

BUSINESS NETWORK FOR THE DIGITALIZED WORLD

Blueprint for the new industrial revolution



2. Business environment becomes more dynamic

1. Information gets centralized, while services get distributed

3. Smart, connected products – the third wave of IT

4. Ecosystems open new business opportunities

5. Increased focus on customer experience



DIGITALIZATION IS CHANGING THE WORLD WE DO BUSINESS IN

Digitalization is an ongoing revolutionary business transformation with a deep impact on business and work. In the digitalized world business environment becomes more dynamic. Business is done increasingly in global ecosystems that need to be set up fast to keep up with the shortening product and service lifecycles. At the same time, digitalization frees expert work from the limitations of time and location. Moreover, digitalization of products and services disrupts value chains and forces companies to rethink how to fulfill increasing customer expectations.

Combined with the simultaneous emergence of cloud-oriented technologies, digitalization drives a profound change in business networks¹. In order to support digitalization, networks need to change from static constructions to dynamic entities responding swiftly to changing business requirements. When the applications and data move to the cloud, the network must follow.

This white paper introduces five digitalization trends and explains how they will fundamentally transform business networks. In the end, the last section summarizes why moving network to the cloud enables business networks to better adapt to the requirements of the enterprises.

¹ In this white paper, **business network** means a private telecommunication network that connects the users, devices, offices, applications and partners of an organization to each other as defined by that organization. As such, business network helps the organization to achieve its business goals.



TREND 1: INFORMATION GETS CENTRALIZED, WHILE SERVICES GET DISTRIBUTED

➔ Ubiquitous network reach

➔ Internet will become the backbone for business networks

The amount of stored data is growing exponentially. Cloud economics encourage companies to rely on cloud service providers to store their business related data and to run their business applications. Due to the economies of scale, a few global companies such as Google, Amazon and Microsoft dominate the playground. There is market for specialized, regional actors as well, but the cloud computing development is ending the era of corporate data centers.

On the other hand, from the perspective of a single company, cloud transformation distributes services and their data to multiple locations in the cloud. At the same time, the consumption of the stored data is getting distributed. IT-centric expert work requires access to the information from multiple geographic locations. Some delay-sensitive services – like those using virtual reality capabilities – need to be served from close to the users. Additionally, thanks to technologies like 3D printing, the production can be distributed closer to the consuming markets.

This development of information getting centralized and its consumption getting distributed leads to another exponential development: the growth in the number of network endpoints and the amount of data transported between the data centers and the users. The usage patterns in business networks are changing from site-to-headquarters traffic to site-to-cloud. Based on Cisco Global Cloud Index, by 2019 four-fifths of all data center traffic will be based in the cloud².

Ubiquitous network reach

The centralization of information requires huge network capacities to and from the cloud data centers as well as inside them. The cloud service users generate network traffic while using the services. Another source of network traffic is the data of numerous end user devices which is more and more often stored in the cloud data centers. The development of application programming interfaces (APIs) and mashup applications together with data center virtualization increase the amount of traffic between the data centers.

In addition to increasing traffic volumes, the changing usage patterns require business network services to extend to the cloud. Therefore, the business networks need ubiquitous reach to the endpoints in cloud. In order to provide desired user experience, the traffic to the cloud should take the shortest route instead of traversing through the center of the network.

Also the distribution of data consumption calls for ubiquitous network and network services reachability. The network access, both mobile and fixed, needs to be readily available and should support high quality consumption of applications and services, even if obvious factors like available network bandwidth set natural limits to their use.

² Cisco Global Cloud Index: Forecast and Methodology, 2014–2019

Internet will become the backbone for business networks

Extensive network infrastructure is needed to be able to connect to the business applications and data in the cloud anywhere. Thus the tendency is to utilize the network designed for the purpose of overwhelming global connectivity, namely Internet. In case closed organization networks are needed, they will be built on top of the Internet.

The business criticality of data networks and their services keeps on increasing. Due to the deficiencies of Internet in availability, security and resilience just to name a few, there is a need for network services providing business-grade user experience on top of it. Availability can be improved by using two or even more accesses on site, preferably from different providers. Encryption as well as strong authentication are used to enhance the data security. Moreover, a huge variety of cloud based security services is available. Resilience can be improved for example by multihoming and deploying technologies for dynamic path control and conditioning.

Network function virtualization (NFV) and software-defined networking (SDN) strongly support running business networks on top of Internet by transforming the network elements into virtualized, programmable components, thus allowing separation of network services from the physical infrastructure. The resulting new business network concept is often called as software-defined wide area networking (SD-WAN).

TREND 2: BUSINESS ENVIRONMENT BECOMES MORE DYNAMIC

➔ Immediate response to the changing business needs

➔ Networks will automatically follow the business changes

The business environment is becoming more dynamic. New business opportunities, such as expanding to new markets or introducing new products and services, need to be seized when they arise. Consequently, the cycles of product development, manufacturing and sales are getting shorter as are the product and service lifecycles. Open systems in the IT industry are the key catalysts in speeding up the development and thus shortening the ICT-centric product and service life cycles.

Ability to respond rapidly to the changes in business environment and customer needs has become one of the key success factors for the organizations in the tough global competition. This requires collaboration within business ecosystems that are being set up on demand and disbanded when their tasks are finalized. As a result, organizations expect an immediate response to any changes in their ecosystem.

Immediate response to the changing business needs

In dynamic business environment, business network needs to extend to new locations at short notice. Digging fiber into the ground is time consuming, but often there is a network access readily available in the form of mobile network connectivity or broadband access. When the access is there, the addition of services fulfilling the networking requirements of the organization, including

data security, need to be established with cloud speed – in minutes rather than in weeks or months. And as the organization and its business needs will be continuously evolving, the network service needs to enable a good quality user experience for a new team of people or new set of applications immediately.

Networks will automatically follow the business changes

To make the network services to respond to changing business needs, the organizations need to define business policies concerning their application usage internally and in the ecosystem. The policies reflect the organization's business priorities when allocating the limited network resources to the users. When those policies are changed because of a change in the business, the network will adapt to the new situation immediately and automatically.

In order to adapt the network services to changing business situations, the network needs to understand what are the applications an organization uses and how the applications behave from the network perspective. This needs to be supported by the understanding of the behavior of the devices which an organization uses. This understanding roots from the big data collected from the networks and while all the parameters change over time, the analytics of data collected needs to be close to real-time. Based on the application performance information and business policies the network services can be adjusted automatically to support a good quality user experience.

In the digitalized world the dynamic service requirements are set by IT systems rather than human individuals. Thus the service requests towards the networks are provided by the IT systems as well and need to be responded by the networks in a programmable way.

TREND 3: SMART, CONNECTED PRODUCTS – THE THIRD WAVE OF IT

➔ Seamless connectivity for smart connected products

➔ Network services become part of the digitalized services

After mainframes and the Internet, the third wave of IT is changing the products and services by embedding IT capabilities as an integral part of them. Along the IT comes the connectivity enabling the information produced by the products to be transported for further processing in the product clouds. The amount of these kinds of smart, connected products – also known as Internet of Things (IoT) – will increase exponentially in the coming years. As explained by Porter and Heppelmann³, the changing nature of products is disrupting value chains and forcing companies to rethink nearly everything they do.

The value and capabilities of the products and services vastly increase when they are combined into product systems where each individual product adds value to the other products and the system as whole. An example of such a product system are networked wind turbines, whose software can adjust the blades on each wind turbine to minimize impact on the efficiency of turbines nearby. At the highest level, the product systems will operate autonomously, learning about their environment and adapting to the preferences of the users.

³M. Porter and J. Heppelmann (2014), How Smart, Connected Products Are Transforming Competition, Harvard Business Review, 92(11), 64-88.

Seamless connectivity for the smart, connected products

The smart, connected devices have variable needs concerning the connectivity. Some may require low latency between the device and the product network. Some may require high bandwidth constantly, some intermittently. These requirements may change over time, if the role of the product changes in its ecosystem. Consequently, the networks need to be able to adapt to the communication needs of each product.

A need for connectivity for a smart, connected product may appear unpredictably. Therefore, the connectivity needs to be established on-demand, which ultimately requires automating the whole process of acquiring a network connectivity. To achieve this the link between the product and the network must be made programmable. This requirement applies both to the network access and the related network services. A prerequisite naturally is that there is network coverage available where the smart, connected product is located.

Network services become part of the digitalized services

Whatever can be digitalized will be digitalized. Building and maintaining the physical network infrastructure will still require human touch, but the network services will be embedded to the digitalized services using them. These digitalized services will expose the network services through APIs in a programmable way, ultimately fully automated. The manual tasks related to ordering, provisioning, customizing, paying and finally dismantling a network connectivity will be replaced by automated processes utilizing network function virtualization, software defined networking and cloud technologies.

The role of mobile networks increases with the advent of smart, connected devices. The mobile access is the most ubiquitous form of network access and as such will support the proliferation of the smart, connected devices and their product networks, thus contributing to the digitalization development as whole. Yet on top of the mobile access, network services are required to support the wide variety of device and service needs.

TREND 4: ECOSYSTEMS OPEN NEW BUSINESS OPPORTUNITIES

➡ Speed & granularity in connecting the ecosystem participants

➡ The productivity of an ecosystem is boosted by network services

In the global economy, an organization will increasingly work as part of business ecosystems, dynamic communities of diverse actors creating and capturing value through collaboration and competition. Ecosystems are being set up on demand, and when their tasks are finalized, they cease to exist.

Ecosystems enable different sized and kind of organizations or even individuals to act on the markets in ways not possible for them in case they were alone. As part of a business ecosystem, an organization can focus on its core value proposition and rely on others in providing the complementary pieces required by the customers.

Being a participant of an ecosystem requires an organization being capable to collaborate at many levels. For example, the corporate culture, governance and the business processes need to be adjusted to the ecosystem approach. In case of IT-centric collaboration, the systems and collaboration tools need to support the work between the ecosystem participants even at individual and application level.

Speed and granularity in networking the ecosystem

Due to the speed of change in the digitalizing world, establishing and managing the ecosystem requires dynamic network connectivity between the ecosystem participants. Depending on the need in question, the connectivity may be between organizations, organizations' units like teams or even between individuals. Similarly, the connectivity may be between participants and applications or between applications.

In particular on an ecosystem of multiple companies with different roles and needs, the network connectivity needs to be limited and prioritized based on multiple parameters, including the user, application, time, or available network resources. Therefore, all the people and applications collaborating need to be authenticated and authorized according to the business policies.

The productivity of an ecosystem is boosted by network services

The connectivity between ecosystem participants will be established on-demand. The network services are applied to deliver a good user experience by allocating the needed amount of network resources at the desired level of confidentiality, naturally following the business policies of the participating organizations.

Online portals are the tools to provide a 'social media' kind user interface for building and managing the connectivity between the ecosystem participants. An ecosystem participant invites the required other participants, those being organizations, individuals, or applications. The invited participants will be authenticated and authorized to participate into the ecosystem.

The use of productive collaboration tools can improve the productivity of an ecosystem substantially. Tools like Slack, Skype and Dropbox are simple to learn, easy to adapt to the specific needs and efficient to use. Today, these kinds of cloud services cause headache for the IT managers as part of unmanaged "shadow IT". In the future this will change, since collaboration tools will be integrated to business networks.

TREND 5: INCREASED FOCUS ON CUSTOMER EXPERIENCE

➔ Abstraction of network services

➔ Online portals provide visibility and control to network services

The customer is in the focal point of the organizations. The organizations have been increasing the amount of customer touchpoints in their operations supported by the modern IT technologies. Self-service channels have been deployed, customer service systems are getting highly automated, and social media tools are being used to meet the customer in the digital life. Unfortunately that has often happened without sufficient regard for the high level, integrated customer experience. However, as supported by recent survey by Accenture⁴, the companies are increasingly seeing customer experience as a strategic priority.

When it comes to business network services, the business units are the key customers of networking services provided by the IT department. Providing customers an intuitive way to match the network service to the business needs is an integral part of good customer experience.

Abstraction of network services

In order to improve customer experience, network services need to be presented to their users on their natural language. The key enabler for this is abstraction through which the complicated network technology is hidden behind simple questions asked from the user. Besides being simple and on users' language, the question need to be relevant from the network usage perspective.

Business user, for example, is not interested in megabits and milliseconds as such, but more in getting high quality and secure user experience with chosen applications and services. Therefore, the service needs to be presented and adjustable on business terms in a simple, guided manner whenever appropriate for the user. On the other hand, if the user is a computer program, the abstraction level is very different from the business user's case.

Online portals provide visibility and control to network services

The network services will be acquired like any cloud services. Although building a complicated network solution will require interaction between the using organization and the service provider also in the future, mostly the setup and changes to the service will be managed via online portals. Additionally the online portals will inform the user about the usage of the network on the user terms. This means information about the network users, applications and user experience, rather than protocol or port statistics.

In case the user is not a human being but a connected device or an application, the interaction between the network service and its users will be carried in a programmable way through APIs. Standardization and auto-configuration capabilities are required to enable any connected device to acquire network access and network services when it detects network coverage.

⁴Accenture, 2015 B2B Customer Experience, Research Findings.

DIGITALIZATION DRIVES BUSINESS NETWORKS TO THE CLOUD

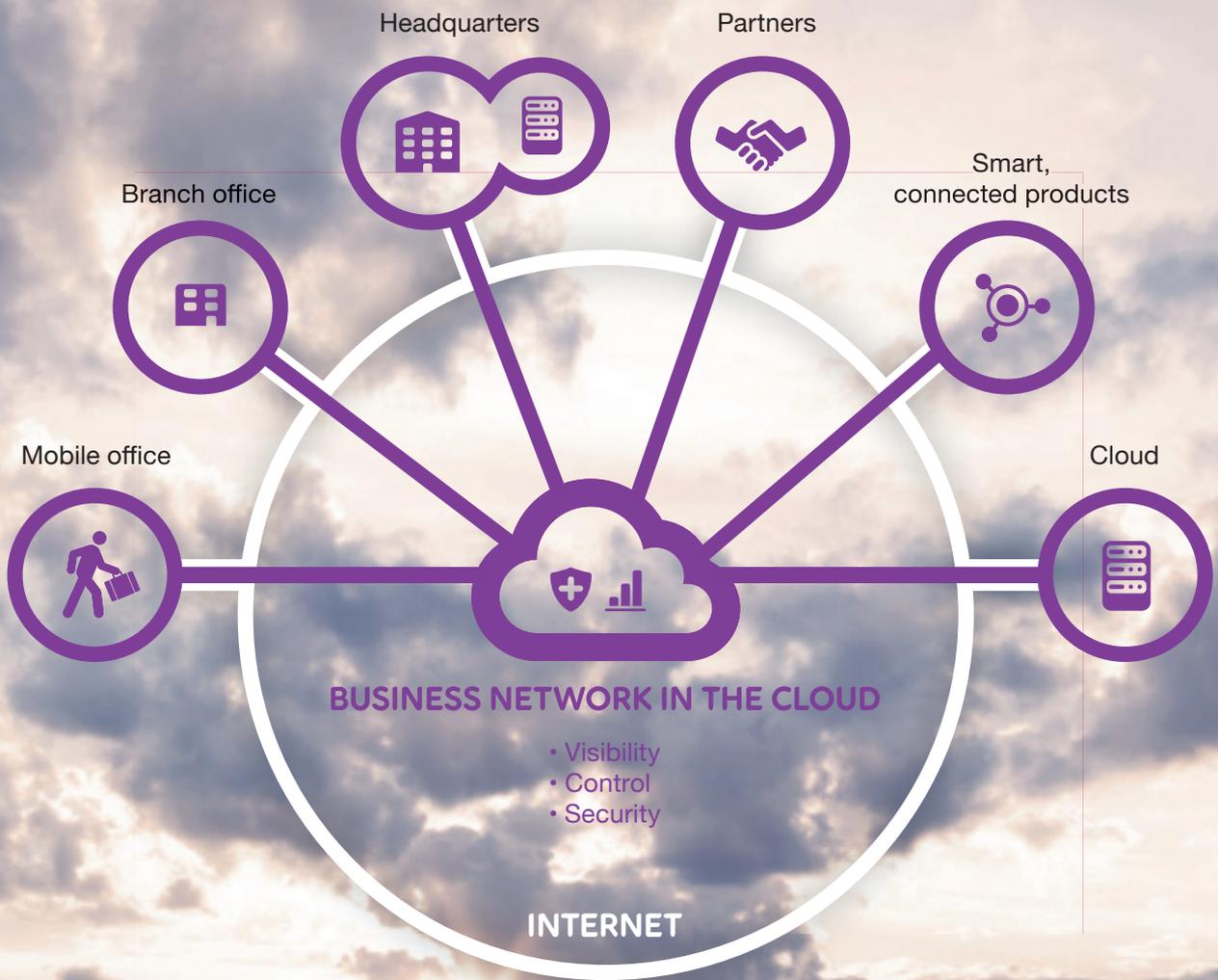
Digitalization is an ongoing revolutionary business transformation with a deep impact on business networks. In the future, the business networks need to be ubiquitously available and adapt rapidly to changing business needs. Increased collaboration within business ecosystems requires capabilities for inter-organizational networking, whereas the emergence of smart, connected devices automates the whole process of acquiring a network connectivity. In order to improve customer experience, the users of business networks need to be able to manage the networks on their natural language instead of technical parameters.

A new business network concept has emerged to address the rapidly evolving needs of the networked business ecosystems under formation. Its core is an infrastructure-agnostic software platform with limitless cloud-enabled computing power accessible everywhere. Network function virtualization and software-defined networking transform the network elements into virtualized, programmable components and enable the use of ubiquitously available Internet connections as the backbone of business networks. As a result, the network will move to the cloud.

The business network for the digitalized world combines the freedom and reach of the Internet with business-grade security and reliability. The character of the network changes from static to dynamic: resources are mainly on-demand and self-healing in nature. This allows for quick modification, automation and scalability of the functionality. The increased automation level and use of public Internet connectivity also improve the cost-efficiency of business networks.

Moving the network to cloud will improve flexibility, customer experience and cost-efficiency compared to today's business networks. The real importance of cloud enabled networking, however, will be seen in networking the business ecosystem and enabling an easier way for global networking. These developments finally enable the real revolution in our business practices.





The dynamics of the digitalization will be enabled by the business network in the cloud

Digitalization is a revolutionary business transformation that accelerates the speed of change, transforms products and services and moves applications to the cloud. Also business networks need to evolve to fulfill the new requirements of the digitalized world. This white paper explains why digitalization will drive business networks to the cloud and how that will improve their flexibility, customer experience and cost-efficiency.

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