

ngena managed SD-WAN-as-a-Service Company Presentation



01

ngena –
overview

ngena
The Shared Network

Who is ngena?

- ngena stands for “Next Generation Enterprise Network Alliance” – an alliance of service providers from across the globe
- Start-up company founded in 2016, providing global business networks to alliance partners
- Transforms alliance partner networks into a single Software Defined Network (SDN)
- Service delivery platform based on Network Function Virtualization (NFV), service orchestration and end-to-end process automation
- Alliance partners offer high quality standardized global VPN services to their business customers

ngena



ngena at a glance

“SD-WAN as a Service @ ngena” provides innovative and highly standardized global business networks together with Cisco

- 1. Disruptive technology:**
Cloud platform for networks built together with Cisco
- 2. New business model:**
Build a global alliance based on a “shared economy” model
- 3. Strong distribution model:**
Wholesale model with trusted and established service partners



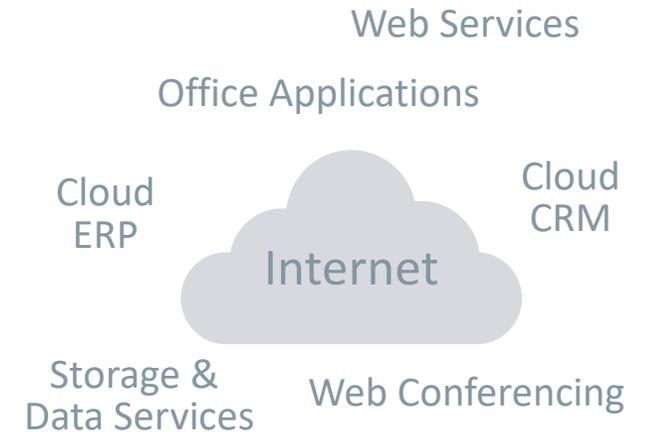
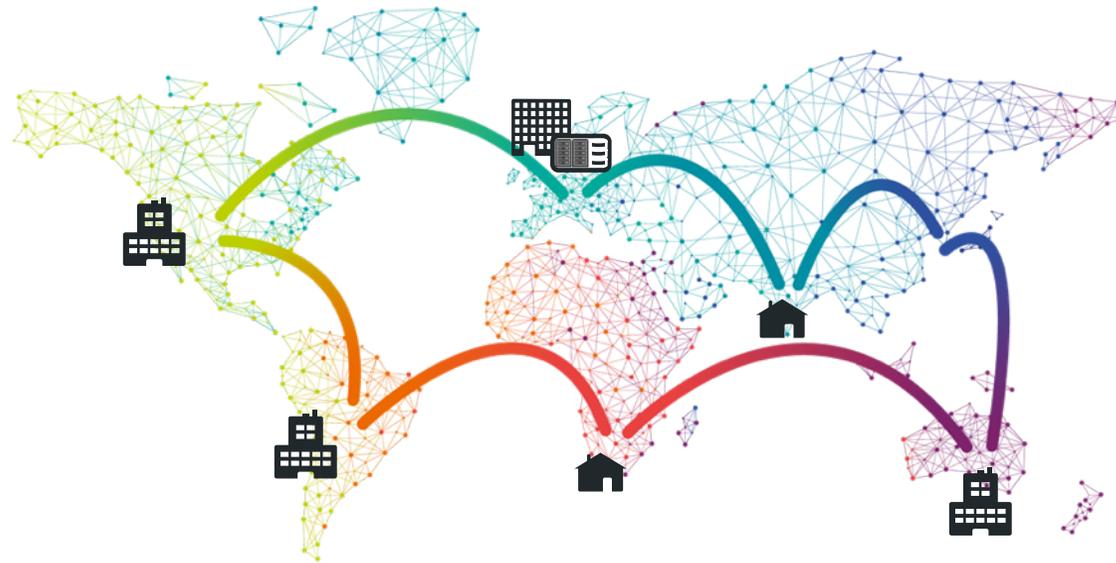
Service delivery platform based on Network Function Virtualization (NFV), service orchestration and end-to-end process automation

Turns the networks of alliance partners into one Software Defined Network (SDN)

Alliance partners, i.e. telcos and system integrators (SI), offer high quality and standardized global VPN services to their business customers

Challenges for enterprises: digitalization, globalization and new IT-solutions

- Truly global connectivity
 - Public Internet as integral part of corporate networks
 - Multi service platforms are required to reduce complexity
 - Cloud services become dominant delivery model
-



New network requirements demand new WAN services

Today business customers lose productivity, business opportunities and revenue ...

... due to insufficient WAN performance.

- Long and unpredictable lead times to connect sites
- Patchwork of networks, products and solutions
- Huge effort for implementation and transformation
- Lack of network agility and low speed of innovation



What we deliver: best connections!

ngena provides an innovative and highly standardized global business network that is:

- quicker to implement
- better scalable
- more secure
- easier to use
- more stable
- less complex

than any other solution in the market

Digitalization driving global SD-WAN demand

Mega Trends



Decentralization: 80% of employees and customers are served in branch offices



Globalization: 41% of businesses globally say they do business in countries outside their own



Bandwidth demand: 21% global business IP traffic growth (CAGR) 2016–2021



Cloud adoption: 70% of large scale enterprises use cloud applications



18% worldwide public cloud services market growth in 2017



Revenue growth (CAGR) **2017–2021** for global SD-WAN infrastructure & services

US\$ 8.05bn

global SD-WAN infrastructure & services revenue by 2021



18% decrease in MPLS revenues expected in Western Europe by 2020

US\$ 106bn

global VPN market in **2022** and CARG of **+13%**



50% of WAN edge infrastructure refresh initiative based on SD-WAN by 2020



58% of enterprises will be deploying SD-WAN services by 2018/19



80% of IP-VPN RFPs demanding SD-WAN solutions today

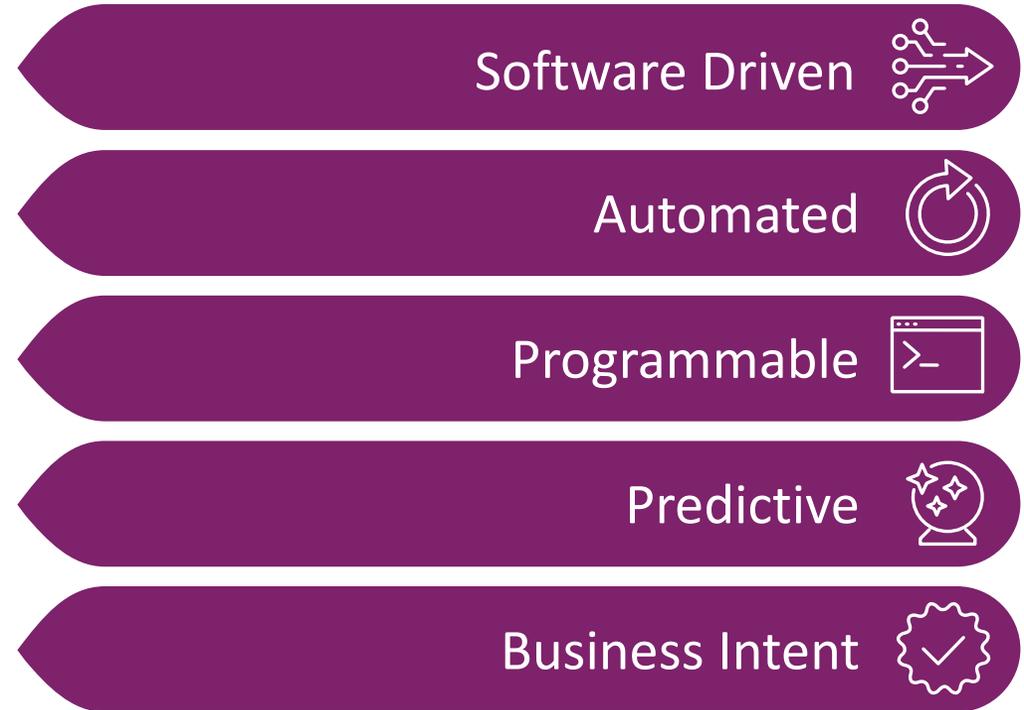
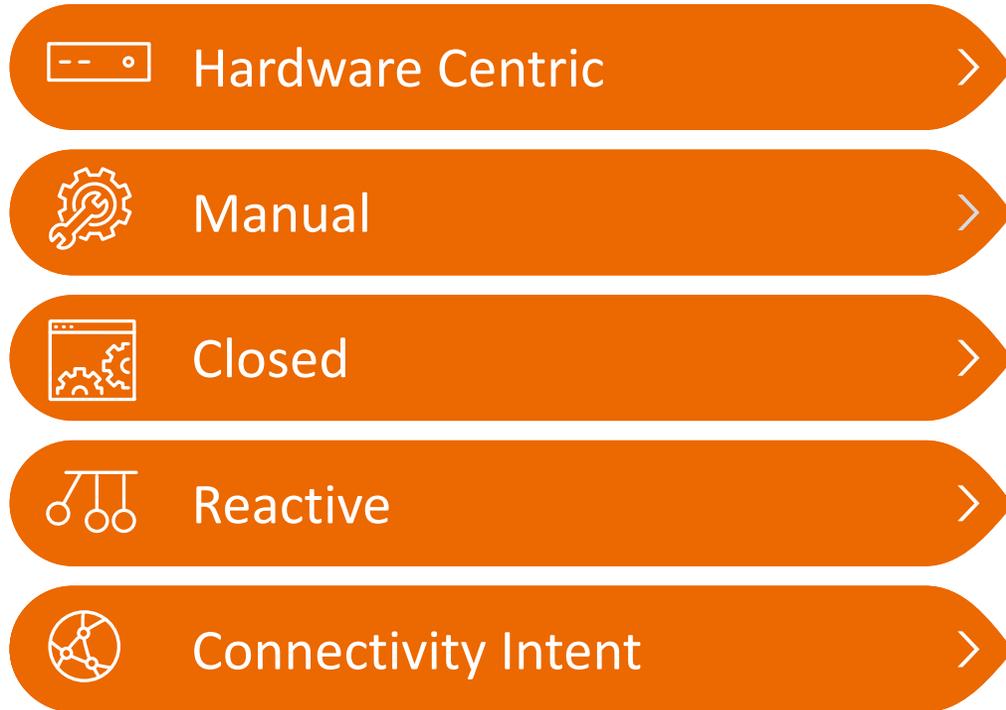
Effects on SD-WAN

IDC: “SD-WAN growth is exploding for at least the next 5 years”.

Sources: 1. Gartner/Viptela; 2. Sage/Populus; 3. Cisco; 4. IDG; 5. Gartner; 6. IDC; 7. IDC; 8. Gartner; 9. Ovum; 10. IDC; 11. IDC; 12. Market Research Future

Traditional and new ways of building global networks

Traditional



Software Defined/SDN

Cloud Based

Hosted, managed

Automation & Scale

Speed, flexibility, zero-touch, policy driven

Security & Compliance

Segmentation, threat mitigation

Assurance & Analytics

Users, applications, devices

ngena's company quick facts & management

Company

ngena is a privately held, limited liability company (Gesellschaft mit beschränkter Haftung - GmbH)

Location

- Headquartered in Frankfurt am Main, Germany
- Further sites in Debrecen (Hungary) & Košice (Slovakia)

Facts

- Founded in 2016
- 155+ employees



Dr. Marcus Hacke

Founder & Managing Director

Background:

Marcus developed the idea of ngena. His responsibilities comprise product management, platform engineering and operations.



Bart de Graaff

Managing Director

Background:

Bart joined ngena in May 2019. His key responsibilities cover partner management, sales and marketing.





ngena lives and breathes the sharing economy model

Uber

global logistics provider
facilitating shared transport
services

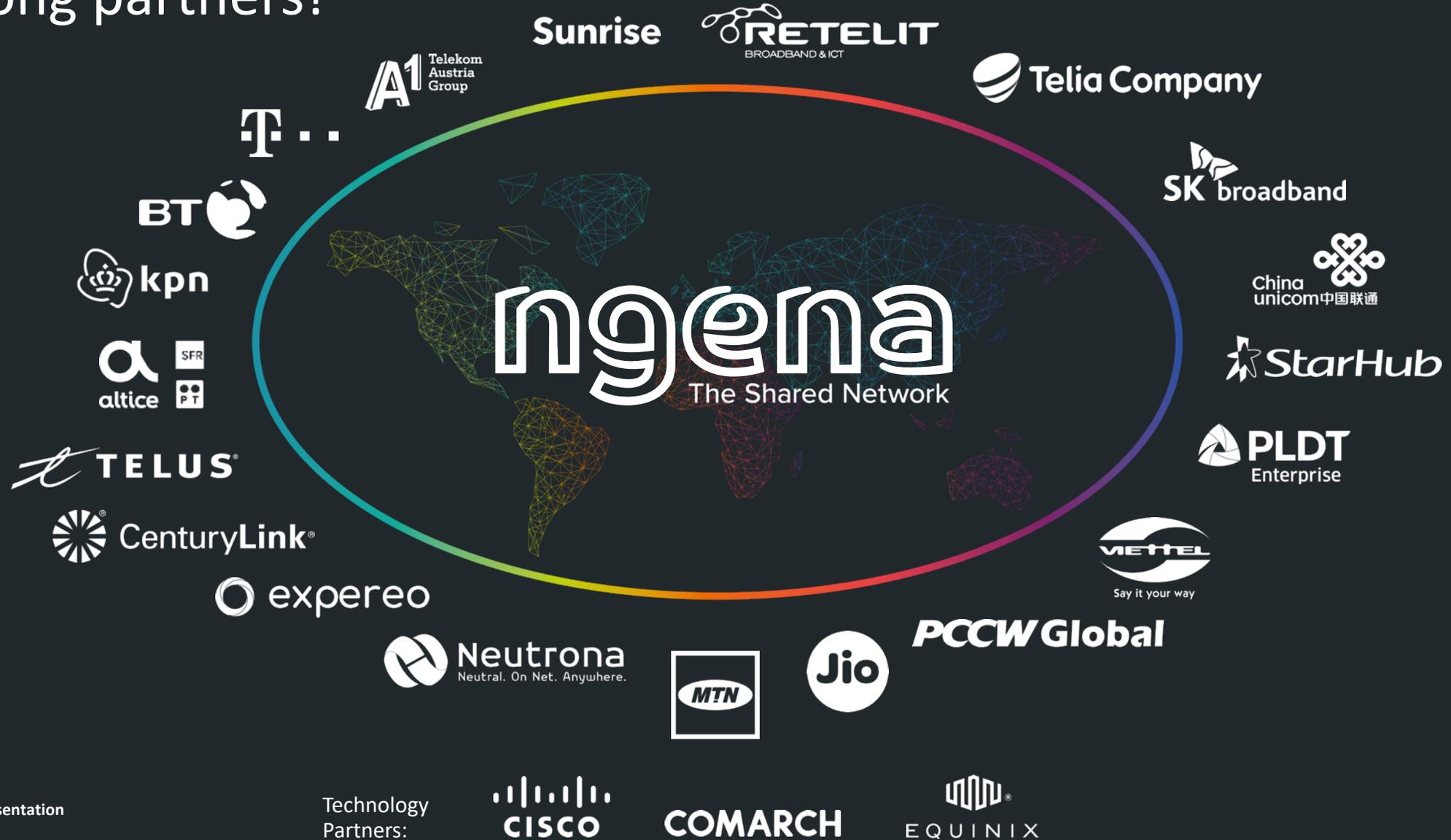
Airbnb

global lodging provider
facilitating shared lodgings

ngena

global network provider
facilitating shared network
service

An ecosystem of strong partners!



ngena – how we work with our partners



ngena turns the networks of all alliance partners into a single Software Defined Network (SDN).



Every alliance partner remains responsible for its customers in its respective region.



Alliance partners can offer their enterprise customers high quality, standardized global SD-WAN services – end-to-end managed by ngena.



ngena uses innovative cloud technology (network function virtualization), end-to-end orchestration and full automation.



Our technology partners (Cisco, Comarch, Equinix) deliver the necessary technical foundation for all cloud and virtualization features.

How we take care of a customers order



Your telecoms provider
("ngena's A-end partner")

Single point of contact to the customer

- from quotation to fulfillment
- monitors network performance
- reporting and managing changes



End-to-end service provider

Coordinates full customer solution design

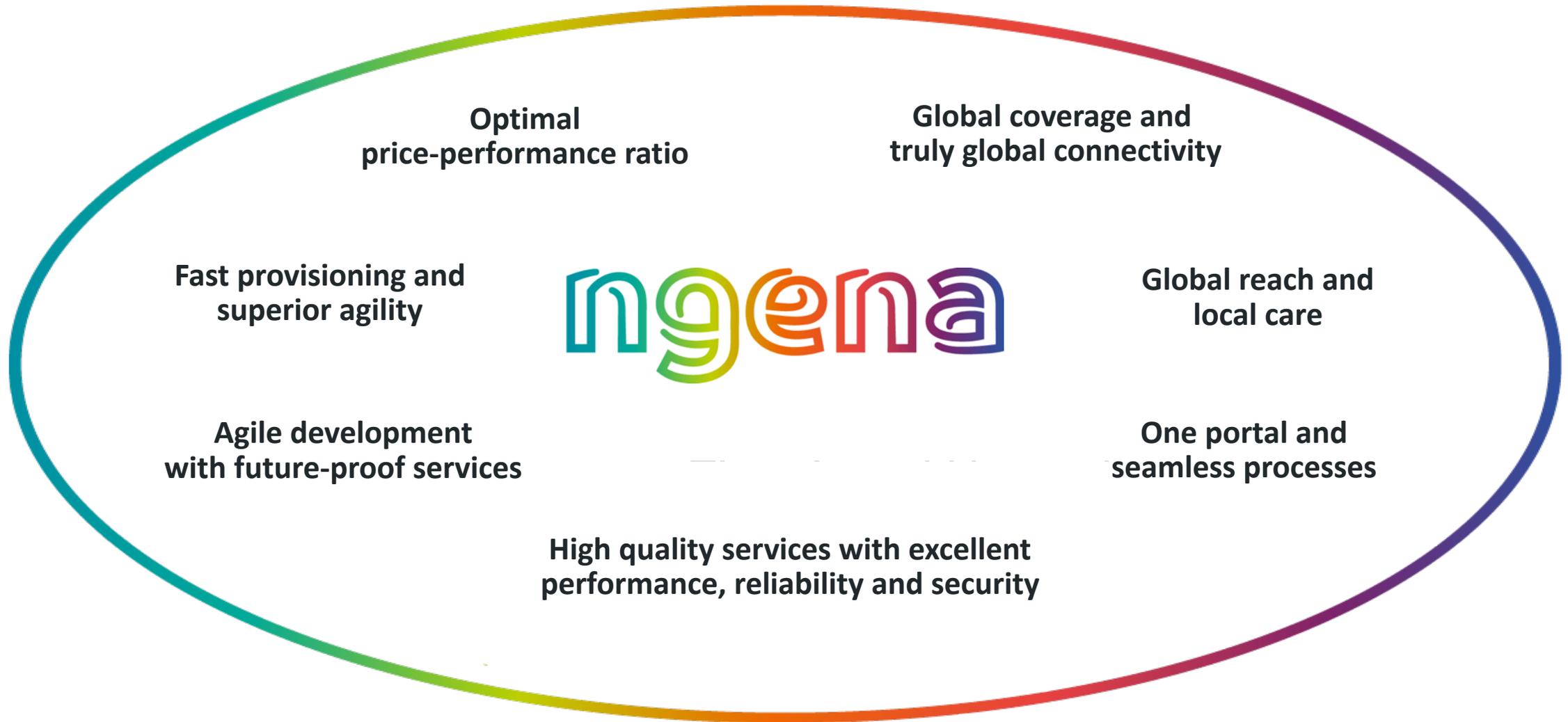
- orders local access,
- coordinates global dispatching and installation of CPE
- test and turn-up, hand-over the solution to the alliance partner



Local alliance partner ("B-end partner")

- Provides local Ethernet and/or Internet access including on-site installation & field service

ngena's network: tremendous benefits for enterprises



ngena: advantages for business customers

Customer Experience



- **Coverage:** strong partners with leading market positions in their regions
- **Security:** highest security for business-critical applications
- **Quality:** homogeneity of the network with end-to-end service and quality levels

Innovation



- **Business model:** first sharing economy model for networking expands reach
- **Technology innovation:** network technology based on virtualization. Completely software defined
- **Customer service updates:** near real time

Agility



- **Rapid deployment:** fast implementation and roll-out, self provisioning
- **Rapid development:** agile and continuous development of network and features
- **Fast ordering:** virtualized services & functionalities in near real time

Customer Testimonial

Challenge

- Increasing bandwidth need
- Application specific challenges
- Severe cloud application latency
- Any-Any connectivity
- Changing requirements
- Complex (traditional) network
- Branch-driven technical variety

Why ngena?

- Easy to deploy, no project needed
- Access to leading (Cisco) capabilities
- Price/ performance
- Globally consistent
- Gradual roll-out/ migration
- Changeability of solution
- SDWAN network design



**IMPERIAL
BRANDS**

*“...we luckily found everything we needed with
ngena SD-WAN-as-a-service...”*

Karen Charlton, Global Service Technology Lead at Imperial Brands PLC



02

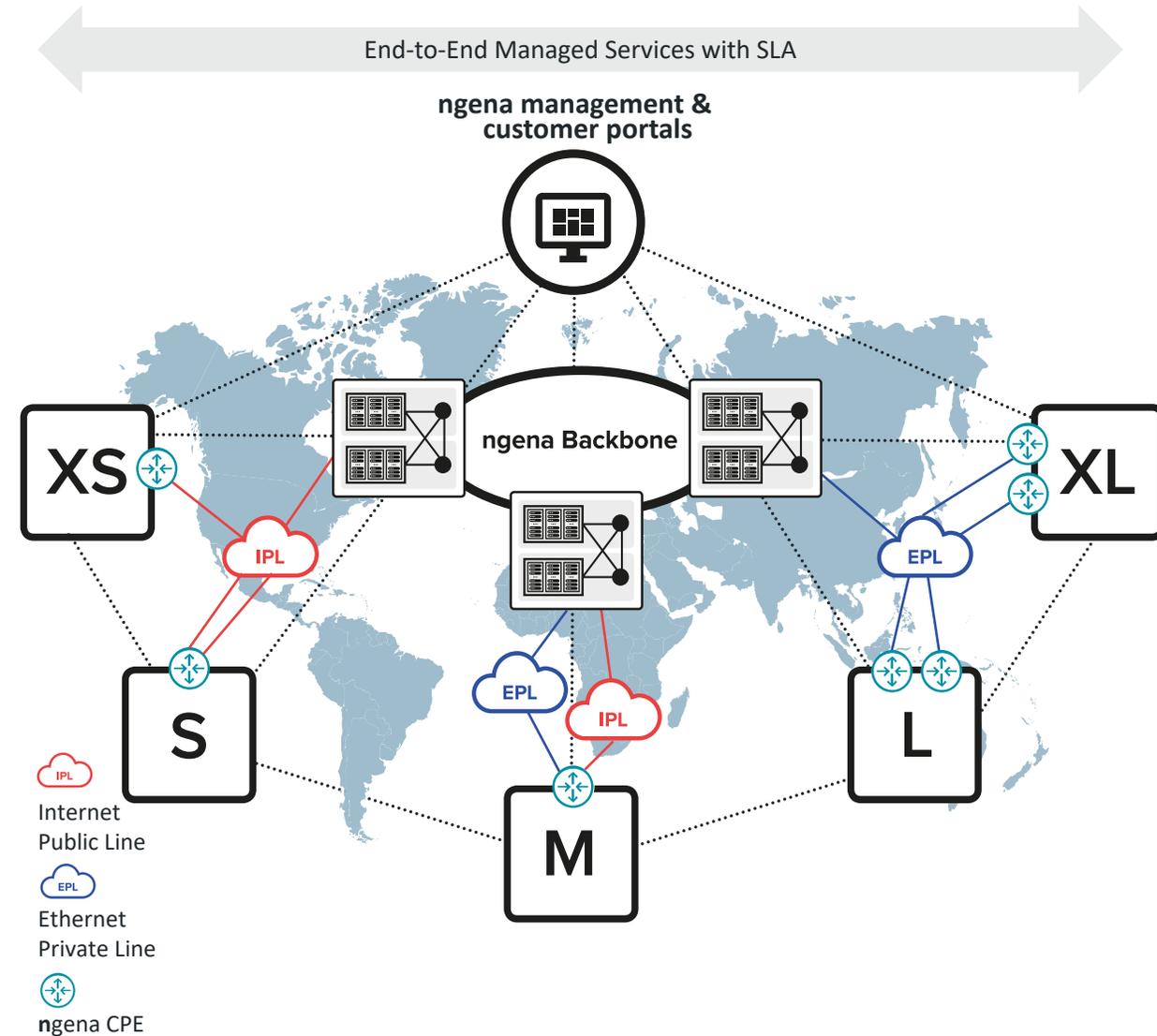
Technical concept and service portfolio



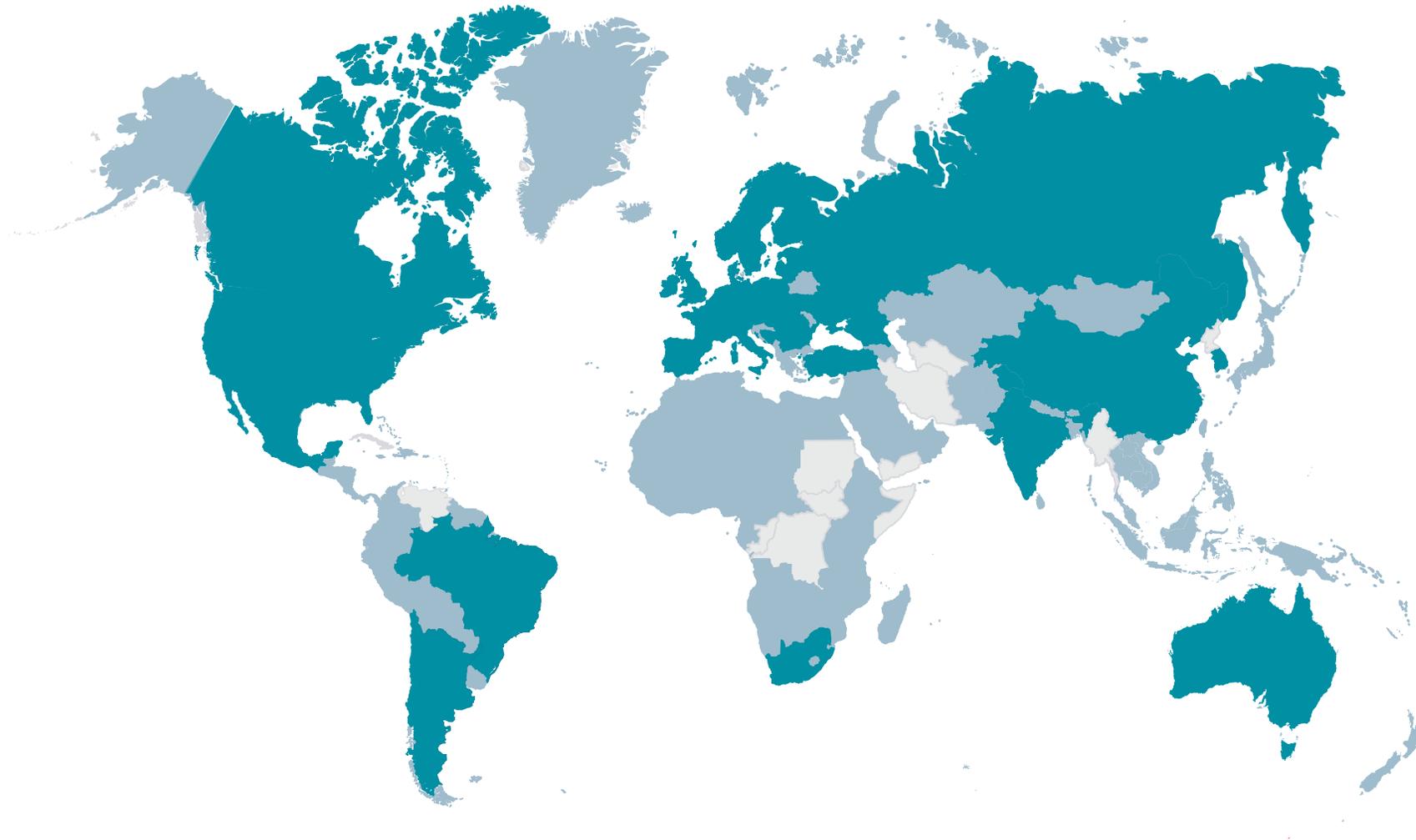
Solution overview

Design principles

- ngena managed SD-WAN-as-a-Service: Offering comprehensive hybrid VPN services
 - Internet connections (IPL)
 - Ethernet links (EPL)
- All access designs with one portal and seamless processes
- End-to-End orchestration and full automation
- Global private backbone
- Broad set of additional functions and value-added services



ngena solution is ready to quote on large scale

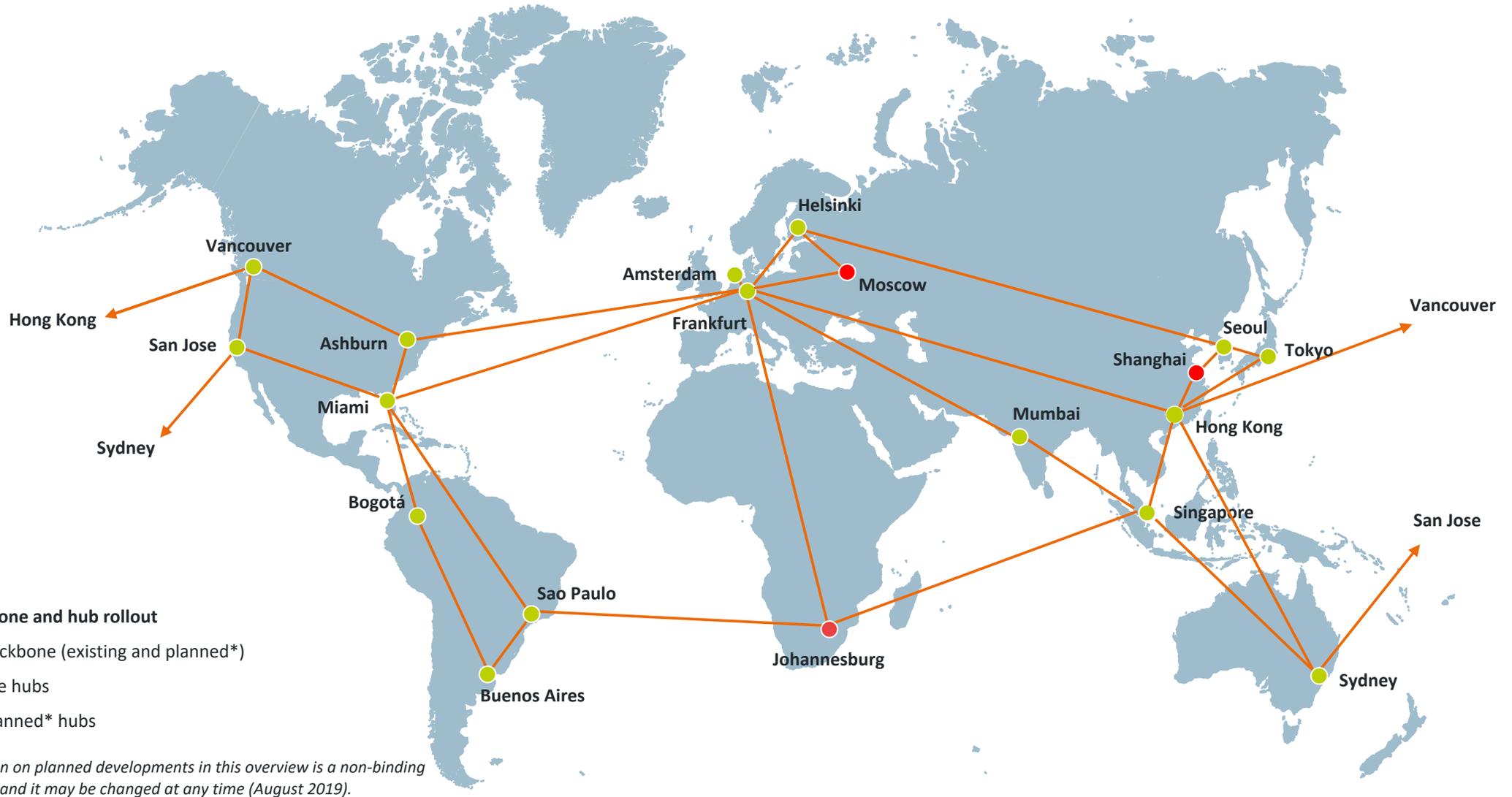


Regions / Access types	No. of countries		
	IPL	IPL & EPL	Total
Africa	50	1	51
Europe	18	29	47
Asia Pacific	33	10	43
Central & South America	39	5	44
Middle East	13	0	13
North America	2	2	4
Sub-Total	155	47	202

ngena's coverage – ready for quotation as per July 2019 for access types based on

-  Ethernet Private Line (EPL) + Internet Public Line (IPL)
-  Internet Public Line (IPL)

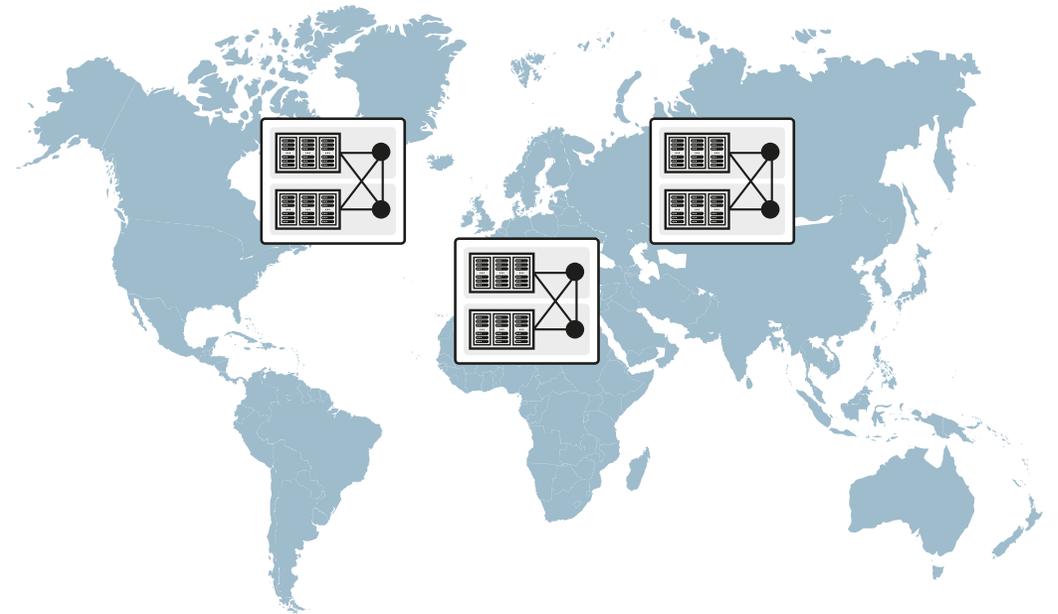
ngena's global hub and meshed network backbone



Brief product solution overview

ngena Hub

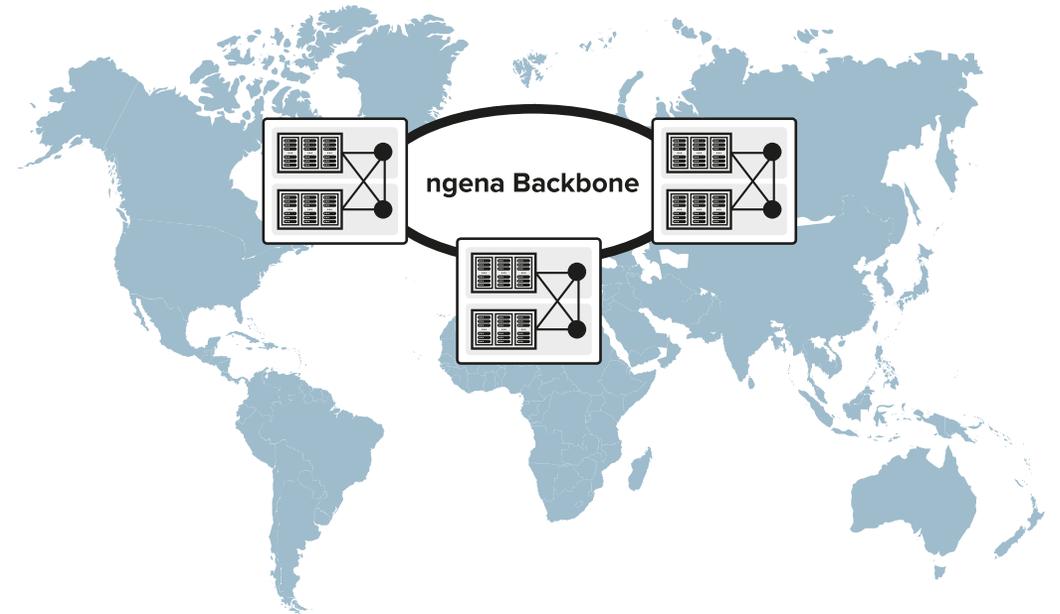
- Data Centre with Virtual Infrastructure Management
 - Service chain to deliver Value Added Services (e.g. Firewall etc.)
 - Full automation and orchestration (service catalogue driven)
 - Resilience and high-availability
-



Brief product solution overview

ngena Backbone

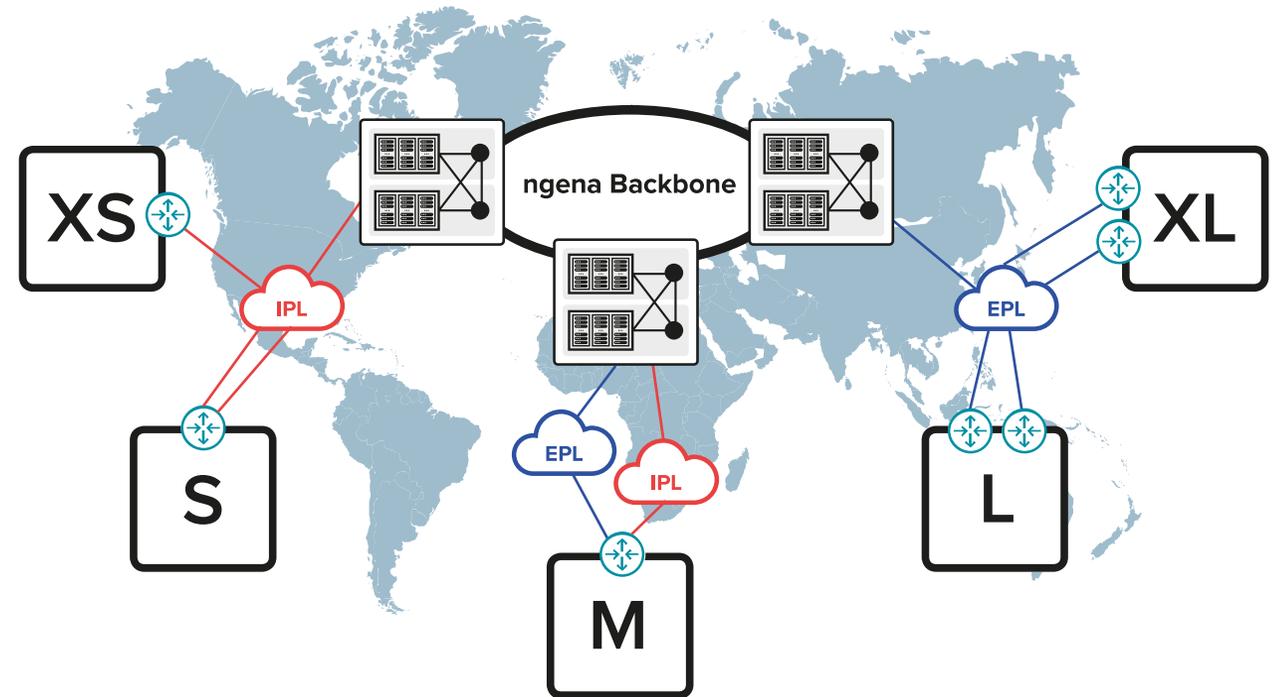
- Interconnection between ngena Hubs
 - CoS/QoS-based routing
 - Encryption (data & control plane)
 - Resilience
-



Brief product solution overview

ngena VPN

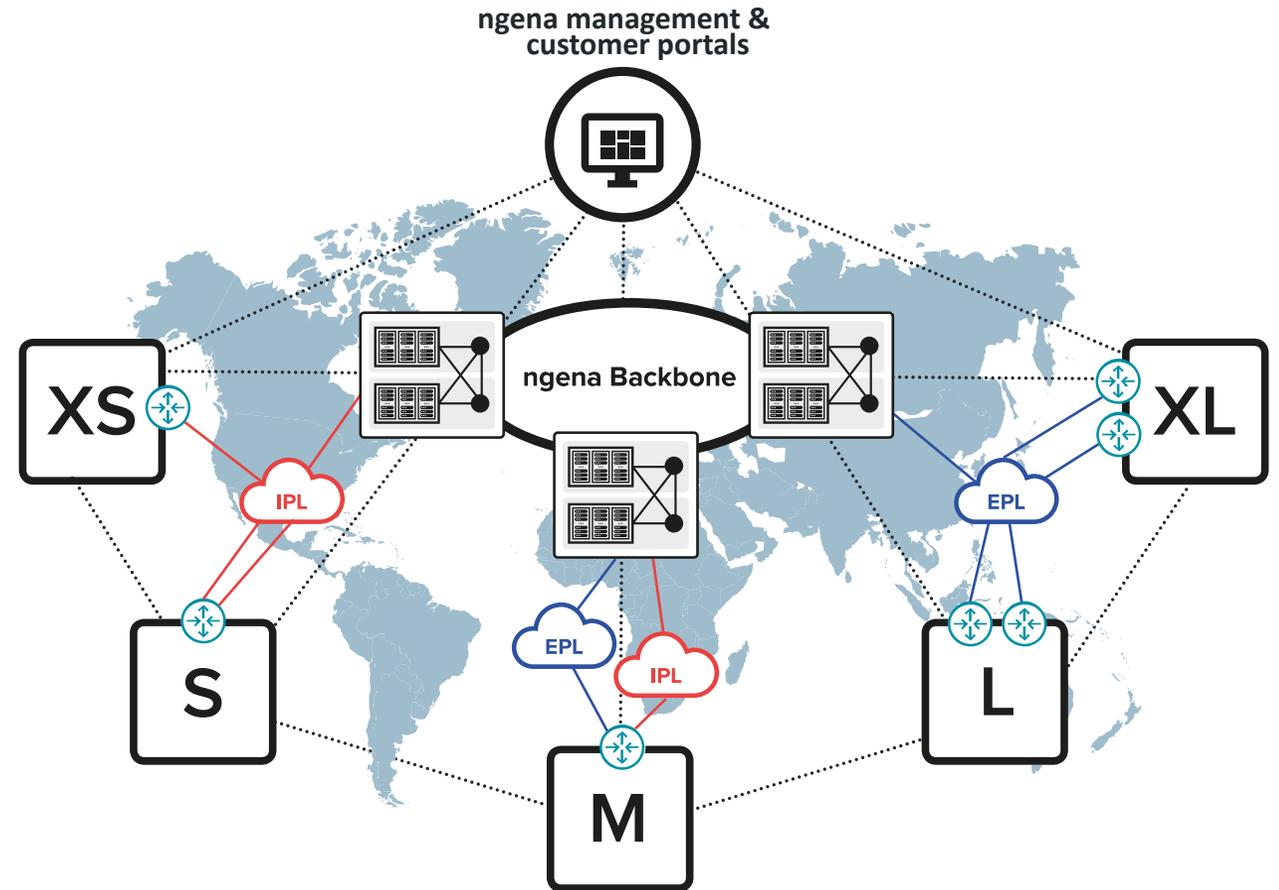
- Network agnostic SDN-based VPN
 - Standardized Access Designs
 - Hybrid access (EPL- and IPL-based)
 - E2E encryption (site pairwise)
 - Zero-touch CPE configuration
 - Path management
-



Brief product solution overview

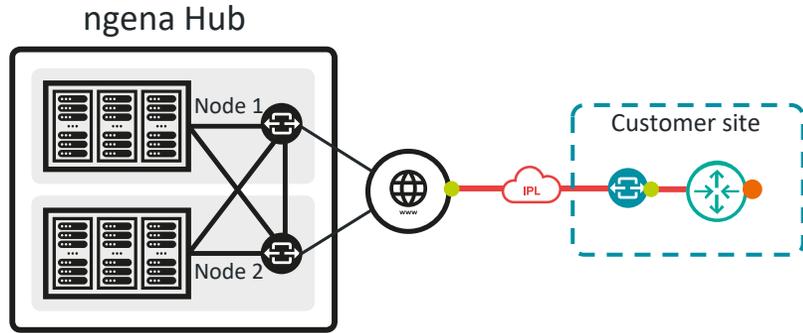
Centralized Management

- Product catalogue driven service design and configuration
 - End-to-End process automation
 - NFV-based services & centralized orchestration
-

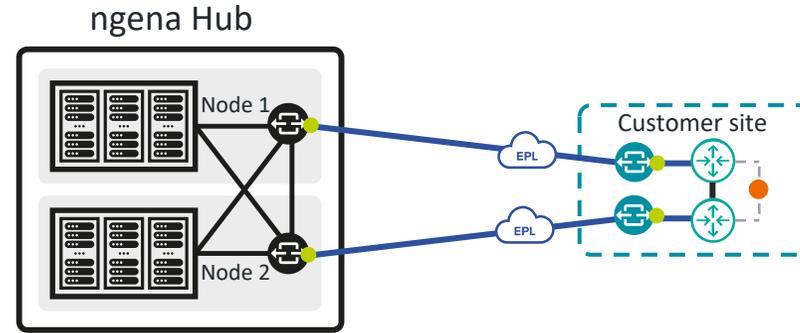


ngena's Access Designs - I

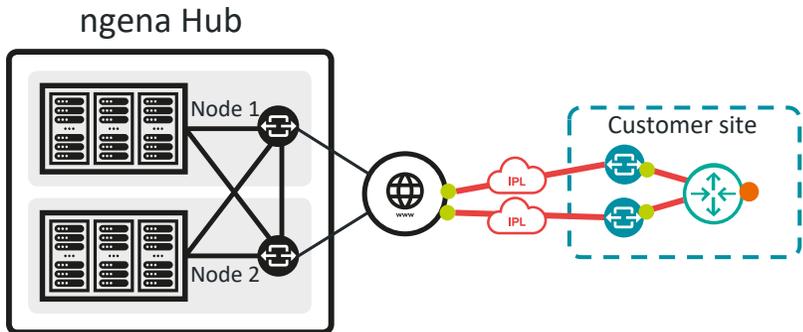
XS



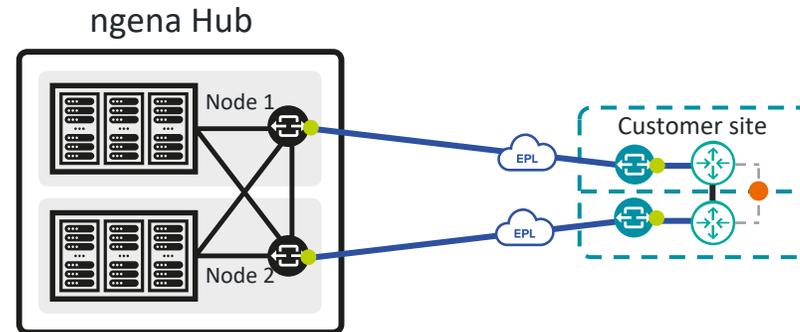
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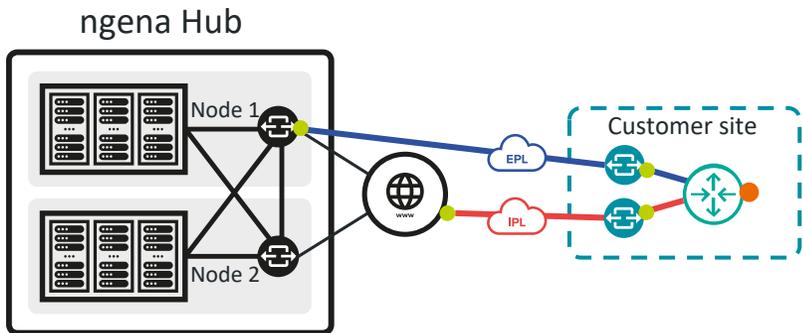
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XL

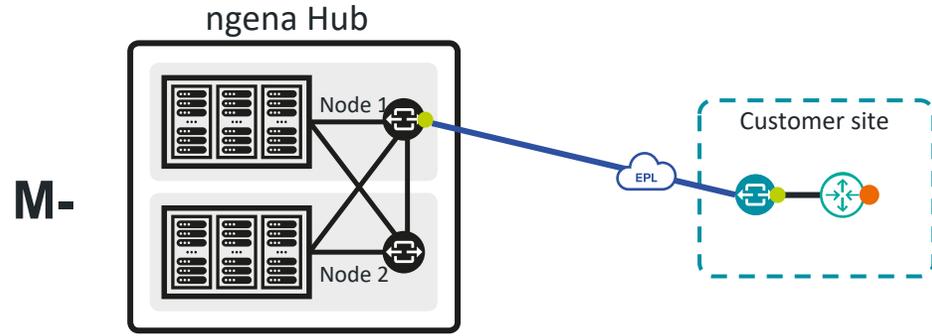
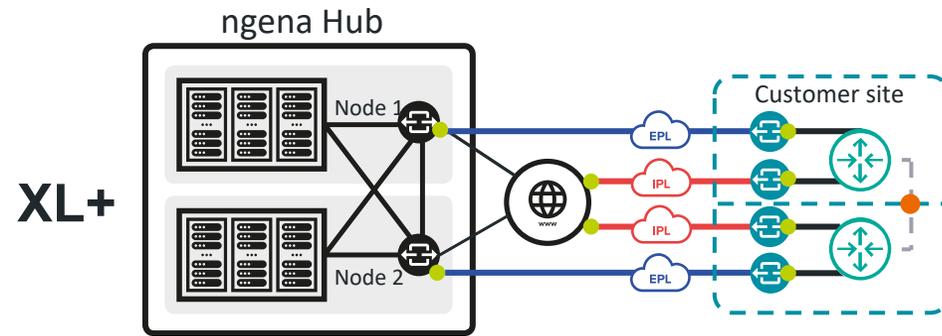
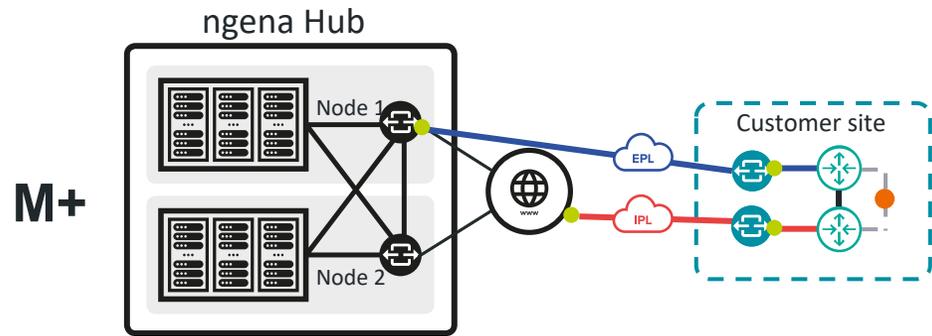
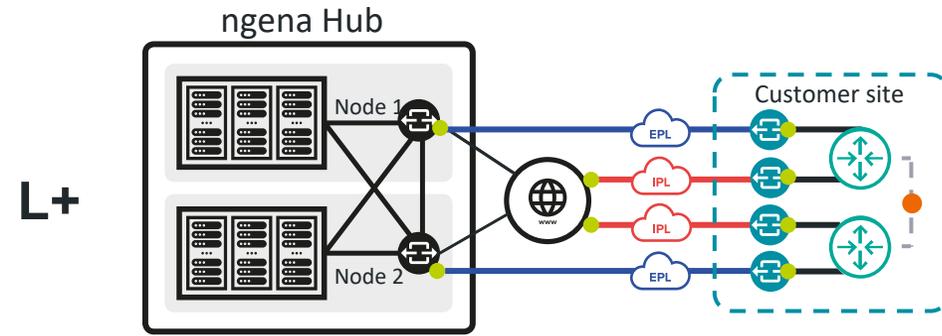
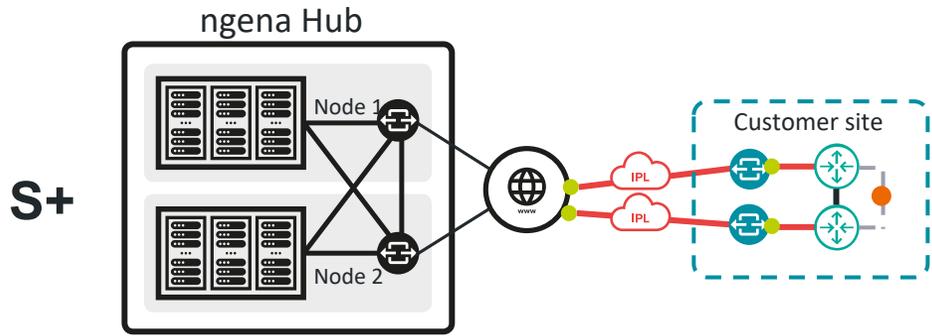


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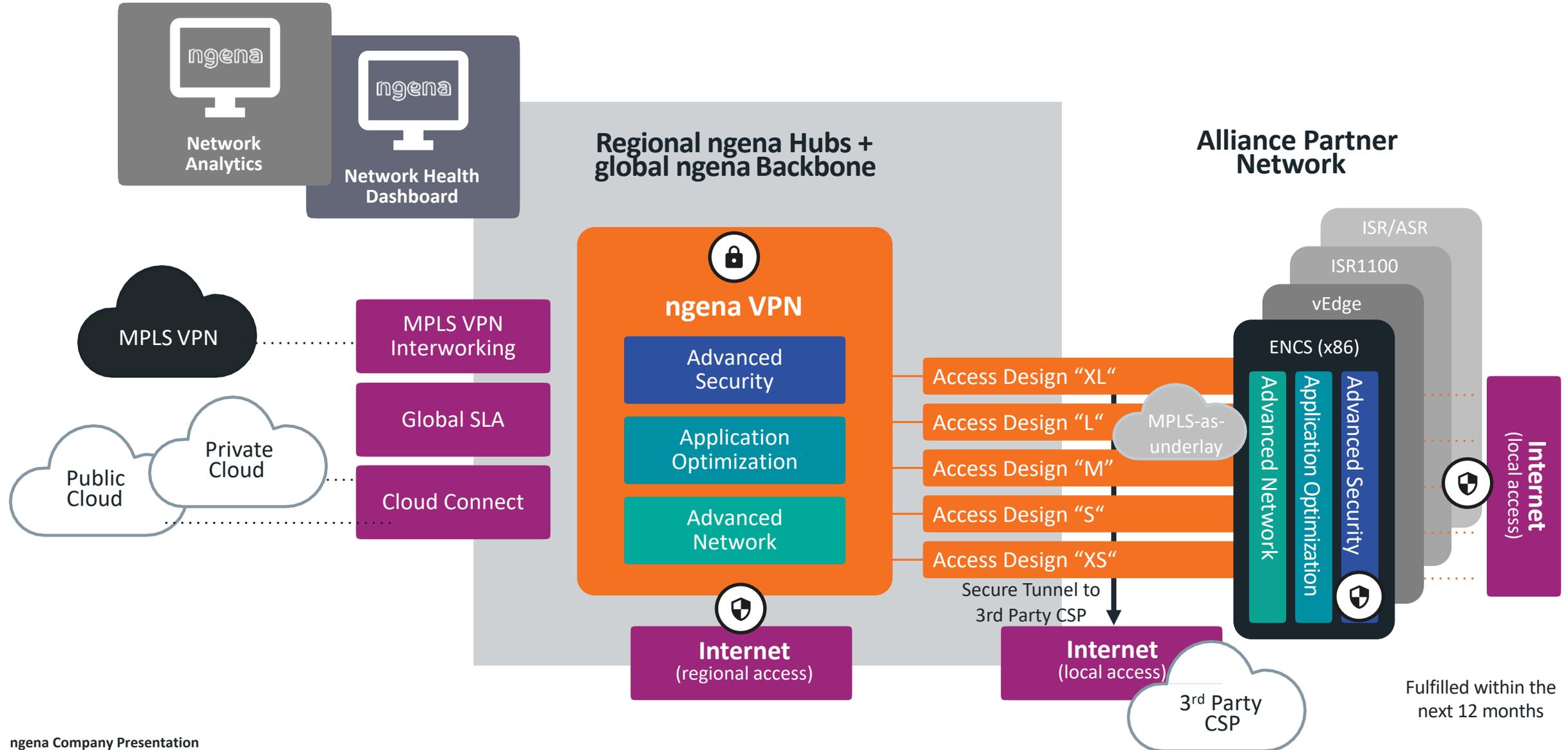
- Access Gateway
- Service Termination Point of B-End Alliance Partner
- Internet Public Line
- Ethernet Private Line
- Line Termination Device of B-End Alliance Partner
- ngena Customer Premise Equipment (CPE)
- Service Termination Point of ngena

ngena's Access Designs - II

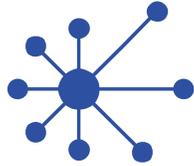


- Access Gateway
- Service Termination Point of B-End Alliance Partner
- Internet Public Line
- Ethernet Private Line
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- ngena Customer Premise Equipment (CPE)
- Service Termination Point of ngena

ngena's portfolio: the big picture



Value added services



Advanced Network Services

Internet Access (regional/central/local), Multi-VPN, CoS/QoS, Nomadic Access, VPN Gateway to interconnect with MPLS VPNs, Intelligent path management (static and dynamic), Micro-Hub for remote areas or as aggregation point, embedded WAN/LAN/WLAN management



Advanced Security Services

Firewall and Web-Security to protect against threat originating from the Internet, Next Generation Firewall and DDOS protection



Application Optimization Services

Application Aware Network – NBAR based automated Application Marking for CoS allocation, end-to-end application optimization and acceleration with vWAAS (based on vBranch)

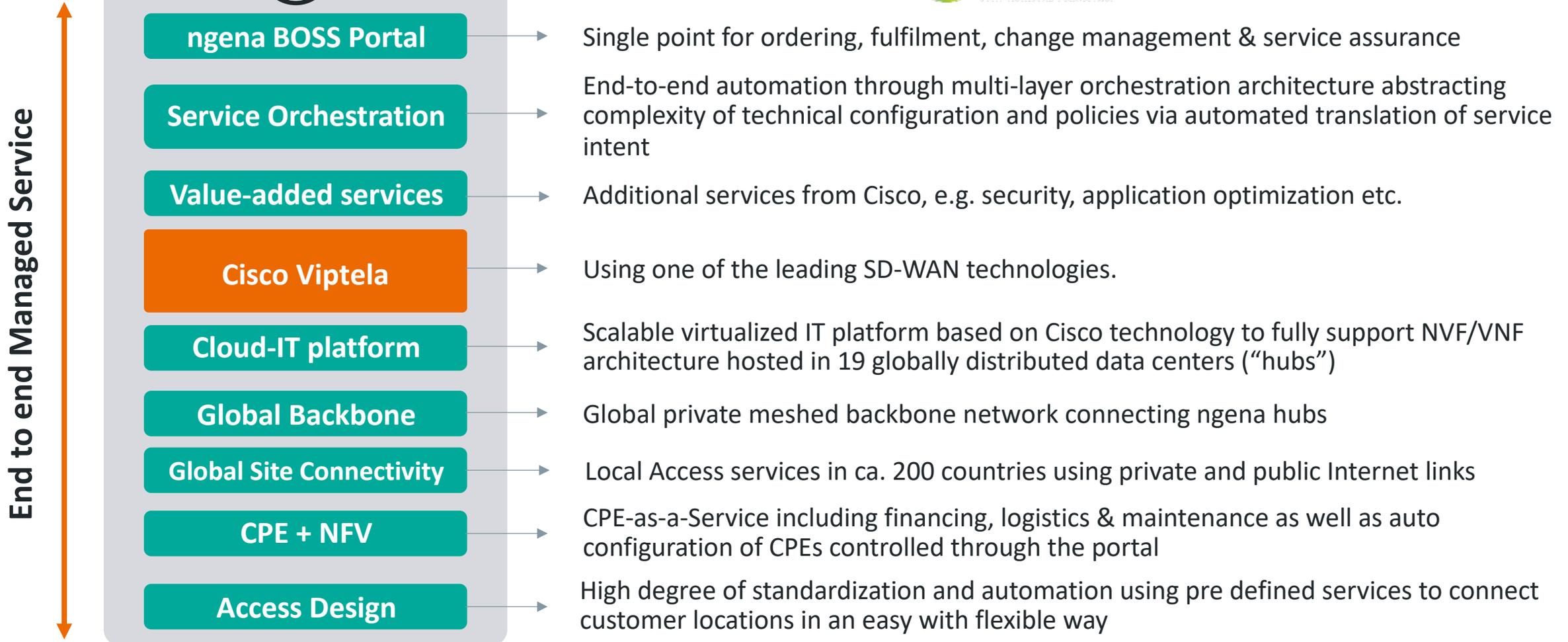


Cloud Connect Services

Cloud Connector to public cloud services for optimized access (secure, and offering high performance)

Fully managed SD-WAN-as-a-Service

Single Service Portfolio





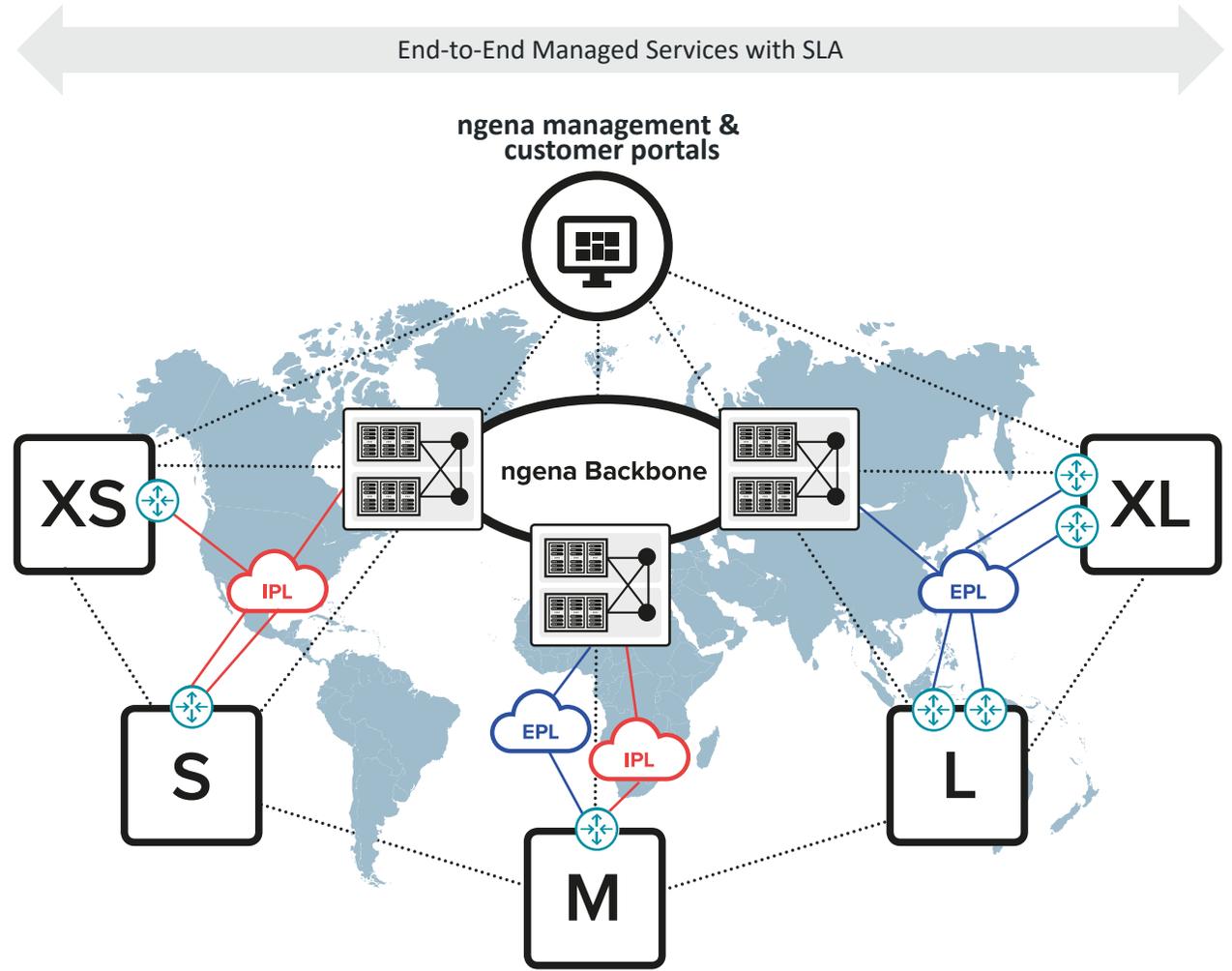
03

Automations and operations

Brief product solution overview

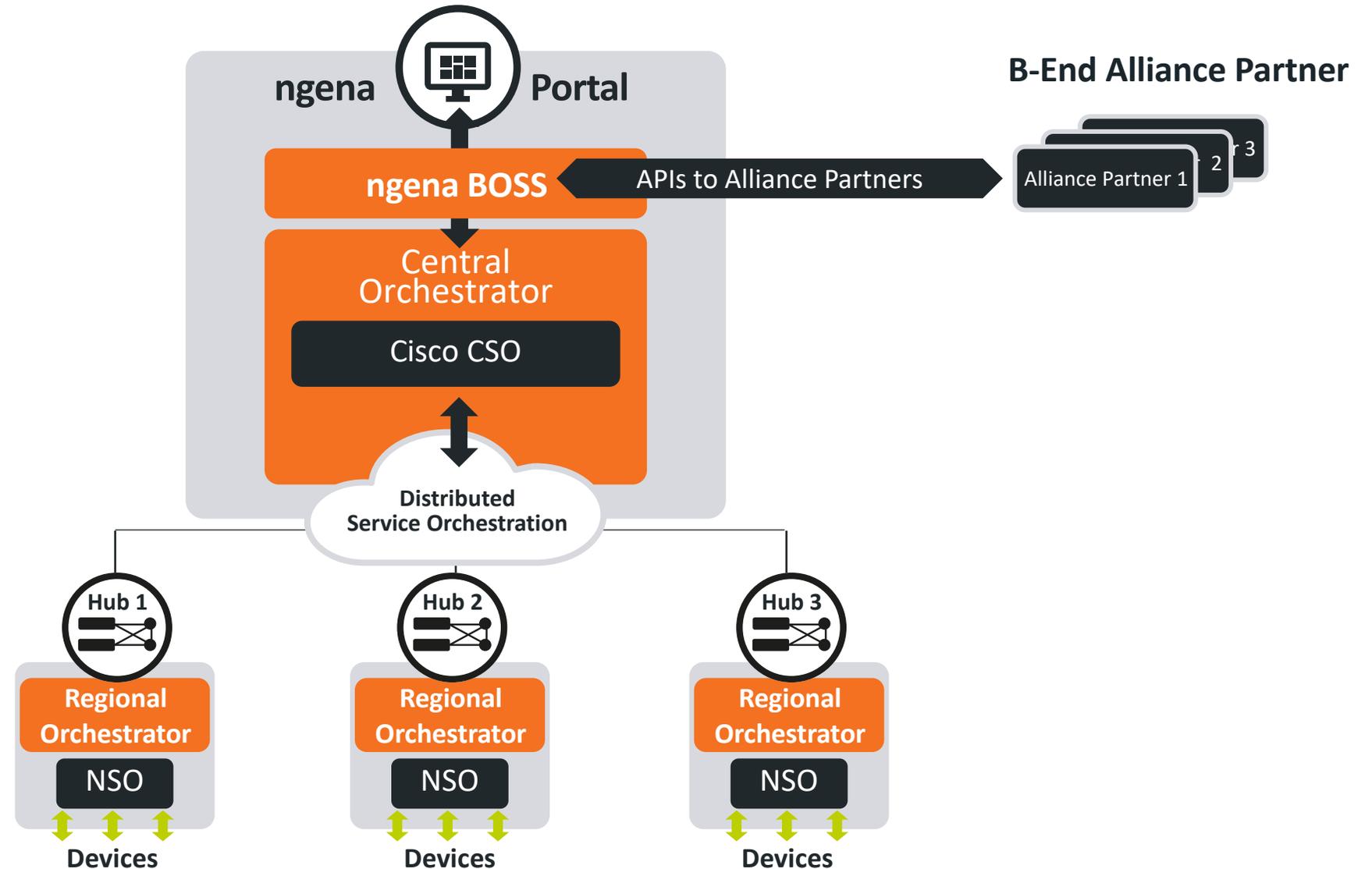
E2E Managed Services

- E2E managed solution
- Field support
- Proactive & reactive service management
- Customer Care Portal
- Service performance visibility
- Global SLA



End-to-end automation with a model-driven architecture

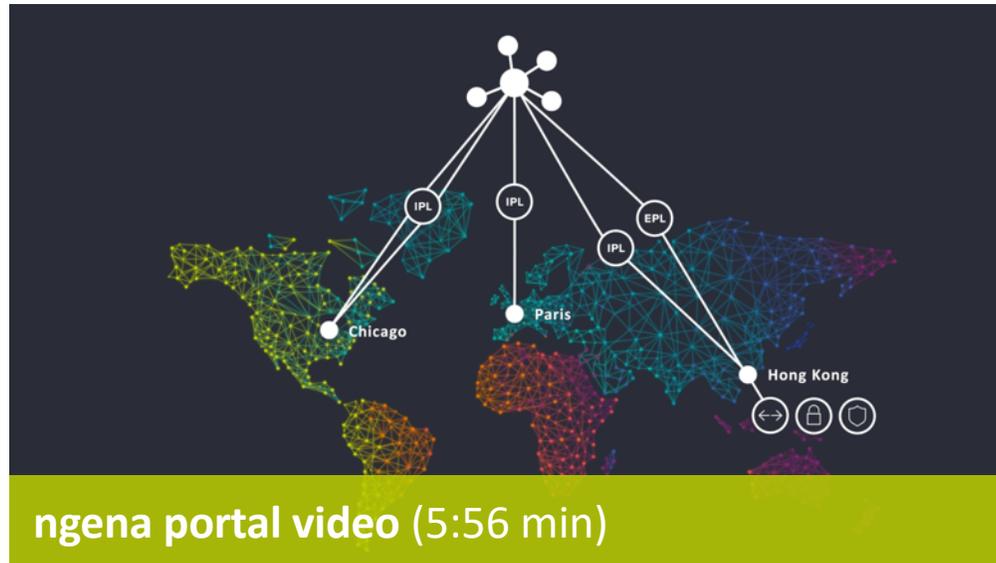
COMARCH



The ngena portal

The ngena portal is the single entry point to support all interactions between alliance partners and ngena. It is a multi-tenant portal with role-based secure access which supports different views for an alliance partner.

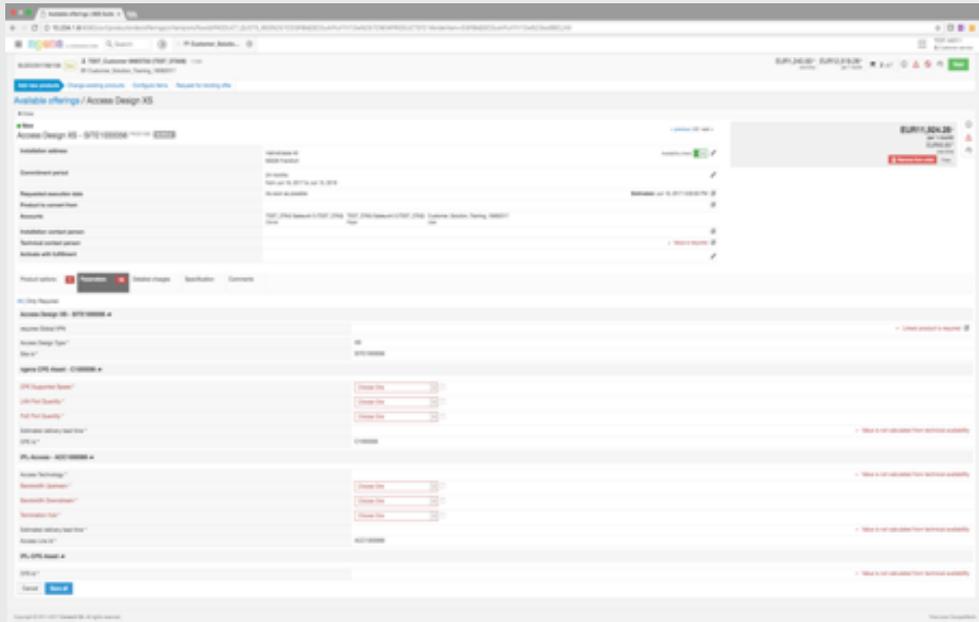
To get a first impression of the ngena Portal, have a look at our video: <https://youtu.be/0XegTEYShew>



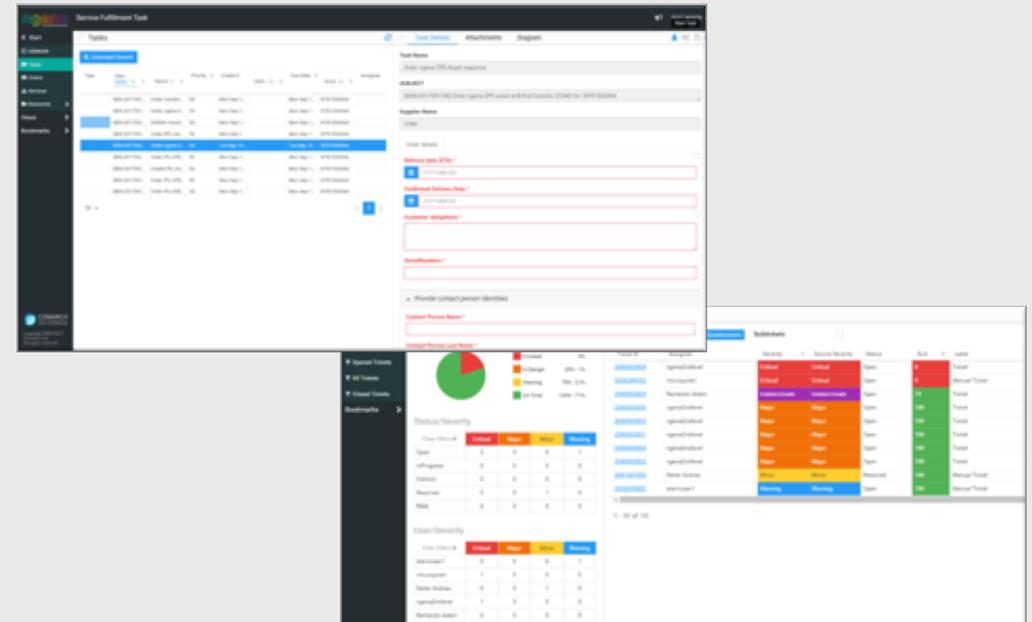
Overview of ngena alliance partner-facing portals

ngena BSS/OSS platform

Business Support System (BSS)



Operations Support System (OSS)



Overview of ngena alliance partner-facing portals

ngena BSS/OSS platform

Business Support System (BSS)

Customer Relationship Management (CRM)

Network Solution Configurator

Customer Order Management

Invoice and Report Presentation (with backend billing system)

Complaint Management System

Product Management System (based on resource DB & APIs)

Operations Support System (OSS)

Fulfilment Workflow System (NGSF)

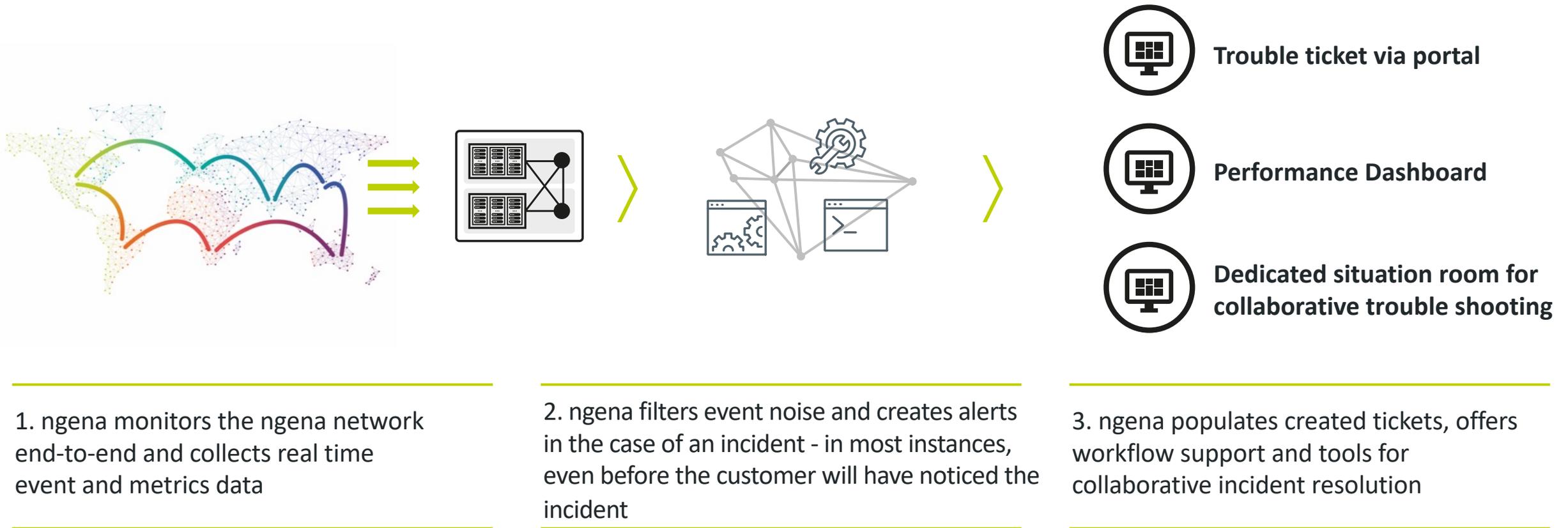
Trouble Ticket Management System
– with integration to incident
monitoring and analytics tools (NGSA)

What does the ngena portal mean for procurement?

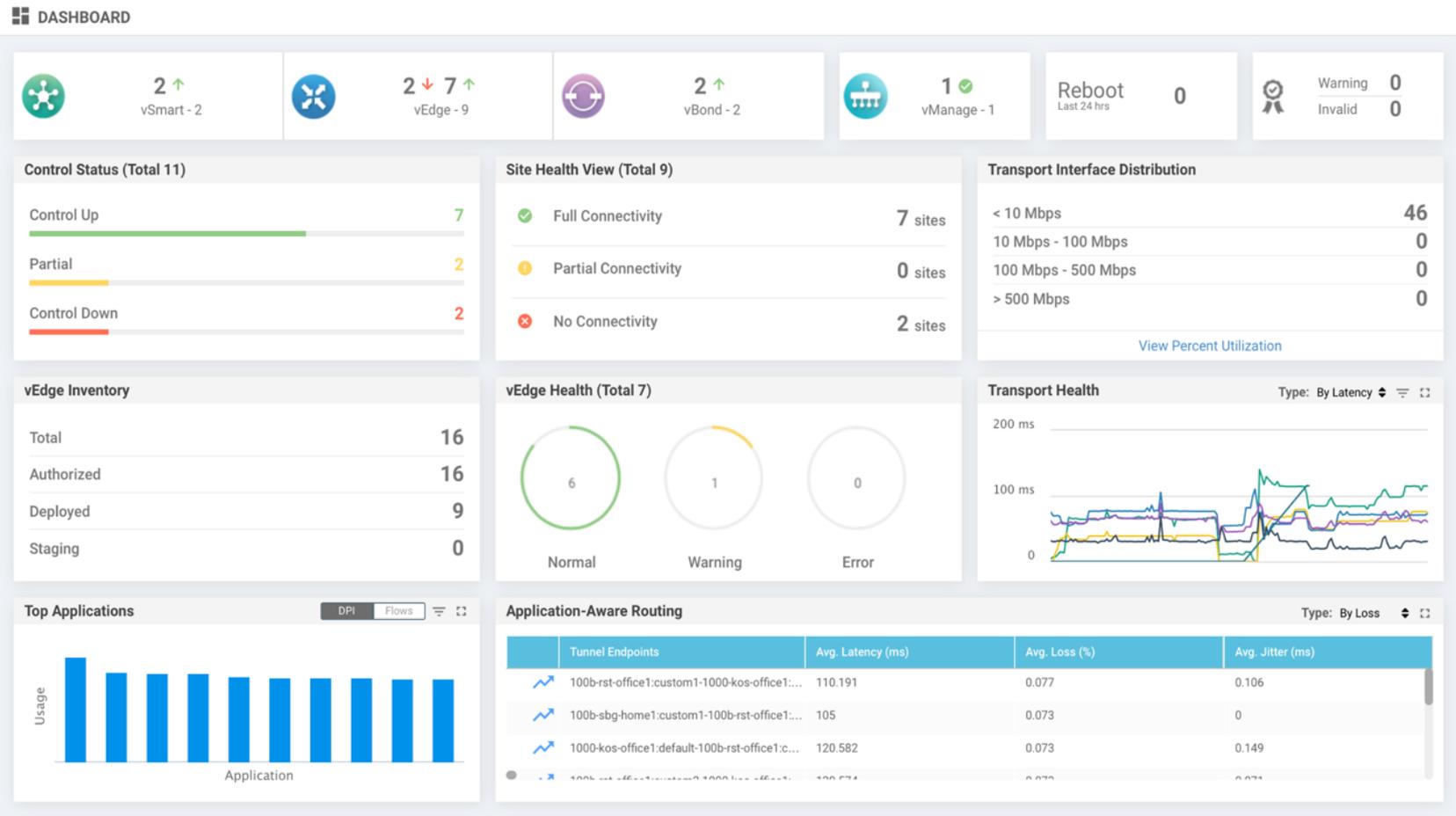
Quotation
in 60
minutes

The screenshot displays the ngena portal interface. At the top, there is a navigation bar with the ngena logo, a search bar, and several active tabs including 'Amazing Solution' and 'Amazing Internati...'. Below the navigation bar, a header section shows the order ID 'BUDO/201711/1041', a 'New' status, the customer name 'Amazing International', and pricing information: 'EUR1,532.95 one-time' and 'EUR6,668.94 per 1 month'. A shopping cart icon indicates 4 items with a total of 28. Action buttons include 'Cancel' and 'Request for binding quote', with a mouse cursor hovering over the latter. Below the header is a breadcrumb trail: 'Add new products > Change existing products > Configure items > Summary'. The main content area is titled 'Available offerings' and shows a location dropdown for 'United States, IL, Chicago 60647, W Armitage Ave 2101'. Below this are filter and sort options. The main grid displays four product offerings, each labeled as a 'BUNDLE': 'Access Design M', 'Access Design S', 'Access Design XS', and 'Global VPN'. Each offering includes a description ('Internet'), pricing ('EURO.00 per 1 month'), and commitment period options (24, 36, 48, 60 months). Each offering also has an 'Available' status and a shopping cart icon.

How we monitor and proactively resolve potential operational issues



Dashboard example – network overview



ngena platform security – made in Germany



ngena has implemented a strong security governance for its own platforms & infrastructure (global ngena hubs, private global backbone etc.) based on...

- Compliance with the German Federal Data Protection Act
- Information security management system
- Configurable security and data privacy requirements
- Policy based security
- Set KPI indicators for review



To ensure a high level of security, ngena has a clearly defined threat prevention & mitigation strategy with...

- Proactive network vulnerability scan
- DDoS mitigation
- Regular penetration testing
- Set KPI indicators for review



To achieve this, ngena uses a comprehensive security infrastructure

- 3rd generation firewall with combination of application firewall & intrusion prevention system + DPI
- Next-generation intrusion prevention & detection system
- Centralized identity and access management
- Security information and event management system
- Use of encryption for all data in rest and in transit



04

What you should keep
in mind

ngena
The Shared Network

ngena SD-WAN as a Service: Explained in 60 seconds



ngena managed SD-WAN as a Service delivers...

- A global, hybrid VPN based on SDN technologies
- Diverse access designs and value-added services with a high degree of standardization in terms of technologies, processes and service levels

ngena managed SD-WAN as a Service means...

- Strong regional partners in an international alliance
- Centrally managed as a result of a new form of service provisioning

ngena provides new and innovative VPN technologies to support digitalization efforts:

- quicker to implement
- better scalable
- more secure
- easier to use
- more stable
- less complex

...with this we are accelerating the network evolution!

Partner and customer benefits

Alliance Benefits

- Simpler service provisioning
- Faster time to revenue
- Lower operational costs
- Delivery of software-defined WAN services at scale
- Competitive differentiation
- Shared expertise



Customer Benefits

- Fully automated provisioning process
- Highest network availability
- Best fit access options
- Fast innovation cycles
- Full transparency of production and processes
- End-to-end customer network management

ngena enables alliance partners to become their customer's first choice in global networking



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