

Key Takeaway

- The shift to hybrid and multicloud environments, as well as support for a myriad of architectures is requiring IT to quickly undertake disruptive changes and move from static, fixed networks to more dynamic, flexible infrastructure.
- The concept behind adaptive networking is to create dynamic, programmable infrastructure which is amplified by analytics and automation. To create this type of network, there needs to be a unified approach, including a change in network policies and procedures.
- Adopting this concept shifts the focus from an own and implement model, to a more cloud-native “as-a-service” model. These network services allow the enterprise to grow as needed with programmable infrastructure collecting telemetry for analytics solutions to gain insights from over time, as well as software control and automation solutions helping eliminate errors and keeping the network running at peak performance.
- With Adaptive Networking, emerging network vendors are offering more cloud native solutions. Startups and vendors focused on single use case are adapting this approach more quickly than the incumbent competition.

What is It

Adaptive Networking is an approach to create more programmable networks run on analytics and automation. The following elements comprise an adaptive network: programmable infrastructure, analytics and intelligence, and software control and automation.

Why It Matters

Static infrastructure was once enough to sustain the network but with enterprises moving to hybrid and multicloud environments, new strategies are required in order to maintain visibility and control of the network. In order to create a flexible, and scalable network, enterprises are increasingly required to adopt elements of an Adaptive Network.

Approaches for Implementation

Adaptive networking consists of cloud native capabilities broken into three overarching categories: programmable infrastructure, analytics and intelligence, and software control and automation. In order to create an adaptive networking strategy with all necessary components, network solutions must be integrated strategically.

- 2.1. *Cloud Native Networking* is networking software that is positioned for use in cloud environments. Cloud native is the capability that enables networks to be native features in cloud.

2.2. *Programmable Infrastructure* enables providers to configure the network as needed and collect telemetry:

- Data Center Networking is commoditized by a few large vendors but there is still room for innovation. Workflow automation and orchestration have become viable alternatives to Software Defined Networking (SDN).
- Application Delivery Controllers help ease application transitions as enterprises change application strategies. New opportunities are being created for segment growth in technologies, such as container and cloud services. Some of these opportunities are due to the shift towards a cloud native DevOps strategy, as new buying influences are coming from application architects and developers.
- Networking-as-a-Service (NaaS) and Virtual Wide Area Networks (WAN) are viable alternatives to dedicated circuits and Virtual Private Networks (VPNs). Both WAN options help tie the network together by offering on-demand provisioning and management, self-service, simplified operations and API integration to network automation.

2.3. *Analytics and Intelligence* learns and adjusts the network based on the data received:

- Network Performance Monitoring is increasing in visibility as vendors are ingesting and analyzing additional network performance data from public cloud solution providers. Additionally, WAN performance monitoring is becoming an important use case for vendors to include in solutions.

2.4. *Software Control and Automation* helps reduce human error and increases network efficiency:

- Networking Orchestration and Automation is being leveraged to reduce operational overhead and human errors. These solutions can be delivered either through certain SDNs, network management systems or through separate tools connected through APIs.

Trace3 Innovation's Point of View

- Adaptive Networking will be adopted by each enterprise differently and should be use case driven. To truly create flexible networks, there needs to be a unified approach including: a single or a combination of solutions, as well as a change to the internal policies and procedures which drive networking.
- As enterprises are moving applications and workloads to the cloud, networking vendors are having to adapt their capabilities and offerings to be cloud native as well.
- Startups and vendors focused on a single adaptive network use case are better positioned to adapt to the cloud native shift more quickly. This fosters innovation and potentially disruptive capabilities in not only functional areas, but also in management and operations. An example of this is workflow automation, where vendors such as Anuta, Gluware and Intential are helping enterprises automate faster and are more reliable than custom in-house built software. For more information on adaptive networking solutions, please refer to the solution list below.

Solutions

Cloud Native Networks Solutions



Gluware provides the Gluware Intelligent Network Automation platform that brings a layer of intelligence to automate and orchestrate large multi-vendor, mission-critical networks code-free and at scale. It is based in Sacramento, California.



Centerity has developed advanced performance analytics and business services management (BSM) for complex technology environments (IT & IoT).



NetFoundry is a platform that enables businesses and developers to spin up global, cloud-native software-defined networks with the simplicity, speed and automation in which virtual machines are spun up today.



Kentik is a cloud-based network visibility and analytics solution that provides a panoramic view of any network. Kentik processes tens of billions of data records per day, equipping service providers, Web enterprises and network operations teams with actionable, usable insights that enable making quick, cost-effective decisions.



ExtraHop provides real-time wire data analytics through the company's digital platform. The company's operational intelligence platform analyzes all L2-L7 communications, including full bidirectional transactional payloads.



Juniper Networks (NYSE: JNPR) offers products and services related to network infrastructure. The Company's Infrastructure segment provides routing and switching products that are used to control and direct network traffic from the core, through the edge, aggregation, and the customer premise equipment level. Infrastructure products include its Internet protocol (IP) routing, carrier Ethernet routing portfolio, and Ethernet switching portfolio.

Data Center Networking Solutions



nuagenetworks

Nuage Networks from Nokia was created to solve the problem of making network resources as effortlessly consumable as IT compute and storage. It recognized the common challenges faced by enterprises who were digitally transforming their businesses and rapidly adopting the use of cloud across their core IT systems and out at their remote branches.



Stateless Networks provides high performance infrastructure and networking solutions to enterprises, service providers and the federal government. Stateless is bringing the intelligence, automation and management capabilities of the server world to network and data infrastructure- speeding deployment times, de-risking operations and providing a new type of integration with virtualization and data applications to improve performance and manage traffic flows.



Kaloôm is a Montreal-based company developing a fully automated, programmable data center networking software solution aimed at transforming how cloud and data center networks are built, managed, and operated for enterprises, cloud providers, gaming companies, data center operators, and 5G wireless providers.



A10 Networks specializes in application networking and security, providing a range of high-performance application networking solutions that help organizations ensure that their data center applications and networks remain highly available, accelerated and secure.



Pluribus Networks delivers software-defined networking as an open application platform to revolutionize data center operations. The company's flagship product, Netvisor, is the industry's first distributed network hypervisor operating system, converging compute, network, storage and virtualization with an open, programmable approach. Its customers realize tangible and immediate business benefits while protecting their existing network investments.



Extreme Networks provides converged Ethernet networks that support data, voice and video for enterprises and service providers. The company's network solutions feature high performance and high availability switching that deliver insight and control enabling customers to solve their real-world business communications challenges.

Application Delivery Controllers Solutions



AppNeta offers IT Performance Management with a cloud-delivered service for integrated, end-to-end visibility across networks and applications. AppNeta delivers a SaaS portfolio of end-user experience monitoring services with cross application performance visibility and network performance insight.



HAProxy Technologies is the company behind HAProxy (haproxy.org), the world's most widely used software load balancer and application delivery controller. HAProxy is a free, very fast, and reliable solution offering high availability, load balancing, and proxying for TCP and HTTP-based applications.



Kemp Technologies is a provider of application-centric load-balancer solutions. Leveraging an agile per-app consumption model with unlimited throughput, predictive application analytics and automated issue resolution, Kemp is simplifying how customers optimize, analyze and secure their applications across private and multi-cloud environments.



Avi Networks is the Cloud Application Delivery Company. The Avi Networks Cloud Application Delivery Platform (CADP) brings the benefits of hyperscale application delivery to enterprises at any scale. With an analytics-driven and distributed application delivery architecture – HYDRATM, the Avi Networks solution guarantees end-user application experience for on-premise and cloud-based applications.



Aryaka delivers application and network performance for the globally distributed enterprise for better collaboration, communication, and business productivity. Aryaka's application delivery-as-a-service enables distributed business users to quickly access centralized enterprise applications and cloud resources from anywhere in the world.



VMware (NYSE: VMW) is engaged in cloud infrastructure and delivers virtualization solutions that aim to reduce IT complexity. VMware aims to accelerate an organization's transition to cloud computing, while preserving existing IT investments and enabling efficient and agile service delivery without compromising control.

Network as a Service Solutions



Alkira has reinvented networking for the cloud era by delivering the network cloud, the first global unified network infrastructure with on-demand hybrid and multi-cloud connectivity, integrated network and security services, end-to-end visibility, controls and governance, all delivered as-a-service.



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Apcela provides high-performance network and application delivery solutions for real-time, mission-critical applications. Leveraging FiberSource, the company's global network optimization platform, the company deploys and manages low-latency networks and private cloud solutions to cost-effectively improve application performance in distributed IT environments.



Teridion delivers Teridion for Enterprise, a public cloud-based WAN service that delivers carrier-grade, SLA-backed performance powered by a cloud-native approach to routing that draw on deep learning, which brings hierarchical and centralized routing to enterprise networking to improve WAN, application and SaaS performance.



Cato Networks provides organizations with a software-defined and cloud-based secure enterprise network. Cato delivers a single networking and security platform that securely connects all enterprise locations, people and data. The Cato Cloud reduces MPLS connectivity costs, eliminates branch appliances, provides direct, secure internet access everywhere, and integrates mobile users and cloud infrastructures to the enterprise network.



Aviatrix provides a software solution for connectivity and migration between enterprise data centers and public clouds. The service is built for Amazon Web Services, Microsoft Azure, and the Google Cloud environment.

Network Performance Monitor Solutions

CENTERITY

Centerity has developed advanced performance analytics and business services management (BSM) for complex technology environments (IT & IoT).

Extreme[®]
networks

Extreme Networks provides converged Ethernet networks that support data, voice and video for enterprises and service providers. The company's network solutions feature high performance and high availability switching that deliver insight and control enabling customers to solve their real-world business communications challenges.

Gigamon[®]

Gigamon provides active visibility into physical and virtual network traffic, enabling stronger security and superior performance. The Gigamon Visibility Platform and GigaSECURE, the industry's first Security Delivery Platform, deliver advanced intelligence so that security, network, and application performance management solutions in enterprise, government, and service provider networks operate more efficiently and effectively.

kentik

Kentik is a cloud-based network visibility and analytics solution that provides a panoramic view of any network. Kentik processes tens of billions of data records per day, equipping service providers, Web enterprises and network operations teams with actionable, usable insights that enable making quick, cost-effective decisions

JUNIPER[®]
NETWORKS

Juniper Networks offers products and services related to network infrastructure. The Company's Infrastructure segment provides routing and switching products that are used to control and direct network traffic from the core, through the edge, aggregation, and the customer premise equipment level.

swim

SWIM provides intelligent edge-based software that executes real-time analytics and machine learning for enterprises, equipment manufacturers, smart-cities and IOT/IIOT businesses. SWIM software locally processes and analyzes massive volumes of streaming data from devices/sensors/equipment where it is created, reducing network volumes, and generating real-time machine-learning business insights.

Network Automation and Orchestration Solutions



Anuta ATOM offers complete Lifecycle Service Orchestration and Telemetry for the physical, virtual, and hybrid networks thus allowing customers to leverage their investments in existing network infrastructure and transition them seamlessly to Intent-Based SDN and NFV environments.



Gluware automates network lifecycle management on existing networks, allowing companies to roll-out a robust suite of advanced network and security features while reducing manual deployment and support costs.



Apstra's flagship product, AOS, empowers organizations to automate all aspects of designing, building, deploying, and operating their networks, enabling them to make changes to their networks quickly and reliably, while making efficient use of human capital and ridding themselves of hardware vendor lock-in.



We are exclusively focused on delivering network automation solutions that help our customers realize their vision of digital transformation. Our solutions leverage the latest thinking, open standards, open architectures, technology partners and best practices to drive network operations and maximize the impact of automation.



Forward Networks provides network visibility, policy verification, and change modeling. Designed to help network teams eliminate costly network outages, the Forward Networks platform enables engineers and operators to easily visualize and search complex networks, quickly debug problems, verify network-wide policy correctness, and predict network behavior prior to making changes to production equipment - for legacy, SDN, or hybrid environments.



IP Fabrics creates technology to take full advantage of the power of the Network Processing Unit (NPU). This technology aims to make possible networks that achieve true wire-speed performance at gigabit/sec and higher rates.

**All vendors provided are examples and is not meant to be an exhaustive list. Emerging technologies are subject to significant changes in market share and relative capability.*