資料3

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Midokura Enterprise MidoNet (MEM)
―次世代高機能ネットワーク仮想化基盤のご紹介―

ミドクラジャパン代表取締役社長
Co-Founder & Chairman of the board
加藤隆哉

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ミドクラとは？

About the company

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“アマゾンの巨大分散システムを設計した創業メンバーによるクラウド向けネットワーク仮想化技術専業の会社”

- Founded in 2010, Midokura is a global company with offices in Tokyo, San Francisco, Barcelona, Tel Aviv, Lausanne, Munich.
- Pioneer in network virtualization – provides software for networking using overlay approach. Pedigree derives Amazon, Cisco, VMware and Google
- Received over $30M in funding from Innovation Network Corporation of Japan, NTT, NEC, and Fujitsu
- Named by CRN as amongst the top 10 networking stories of 2013 and also amongst 10 coolest startups in the world
- Won Nokia’s Silicon Valley Innovation Challenge – 2014
- Named AlwaysOn award winner for the second consecutive year
- Won the most innovative technology of network industry award in 2015 by Tech Target
- Significant contributor to the OpenStack Networking (Neutron) Project
- First SDN vendor to be certified for Red Hat OpenStack environment
- Early member of the Open DayLight Project (ODP)
- Broad and deep technical partnerships with network switch vendors, software companies and solution providers

We are a real Global-born Tech Start-up

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“コンピュータ産業における第二のホンダ、ソニーを目指した極めて稀なグローバルボーンの日本発ハイテクベンチャー”

60 people in 6 offices with more than 10 nationalities

- 47engineers

- 東京 : 本社機能/製品開発/営業/サポート
- サンフランシスコ : マーケティング/営業/サポート
- バルセロナ : 製品開発/サポート
- ミュンヘン : 営業/サポート
- テルアビブ : 研究開発
- ローザンヌ : 登記上の本社

Key Team: Serial Entrepreneurs and Amazon Past

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CEO and Co-founder
Dan Mihai Dumitriu, Lausanne
Track record in distributed systems

MS of Computer Science from Cornell Univ., EPF Lausanne, **Tech lead of Amazon**, Sony etc.

President and COO
Koichi Narasaki, Tokyo
Track record in managing IT startup in SV

BA of E/F from Waseda Univ., MBA from Univ. of Phoenix, U.S.CPA, **COO-ACCESS, CEO-IP Infusion, Mitsubishi**

Chairman and Co-founder
Tatsuya Kato, Tokyo
Serial Entrepreneur with strong enterprise IT experience

BS of Aeronautical Engineering from Kyoto Univ. **Founder of GLOBIS, CEO of CYBIRD, Exec Officer of CSK**

MS of Computer Science from Cornell Univ. **Tech Lead of Amazon**

CTO and VP of Product
Pino de Candia, Barcelona
A world-famous "Dynamo" Architect and Inventor

BS, Computer Science and Mathematics, Morningside College. **Founder & COO of Genkii**

VP of Business
Adam Johnson, San Francisco
Serial Entrepreneur with operational & technical expertise

EE from Keio University, MBA from HEC Paris, **Spin-off Itochu, JV Asurion Japan**

VP of Corporate
Masakazu Koyanagi, Tokyo
Track record in establishing IT company's corporate from the scratch

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Board/Advisors: Experience and expertise

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Independent Board Member

sunbridge

Allen Miner
CEO, SunBridge Corporation

Oracle Corporation (US HQ), founder of Oracle Japan and SunBridge.
Cofounder of japan Venture Capital Association.
Degrees in CS and Asian Studies from Brigham Yong Univ.

Advisor

CORNELL UNIVERSITY FOUNDED A.D. 1865

Robbert Van Renesse
Principal Research Scientist at Cornell Univ.

Ph.D. from Vrije Universiteit in Amsterdam.
Expert in Distributed Operating System.
Worked at AT&T Bell Laboratories, co-founded D.A.G. Labs, Reliable Network Solutions. Published over 150 papers and have 11 patens.

EPFL ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Willy Zwaenepoel
Professor at EPFL

Ph.D. from Stanford University.
Expert in Operating and Distributed System.
Former Dean of the School of Computer and Communications Sciences at EPFL.
Faculty at Rice Univ. He receives many awards in the fellowships and papers.

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ネットワーク仮想化とは？
SDN/NFVとは？

What is network virtualization?

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- 仮想化とは…
  - コンピュータなどITのリソースを抽象化すること、物理的なものを抽象化して、その抽象化したものを、ユーザーにとって都合のいいインタフェースで扱える技術
- ネットワーク仮想化とは…
  - 物理的に一つのネットワーク機器を複数に見せたり、逆に複数のネットワーク機器を一つのネットワークリソースプールとして扱う技術。また、 リソースプール化した仮想ネットワークを、物理構成に関わらず、論理的に分割したり生成したりする技術。
- SDN=Software Defined Networkingとは…
  - ユーザーがビジネス上の目的を達するために必要なネットワーク（主にコネクティビティー）を、高度に自動化された形で構築・設定するための技術や製品
- NFV=Network Function Virtualizationとは…
  - ロードバランサー/ファイアウォールなどの高度なネットワーク機能を　仮想化すること

A History of Game-Changing Disruptions

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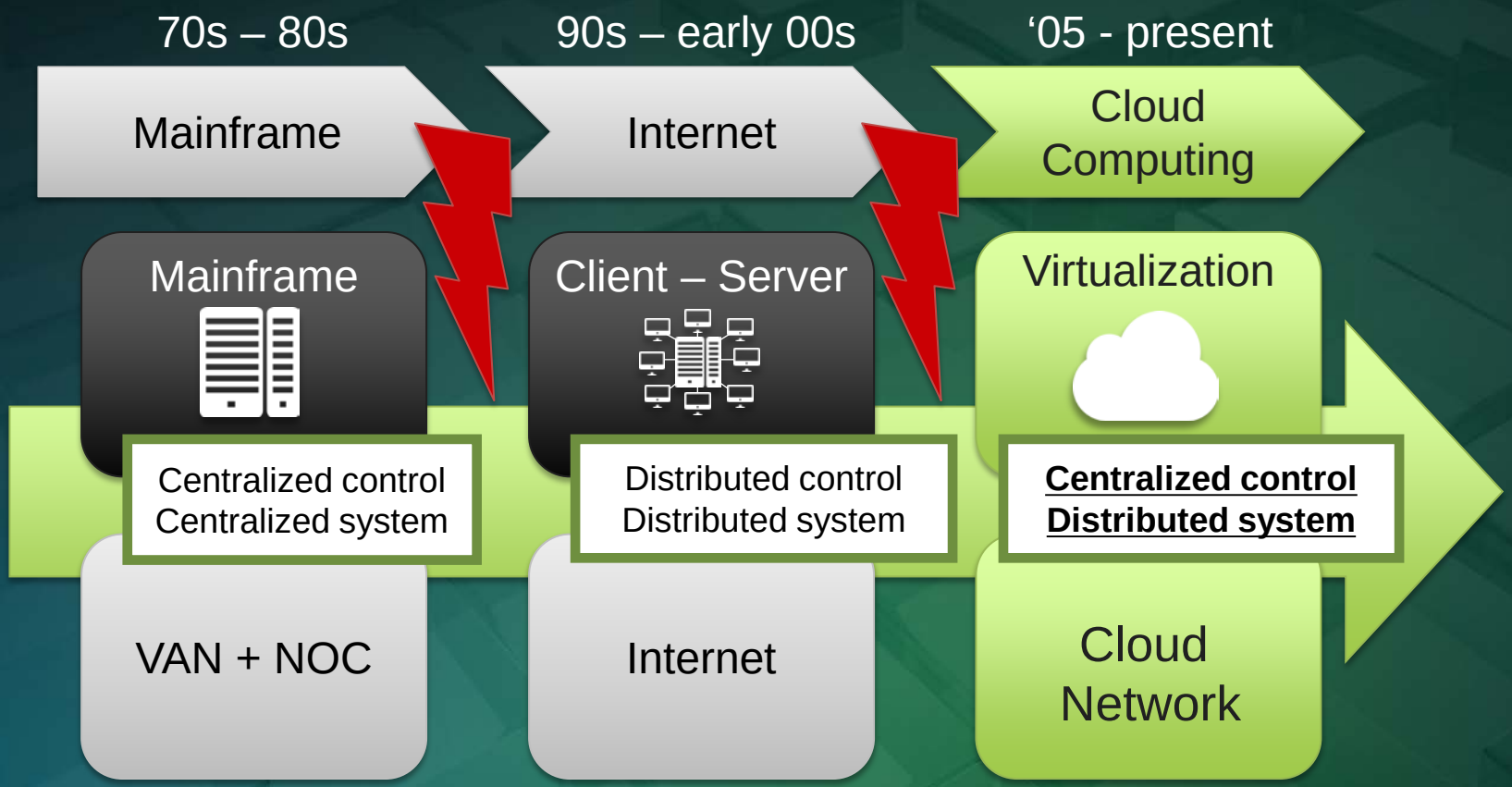
“いつでもどこでも簡単につなげ、必要な分だけ使うことができる分散システムによる集中管理型の新しいネットワークがクラウド時代には必要”



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Disruptions by Virtualization technology

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“サーバー＆ストレージの仮想化は既にコモディティ化、ネットワークの仮想化が最後のミッシングリンク”

Hardware solution

Software solution

Server

vmware

’06 ’14

$0.7b ==> $6.0bn

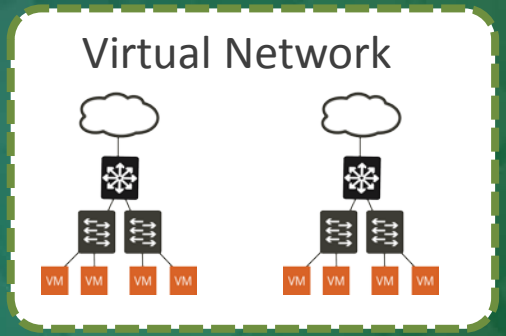
Storage

NetApp

’06 ’11

$2.1b ==> $5.1bn

Network



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Bottleneck of cloud computing is network!

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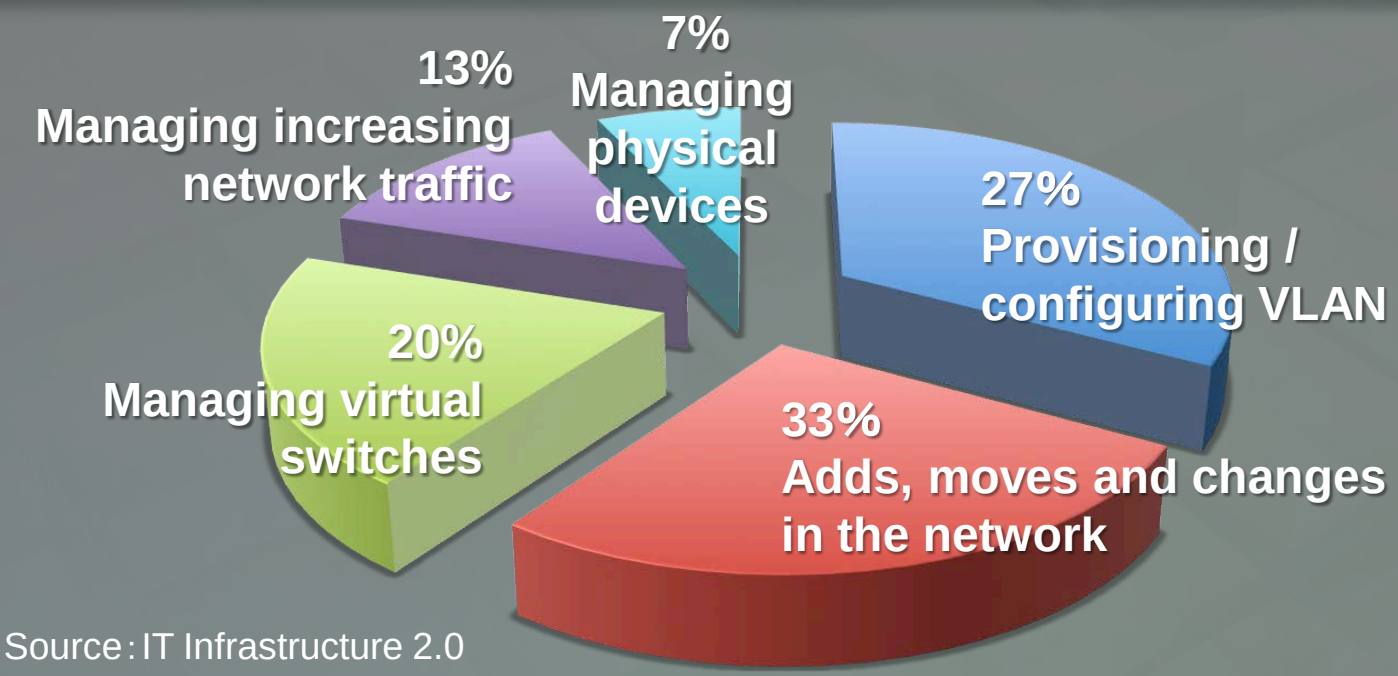
『 With respect to server virtualization, which of the following is your organization's biggest technical challenge? 』



Source : IT Infrastructure 2.0

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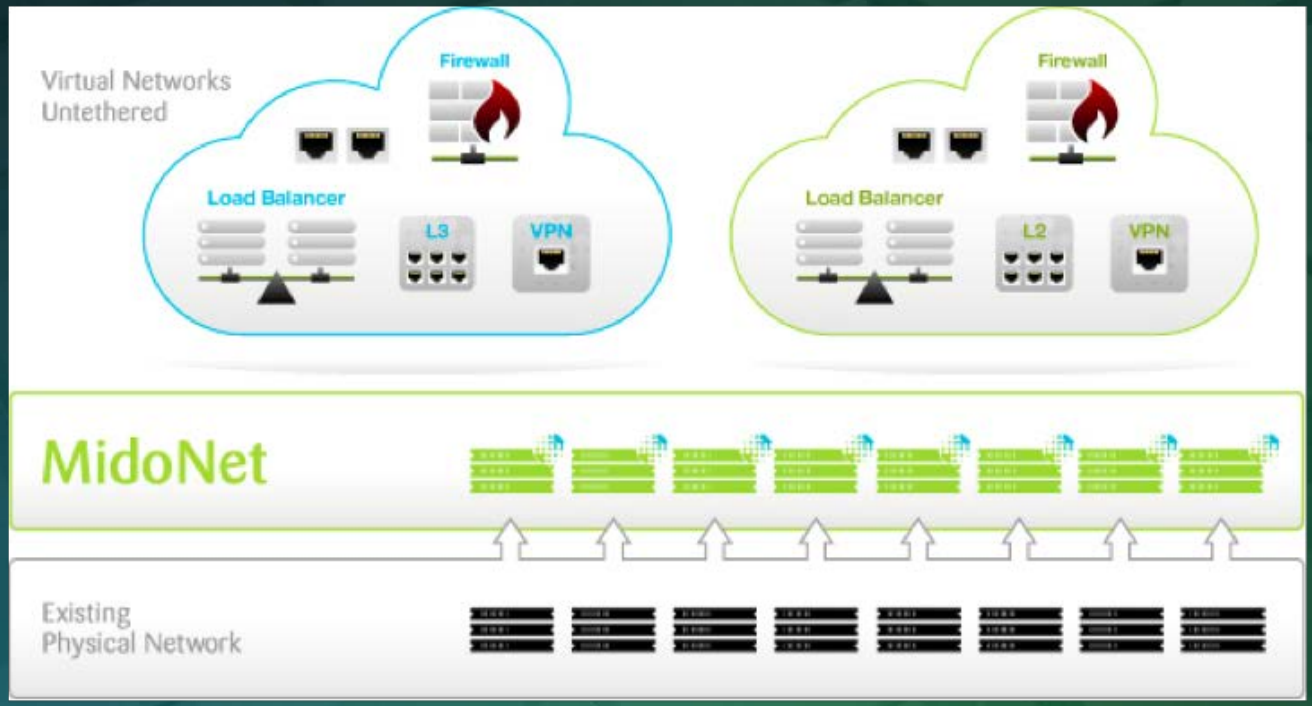
次世代高機能ネットワーク
仮想化基盤：MidoNet

What is MidoNet…

MidoNet is a highly resilient, decentralized and scalable Network Virtualization platform for IaaS cloud. MidoNet decouples your cloud from your network hardware, creating an intelligent software abstraction layer between your VMs and your physical network.



MidoNet based on fully distributed architecture

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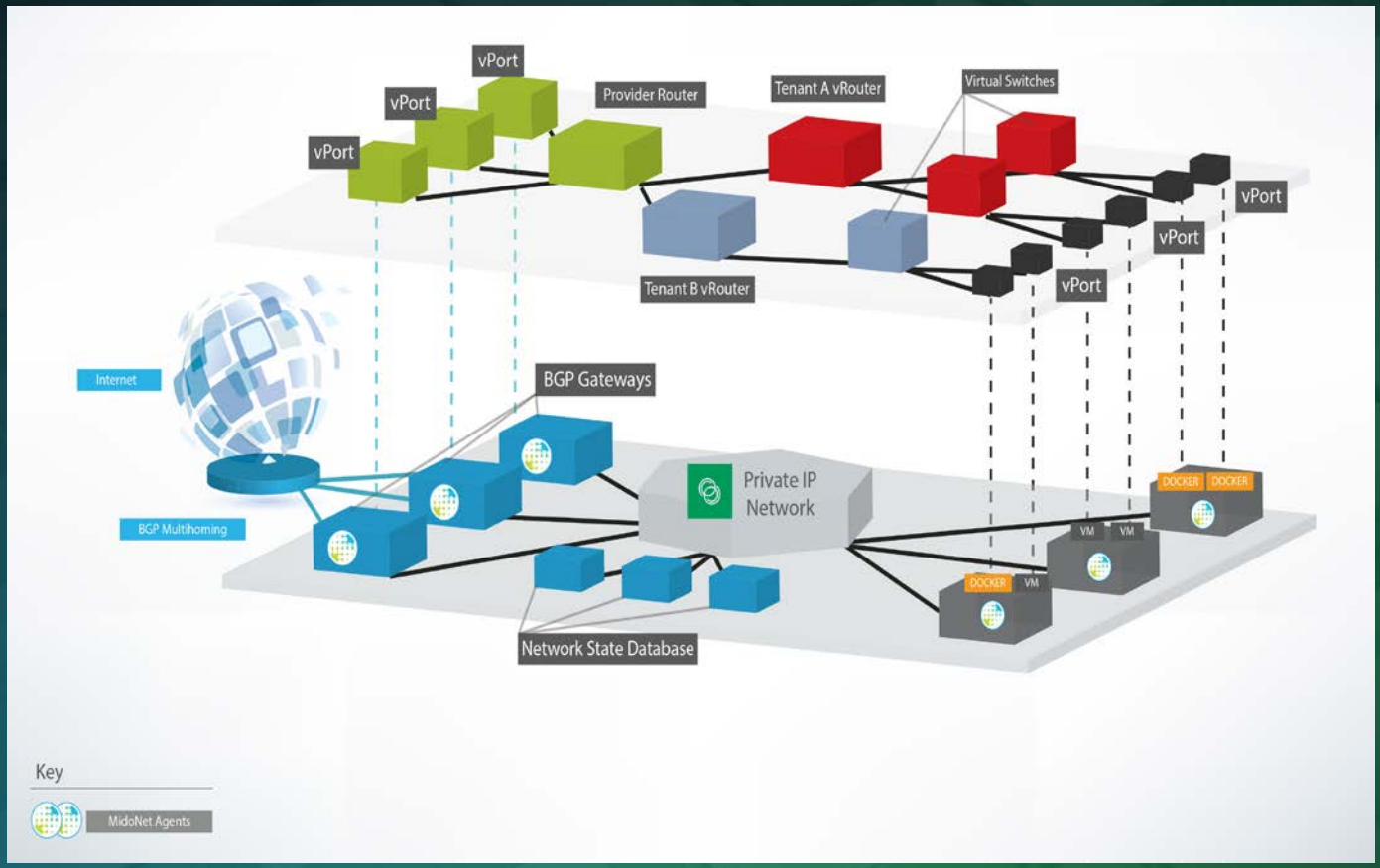
“ MidoNetは小さな分散コントローラーエージェントソフトとして、全てのDC内サーバーにインストールされ、自律協調して高度な仮想ネットワークを自動的に生成／削除／修正することができる。単一障害点がどこにもなく耐障害性に優れ、実装が簡単なことから大規模化にも対応できる”



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MidoNet: Security, Agility, Simplicity

- Distributed controller for best performance, resiliency, and scalability
  - Single Virtual Hop = Better Performance
  - No SPOF = Production Grade
  - Fully Distributed = Massive Scale

- Additional distributed services like L4 Load Balancing
- Floating IPs, Security Groups, Routing without the need for IP Tables, L3 Agent, etc. (few or none do this)
- Distributed State-full NAT (others do failover)
- Fully distributed L3 GW (others do failover)
- L4LB with health checks (no one has this)
- VXLAN Gateway
- Simple Architecture=Simple Ops (no service nodes, no active/standby)
- Competitive and Simple Subscription Licensing ($1,899 per node per year)

Market Definition and competitive landscape

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“ MidoNetはネットワーク機器に依存しない完全なオープンソース
ベースの市場で唯一のソフトウエア製品”

Customers in production in every geography

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Several Fortune 100 companies (Telco, Automobile, Airline, Bank, Manufacturer…) are now doing POC, other than these customers.

Web Service	overstock.com, BlueJeans, ancestry, CyberAgent
Enterprise	DELL, puppet labs, Cerner, gettyimages
Service Providers	AURO Powered by OpenStack, colt, S2, SysEleven Hosting. Skaliert., zetta.io
Education & Research	MPISD, Johns Hopkins Applied Physics Laboratory, nectar

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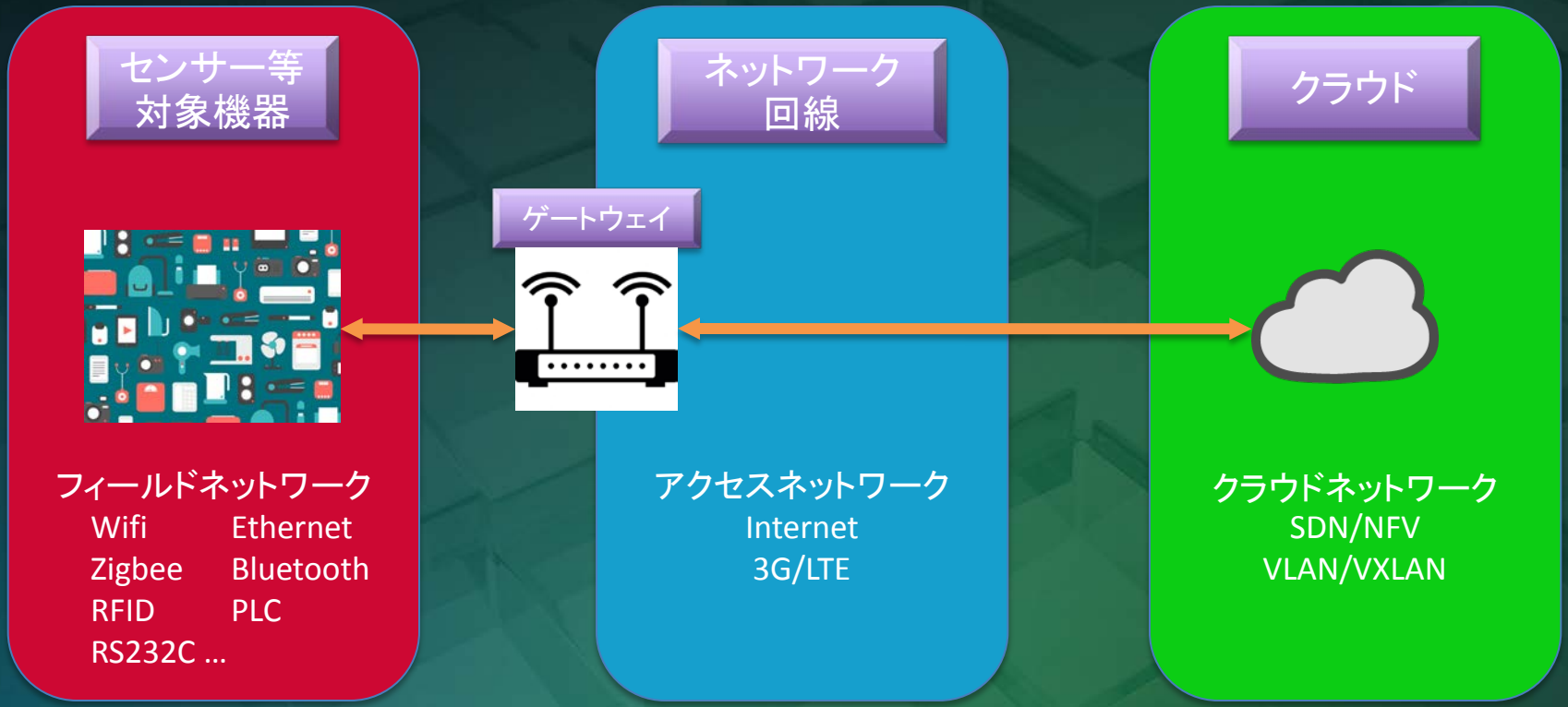
IoT時代におけるネットワーク仮想化基盤の適用領域

IOTシステムの基本構成



IOTシステムにおけるネットワークへの要請

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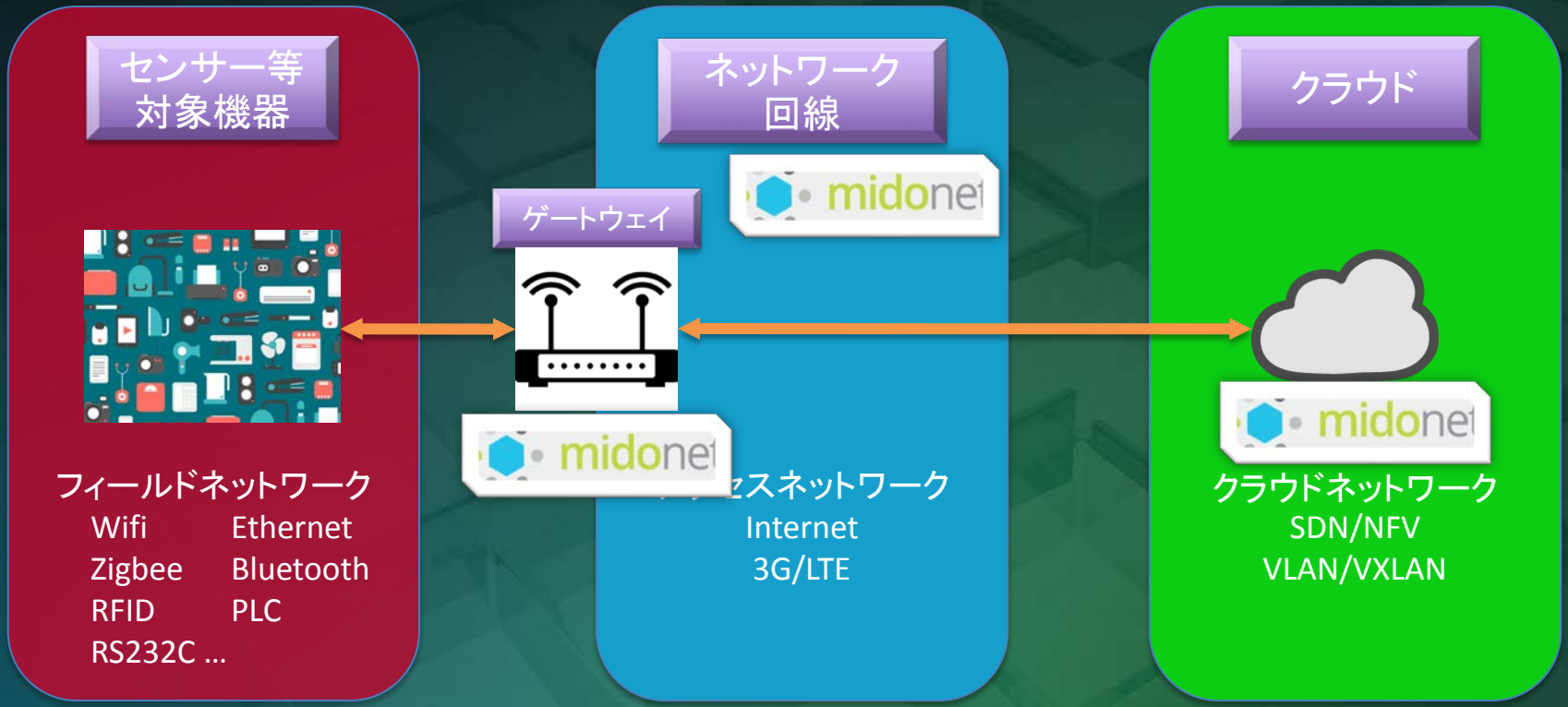
- 安価なネットワーク
  - IOT時代のパケットはそれ単体ではお金を産まないパケット。従って、　フィールドネットワーク、アクセスネットワーク、クラウドネットワークの全てにおいて圧倒的に安価なネットワークインフラが必要となる
- ScalableかつElasticかつFlexibleなネットワーク
  - 500億以上のデバイスがつながるIOT時代にはネットワークそのものが　需要に応じて大規模化かつ弾力的に生成され、ネットワーク機能を柔軟に設定できる必要がある
- Secureなネットワーク
  - 多種多様なIOTシステムの安全性を担保するためには、高度かつ極めて柔軟にセキリュティー設定可能なネットワークが必要となる
- エッジ処理ができるネットワーク
  - 現在の集中コンピューティングによる全量クラウド処理には自ずと限界　があり、エッジコンピューティングまたはフォグコンピューティングに代表　される分散エッジ処理が必須となり、必然としてエッジで高機能なネット　ワーク処理が可能となる分散型ネットワーク技術が重要となる

MidoNetの分散仮想化ネットワーク基盤が活きる領域（イメージ）



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Distributed flow state

over 1000 vports over 1000 servers

1 million virtual machines

1 billion active connections

100.000 Gbit/s **stateful** L4 flows

... all in software

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Become the leading virtualized Network Operating System provider for any environment …

“ We’re aiming at the next-gen Network OS of Microsoft in the era of Cloud Computing! “

… by building highly available, scalable, flexible and secure Open networks for data center, carrier, cloud and IoT providers

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Appendix

The attributes of target market

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"Mode 2" system requires ***massively scalable, fully automated, elastic and agile cloud*** as a basement. Considering the trend of IoT, it must be made of Linux-shabby software based on open innovation ecosystem.

Bimodal IT = Marathon Runners + Sprinters

Think Marathon Runner

Mode 1		Mode 2
Reliability	Goal	Agility
Price for performance	Value	Revenue, brand, customer experience
Waterfall, V-Model, high-ceremony IID	Approach	Agile, Kanban, low-ceremony IID
Plan-driven, approval-based	Governance	Empirical, continuous, process-based
Enterprise suppliers, long-term deals	Sourcing	Small, new vendors, short-term deals
Good at conventional process, projects	Talent	Good at new and uncertain projects
IT-centric, removed from customer	Culture	Business-centric, close to customer
Long (months)	Cycle times	Short (days, weeks)

Think Sprinter

Gartner

vmware

openstack CLOUD SOFTWARE

docker

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MidoNet as the answer to unmet Market needs

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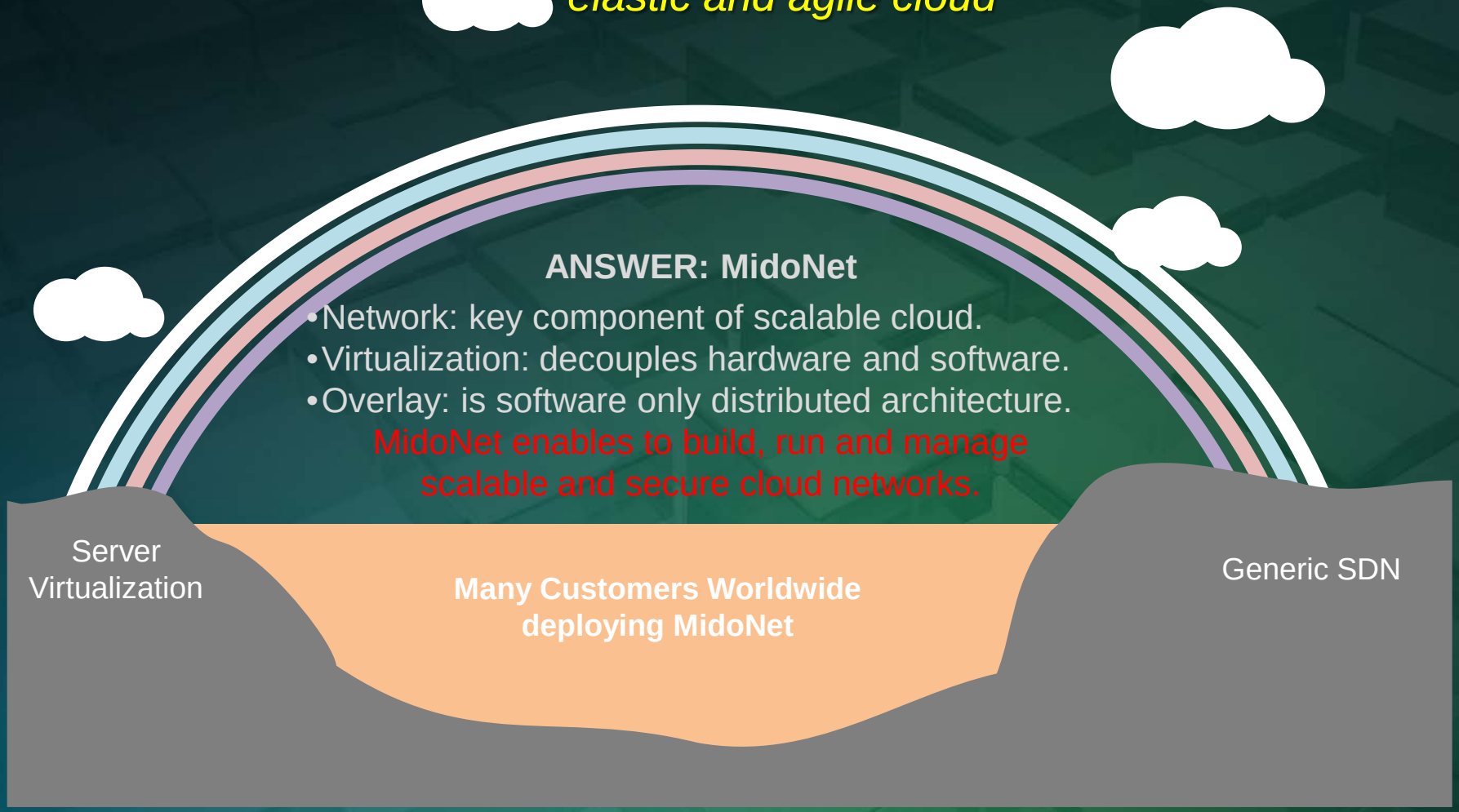
MARKET NEEDS: *massively scalable, fully automated, elastic and agile cloud*



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Problem: Cloud has led to an explosion of network complexity

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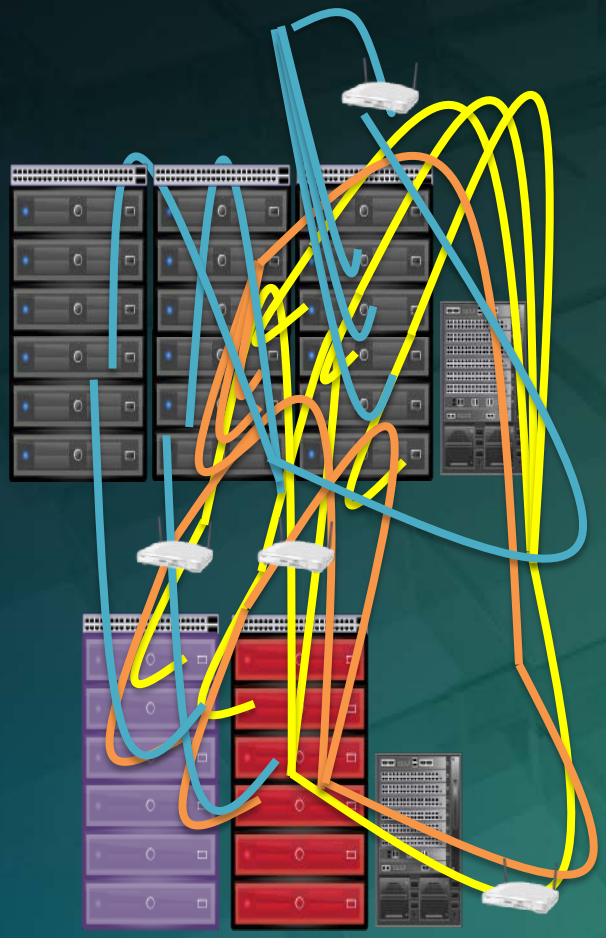


Inflexible

- Networks don't scale with dynamic workloads
- Takes time to provision network services
- Poor quality of service

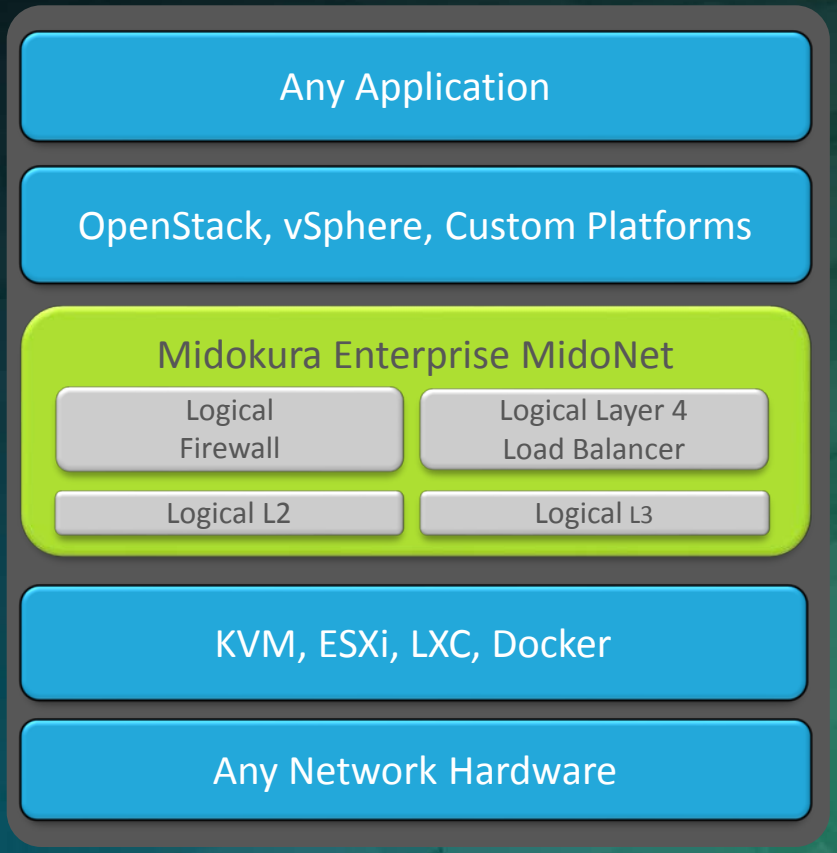
Complex

- Manual provisioning
- Fragmented management
- Higher latency
- User experience can be improved

Costly

- Under utilization of compute
- Dedicated appliances
- More power consumption

Solution: Midokura Enterprise MidoNet the most Advanced Network Virtualization Platform



Distributed Networking Services

Logical Switching – Layer 2 over Layer 3, decoupled from the physical network

Logical Routing – Routing between virtual networks without exiting the software container

Logical Firewall – Distributed Firewall, Kernel Integrated, High Performance

Logical Layer 4 Load Balancer – Application Load Balancing in software

MidoNet API – RESTful API for integration into any Cloud Management Platform

MidoNet Value: Customer Journey

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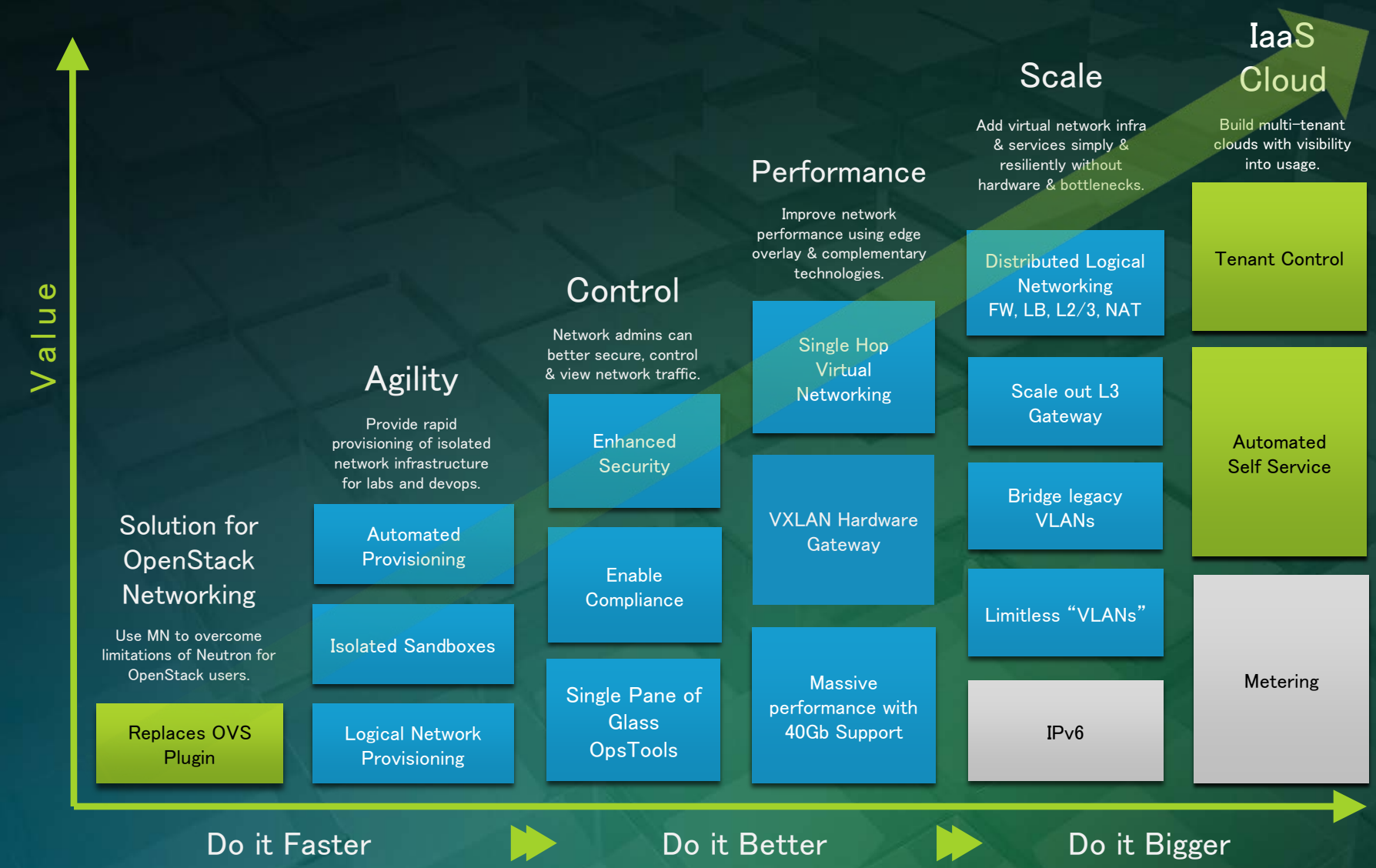

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Network agility continues to evolve

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INNOVATION IN NETWORKING AGILITY

VLAN APPROACH

OpenFlow

OPENFLOW REACTIVE APPOACH

PROACTIVE SOFTWARE OVERLAY

Manual End-to-End

Reactive End-to-End

Virtual Network Overlays

VLAN configured on physical switches

- Static
- Manual
- Complex
- Tenant state maintained in physical network

Requires programming of flows

- Limited scalability
- Hard to manage
- Impact to performance
- Still requires tenant state in physical network

Decoupling hardware and software

- Cloud-ready agility
- Unlimited scalability
- Open, standards-based
- No impact to physical network

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Technology Advantages

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Midokura outperforms its key competitors in mission-critical features of "Cloud network".

Neutron Plug in	Dynamic Routing	Distributed Logical Routing	Distributed Stateful L4	Hardware VTEP
midonet	✓	✓	✓	✓
vmware NSX	×	✓	✓	×
Juniper CONTRAIL	✓	✓	×	✓
nuagenetworks	✓	✓	×	✓
PLUMgrid	×	✓	×	×
DVR	✓	✓	×	×
OVS	×	×	×	×

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