with automation and orchestration tools, organizations can achieve greater efficiency, agility, and reliability in managing and maintaining IT infrastructure and network systems.

Here are some examples:

- **Automated Remediation:** Observability data can be leveraged to create automated remediation processes. When anomalies or issues are detected, automation tools can be programmed to trigger predefined remediation actions, such as restarting a service, scaling resources, or rerouting traffic, without manual intervention.



- **Self-Healing Systems:** Observability data can be utilized to build self-healing systems that automatically detect and recover from failures or performance degradation. By continuously monitoring system health and performance metrics, automation scripts can be designed to trigger corrective actions, such as restarting failed services, restoring configurations, or failing over to redundant components, ensuring uninterrupted service delivery and minimizing disruptions.
- **Streamlined Deployment and Configuration Management:** Observability data provides insights into the impact of changes on system performance and reliability, facilitating automated deployment and configuration management processes. Orchestration tools can leverage observability metrics and logs to validate changes, assess their impact, and rollback configurations if anomalies or issues arise, ensuring smooth and reliable deployments without manual intervention.

## Available Observability Solutions

The C1 Infrastructure Experience specializes in crafting, implementing, and overseeing enterprise networking, data center, and cloud solutions. Our aim is to equip our clients with adaptable, secure, high performance, and dependable technology frameworks. Our solutions empower employees to deliver seamless connected human experiences, reflecting our commitment to excellence in infrastructure management.

As it relates to observability, C1 partners with, deploys, manages and recommends three observability solutions:

- Cisco ThousandEyes
- Extreme Networks CloudIQ
- Juniper Mist AI

**Cisco ThousandEyes** is a cloud-based network and application performance monitoring platform that provides comprehensive visibility into digital experiences across the internet. It offers a suite of observability tools designed to help organizations monitor, troubleshoot, and optimize the performance of their networks, applications, and services from a user-centric perspective. Here are some key aspects of Cisco ThousandEyes observability:

1. Network Visibility
2. Internet Intelligence
3. Application Monitoring
4. Cloud Visibility
5. Internet Security
6. Real-Time Monitoring and Alerts





**Extreme Networks CloudIQ** is an AI-driven network management and analytics platform that provides comprehensive observability into network infrastructure. Here's an overview of Extreme Networks CloudIQ observability:

1. AI-Powered Insights
2. Network Performance Monitoring
3. Application Visibility
4. User Experience Monitoring
5. Security Analytics
6. Predictive Analytics
7. Centralized Management

**Juniper Mist AI** Observability is a part of Juniper Networks' Mist AI platform, which offers cloud-driven networking solutions with integrated AI-driven insights and automation. Juniper Mist AI Observability provides comprehensive visibility and analytics capabilities to monitor and troubleshoot network performance, client connectivity, and application experience. Here are key aspects of Juniper Mist AI Observability:

1. AI-Driven Insights
2. End-to-End Visibility
3. Service Level Expectations (SLEs)
4. Root Cause Analysis (RCA)
5. Client Journey Analytics
6. AI-Driven Automation

## Conclusion

In conclusion, observability stands as a vital solution in the contemporary landscape of complex digital infrastructures. The challenges posed by diverse architectures, distributed networks, and hybrid cloud environments are met with the comprehensive insights provided by observability tools. By embracing observability, organizations can navigate the intricacies of modern infrastructure with greater ease, addressing common challenges such as scalability, reliability, security, and visibility.

The business benefits derived from observability are multifaceted. From enhancing scalability and optimizing resource allocation to improving security posture and facilitating automation,



observability empowers organizations to achieve greater efficiency, agility, and reliability in managing their IT infrastructure and network systems.

Furthermore, observability unleashes the potential of data-driven decision-making, enabling informed choices based on actionable insights extracted from the vast volumes of data generated by infrastructure devices and systems. Ultimately, observability empowers organizations to accelerate proactive and strategic planning.

Through automated remediation, self-healing systems, and streamlined deployment processes, observability not only alleviates the burden on IT operations but also enhances overall system performance and reliability. By integrating observability with automation and orchestration tools, organizations can foster collaboration between development and operations teams, driving continuous improvement and innovation in infrastructure management practices.

In essence, observability transcends traditional monitoring paradigms by providing holistic visibility and actionable insights into the behavior, performance, and health of infrastructure and disparate network systems. As organizations continue to navigate the complexities of digital transformation, observability emerges as a critical enabler, ensuring the reliability, security, and performance of modern infrastructure in an ever-evolving technological landscape.

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## So Now What?

Are you ready to propel your business into a future of seamless connectivity and unparalleled efficiency? Look no further than our C1 Enterprise Networking WAVES workshop, where we dive deep into your digital infrastructure landscape to uncover hidden potentials and pave the way for transformative solutions.

Here's why you can't afford to miss out:

**Comprehensive Analysis:** Our WAVES methodology leaves no stone unturned, examining over 100 evaluation points across various domains such as Enterprise Visibility, Vulnerability Management, Data Center Network, and much more. We'll pinpoint technical and business constraints, providing you with invaluable insights.

**Tailored Recommendations:** Say goodbye to generic solutions! We craft a detailed analysis report tailored specifically to your organization, presenting a consolidated list of considerations and recommendations. This roadmap will align seamlessly with your most critical organizational objectives.

**Automation, Orchestration, Optimization:** Streamline your operations with our expert assistance. We'll help you automate deployment, orchestrate network resources, and optimize performance in real-time. Say hello to increased efficiency and reduced errors.

**Holistic Assessment:** Gain a 360-degree view of your infrastructure planning. Our workshop, coupled with a complimentary enterprise networking health check, will highlight your current standing, level of preparedness, and any potential gaps that need addressing.

**Don't let outdated infrastructure hold you back. Register now for a FREE assessment and embark on your journey towards a future-ready network!**

**To sign up for the FREE assessment, please visit:**

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