



# BEST FIT SOLUTIONS FOR ENTERPRISE NETWORK ARCHITECTURE

---

BUILD A STRONG RESILIENT BUSINESS



## CSG TECHNOLOGIES NETWORK ARCHITECTURE

Focus on What you need to get done, not on how to do it!

## TABLE OF CONTENTS

<b><u>INTRODUCTION</u></b> .....	<b>4</b>
<b>KEY BENEFITS OF NETWORK MONITORING</b> .....	<b>4</b>
HELPS STAY AHEAD OF OUTAGES .....	5
QUICKER RECOVERY .....	5
GAIN IMMEDIATE ROI .....	5
FLEXIBILITY .....	6
IDENTIFY SECURITY THREATS .....	6
JUSTIFY EQUIPMENT UPGRADES .....	7
<b><u>LITERATURE OVERVIEW</u></b> .....	<b>8</b>
<b>CURRENT SCENARIO</b> .....	<b>8</b>
<b>A CASE FOR OUTSOURCING</b> .....	<b>9</b>
COST SAVINGS .....	9
EFFECTIVE IT AND BUSINESS PERFORMANCE.....	10
RENEWED FOCUS ON CORE BUSINESS.....	10
<b><u>CONCLUSION</u></b> .....	<b>10</b>

## INTRODUCTION

Enterprise networks today are faced with relentless challenges that threaten capacity, efficiency, security and user experience. Bringing in new tools is not enough. The complex and continuously evolving networks of modern, evolutionary enterprise warrants a completely new approach to design, deployment, and management.

### *What is Network Architecture?*

Network architecture refers to the way network devices and services are structured to serve the connectivity needs of client devices.

- Network devices typically include switches and routers
- Type of services include DHCP and DNS
- Client devices comprise end-user devices, servers and smart tools

### *Why are there Different Network Architectures?*

Computer networks are built to serve the needs of their clients. Described below are three common types of enterprise networks:

- Access networks, for campuses and branches, are built to bring users and things onboard, such as connecting employees within an office building.
- Networks for data center connect servers that host data and applications and make them available to users.
- Wide-area networks (WANs) connect users to applications, sometimes over long distances, such as connecting hospital workers to health applications.

These and all other networks face different security threats, which they need to guard against.

To accommodate these varied requirements, all network types have unique architectures.




### *Why are Network Architectures Under Pressure?*

Today, to serve the pinching needs brought on by technology advancements and initiatives in the field of digital transformation, networks are compelled to do more.

Access networks are required to recognize, authenticate, and authorize user devices and smart tools before bringing them on board. Data center networks are required to connect applications in multiple data centers and clouds. WANs are required to minimize costs whilst enhancing user experience when serving distributed applications to distributed users.

Networks also need to be dynamic, agile, and in lockstep with business needs. Traditional, manually intensive methods of managing computer networks are proving to be unsustainable in an increasingly complex environment. New approaches are necessary, ones that require transformational changes in how networks are designed.




## MODERN NETWORK ARCHITECTURE

Traditional networks are gradually becoming obsolete, as they are unable to handle the increasing strain placed on their available resources by the various “heavy-weight” requirements of emerging applications. Network data flows in this highly dynamic environment, where the computing focus has shifted from local servers to the cloud, have significantly increased in volume, while at the same time being less tolerant to delays and jitter due to their time sensitive nature.

As real time stream processing of big data on high-performance computing resources in the cloud continues to grow, it is of fundamental importance that the next generation networks are capable of agilely handling and adapting to this burden. This implies that the future network architecture to support the emerging demands of organizations must rely on an agile backbone and aggregation links that are part of a highly automated, programmable network, capable of responding to individual user requirements by exhibiting application and cloud awareness. The future network architecture must maintain standards of efficiency and resiliency while providing a flexible and scalable service delivery infrastructure with dynamic end-to-end connections on-demand that will offer a higher quality of experience (QoE) to its end users.

A QoE can only be assured if the underlying network is dynamic and flexible enough to be responsive and able to adapt to an environment in a rapidly changing environment in which complex services are constantly evolving. The network must not only provide superior connections for devices, but even more importantly the connection provisioning of network resources must be implemented such that the downtime is zero, even during migration. This will enable a zero downtime, Zero-touch, highly efficient utilization of network resources for end-users, who will experience agile network that provides connectivity to their needed services free of any interruption or Jitter.




Using the zero-downtime, Zero-touch paradigm, the underlying network will be able to adapt to the requirements of the organization in a flexible manner.

This convergence between services offered on the cloud and the delivery of network infrastructure has many benefits for both end users and network administrators. The zero-downtime network-as-a-service-concept offers higher value services to the end users while simultaneously significantly lessening the burden of network administrators for provisioning and managing network devices.

#### COMPONENTS OF MODERN NETWORK ARCHITECTURE

CSG Technologies is now deploying architectures that ease the burden of building and maintaining computer networks for the digital age. The company offers a complete portfolio of modern network architectures for access, WAN, data centre, and cloud. The various components of network architecture solutions include:



## Intent-Based Networking

- An intent-based network begins by taking an organization's desired output as input and designs a network around those objectives. It does so by automating operations extensively, analysing network performance, pinpointing problematic areas, providing all-around security, and integrating the overall architecture with core business processes

## Controller-Led

- Network controllers are foundational to intent-based networking and are essential to scaling and securing networks in the digital era. Controllers dramatically simplify operations and help organizations respond promptly to changing business requirements. They automate networking functions by translating business intent into device configurations, and they monitor the network devices continuously to help ensure performance and security.

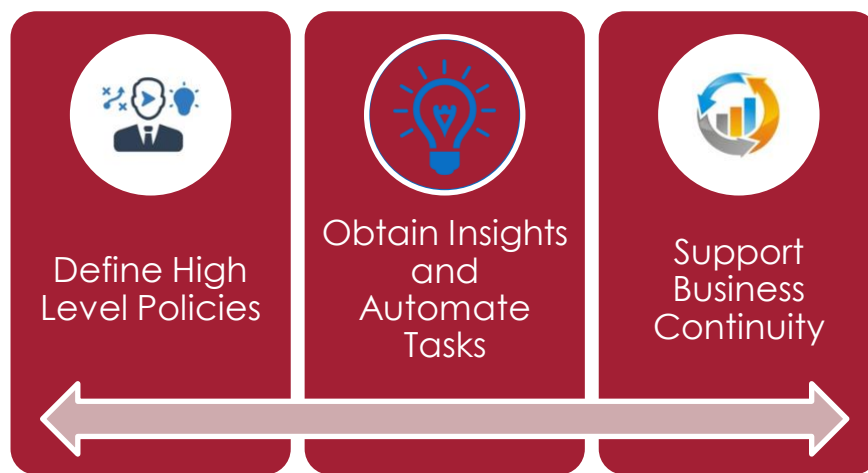
## Multidomain

- Multiple networks in an enterprise communicate with one another through their controllers. Such cross-network, or multidomain integrations generally involve exchanging relevant operating parameters to help ensure that desired business outcomes that span across all networking domains are achieved.



## WHAT CAN YOU ACHIEVE WITH SUCH A NETWORK?

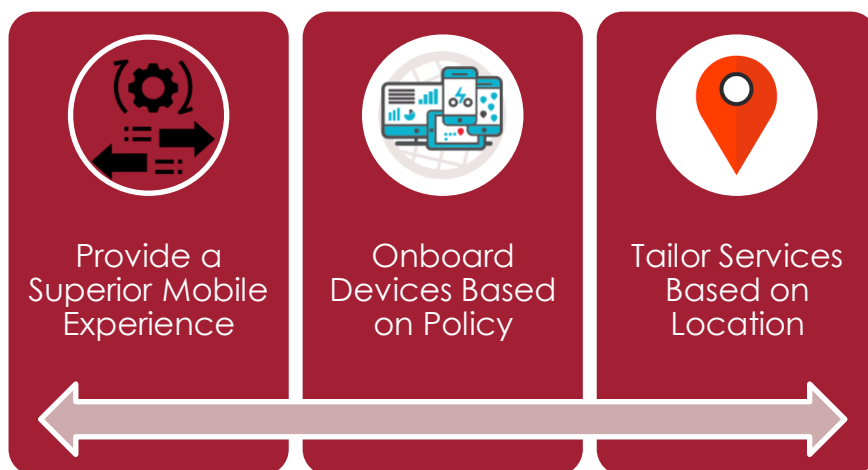
*Key Business Objectives* - You can leverage the power of intent-based network design to increase business flexibility, reduce TCO (total cost of ownership), accelerate innovation, and simplify management.



*Security* – A single security breach can cause significant damage to an organization's budget and brand reputation. A business simply cannot afford to discover a breach three months too late. An intent-based network architecture can be used to sense threats and take corrective action to contain the breach.



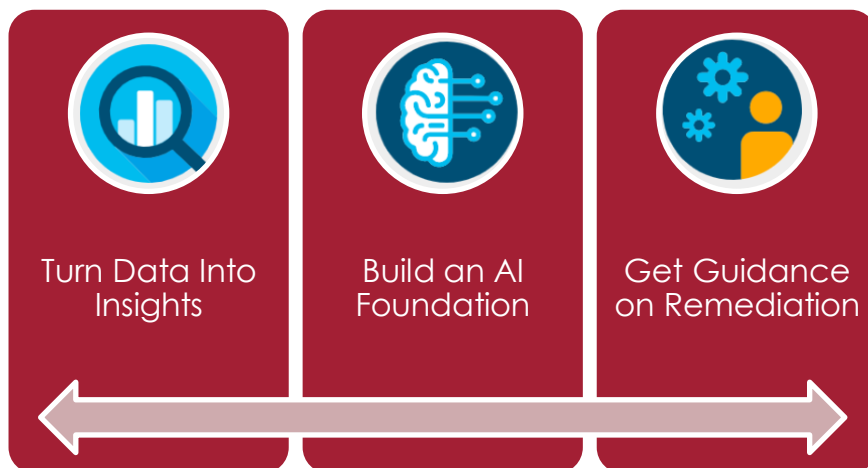
*Mobility* - Wireless is a preferred way for users to connect to the network. Ensuring excellent coverage, secure onboarding, and a superior experience as users move through the network can present unique challenges.



*Productivity* - Evidently, the growth in network scale, complexity, and uncertainty is threatening IT departments' ability to effectively deliver digital experiences that are demanded by employees and customers. Automating routine tasks on a network enables enterprises to free up staff allowing them to focus on more important issues, ensuring that the business remains resilient.



*User Experience* – To optimize user experience, an organization will need to minimize network downtime. But inadequate network visibility limits enterprise ability to anticipate future problems and troubleshoot known issues. An intent-based network design will allow organizations to ensure that the network is fully tuned and serving users as best it can.



*Cloud* – Organizations today are increasingly migrating data and applications to private and public clouds and using software-as-a-service (SaaS) applications from a variety of providers. A well-defined, intent-based network architecture allows enterprises to quickly and securely scale WAN network to the cloud.




Innovation is not easy when an organization is working with outdated processes and legacy systems that are not designed to cope with today's problems.



## INTENT-BASED NETWORKING SOLUTIONS

Networking systems are facing the challenge of rapidly developing and deploying new functions and services to support the diverse requirements of various applications. In order to live up to users' expectations for fast, but also highly elastic, dynamic and scalable networking, fundamental changes are required in the way heterogeneous networks cooperate to support the wide spectrum of applications they offer. A promising approach within the networking research community in addressing these challenges is the decoupling of hardware and software in networking components, leading to the virtualisation of all networking resources. Service-oriented network virtualisation can enable the implementation of a network-as-a-service (NaaS) paradigm that allows the network infrastructure to be exposed and accessed as network services.




Further, the cost involved in setting up and delivering high performance networks also warrants considerations as many small businesses do not have the required resources to support layered network architecture. This whitepaper explores various needs of large and small enterprises in terms of agility, flexibility, performance and cost of network architecture and its solution.

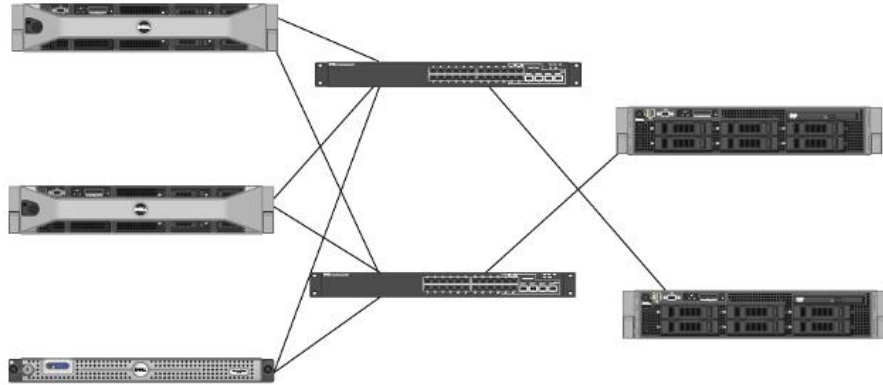
Larger, data intensive, highly dynamic environments demand high performance network architecture that offer zero downtime solutions. At the same time, smaller organisations require flexible networks that are not only scalable but also offer ease of operation and reduce cost. These organisations do not have in-house IT teams to set up devices and configure changes to networks every time a change occurs, a more plug-and-play concept is required to meet their needs. Zero Touch provisioning powered by Synology is the solution to meet the critical needs of these organisations.

---

## HIGH-PERFORMANCE NETWORK ARCHITECTURE

Taking into consideration the diverse, yet critical requirements of large, data intensive organizations, CSG Technologies proposes Network Virtualization through a multi-tier diversified architecture separating hosts, data, services, users and infrastructure and establish them as individual objects. This facilitates high flexibility in the design and integration of network devices deviating from the existing “one suit fits all” paradigm a more intent-based networking architecture.





VMware Servers and SAN

CSG Technologies proposes to establish a de-conflated environment in which each of the fundamental component can exist independently. Local processing and storage is seamlessly moved to the internet cloud allowing each component to exist independently of the local infrastructure. In this scenario, if a local hard drive is rendered dysfunctional, the back-up drives immediately take-over the network load while the dysfunctional drive is fixed. The virtual host allows the load to be automatically transferred onto back-up drives without the end-user facing any down time. This high-performance network infrastructure thus paves the way for a zero-downtime operational environment.

The goal is to empower organizations to choose the type of connectivity and define the higher-level service requirement from the network based on their enterprise objectives. Each connection should allow for service elasticity, i.e. the possible change of service characteristics during its lifetime.

Through the Zero Downtime Network Architecture, CSG Technologies overcomes the ultimate challenge which is the implementation of a service/network configuration solution where service continuity is unaffected by service creation/modification/removal.




---

## COST EFFECTIVE NETWORK ARCHITECTURE

Businesses with 50 or fewer employees, including home-based businesses need to store ever-increasing amounts of critical business and financial data and protect that information against loss. Though their budgets are limited, their storage and backup needs are just as vital as those of the world's largest multinational corporations, yet few have the luxury of onsite IT support.

CSG Technologies leverages NAS (Network Attached Storage) functionalities to ease network loads for small businesses. Centralizing storage of data and back-up enables access from anywhere, anytime.

The solutions are built to afford the following benefits to small businesses:

- Add capacity in an affordable way
  - Store and access files from any PC or Mac computer using existing network, eliminating the need for multiple hard drives
  - Share capacity with other parties (suppliers, customers)
  - Offer full-proof (RAID) central back up, which can be automated, for extra data protection
  - Share a USB printer across the network
  - Automatically and continuously backup data to ensure all files are safe and secure.
- 



## Five Indicators that it's Time for NAS

Businesses may discover that an entry-level NAS system is their best option if any or all of the following indicators can be identified:



**Limited IT budget or services.** NAS systems are easy to use and require no specialized skillset to maintain. Technical support may be available with the purchase of a system.



**Affordability is important, but so is performance.** Entry-level NAS systems powered by the Intel® Celeron® processor N3000 family are available for less than USD 1,000. The processor enables features that are also available in high-end NAS systems.



**Enterprise-level storage is excessive.** Implementing a data center sounds expensive, can be very technical, and may exceed what the business needs.



**Other solutions are not a good fit.** Sensitive data continues to grow and must be protected in the event of a drive failure, which can be complicated to implement with DAS. Sending sensitive data over the Internet to a public cloud solution raises security concerns, and then there is also the possibility of slower performance if required throughput is high or Internet service is slow.



**Compliance is necessary.** Industries such as finance and healthcare require businesses to comply with regulations for data security and privacy, which may not be possible with a public cloud solution.



## CONCLUSION

CSG Technologies' network architecture stands to fulfil the requirements of emerging service demands and end users by adopting all the best approaches in terms of network elements, network domain and multi-networks integration. By building an agile, dynamic, programmable network that is highly automated, CSG Technologies will ensure that they are able to fully take on the challenges posed by virtualised environments and offer their users the quality of experience that they expect.

CSG Technologies' dynamic and agile network architectures, built on intent-based networking principles, helps you build the new network for your enterprise, branch, and WAN and deliver better experiences more securely, so you can focus on your business, not on your network.

