Is your Infrastructure ready for Cloud?

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CommScope

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Global data center networks are fully integrated into our daily lives and activities.

Every post, tweet, email, online purchase, financial transaction, picture and video we collectively produce flows through an intricate network of switches, routers and servers connected via fiber optics inside monolithic, concrete buildings we elegantly refer to as the “cloud”.

As a society we are wholly reliant on this infrastructure and it is fundamentally changing.

Why This Area Matters

13.5 Billion

Connected THINGS By 2020

Gartner

Connected THINGS that Will Be Shipped By Vendors In 2017

Gartner

8.5 Billion

$2 Trillion

Will Be Spent On These Endpoints And Services

Gartner

Percentage Of The Compute, Network, And Storage Will Be Going Into What They Call "Scale" Data Centers By 2025.

Intel Projection

70% - 80%

$33 Billion

Worldwide Data Center Colocation Market Annualized Revenue Projected by End of 2018

451

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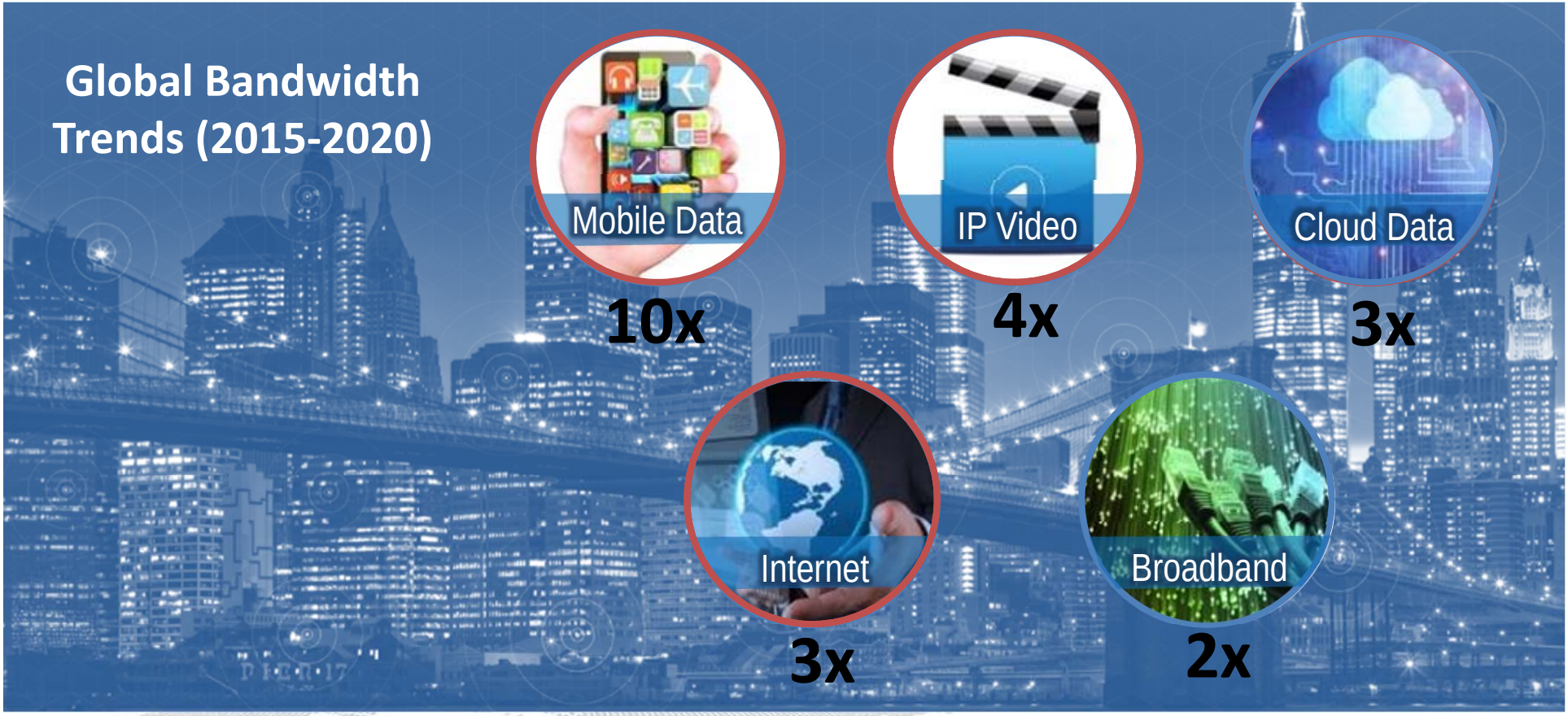
The Bandwidth Explosion



Sources: Cisco and Deloitte

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Meanwhile, in today's Data Centers…

65%

IT assets in enterprise-owned Data Centers

60%

IT managers consolidating servers

43%

To meet Increased IT demand with public cloud

25%

Report unplanned outages last year

32%

Lack confidence in IT resilience strategy

Uptime Institute Data Centre Industry Survey, May 2017

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Customer Needs

Internet Content

Low latency

Fast deployment

Multiple internet access

Finance

Security

Reliability and availability

Standardization

Low latency

Multiple internet access

Developers

Security

BoD

GUI

Low latency

Multiple Path

Enterprise

Security

Reliability and availability

Multiple internet access

ROI

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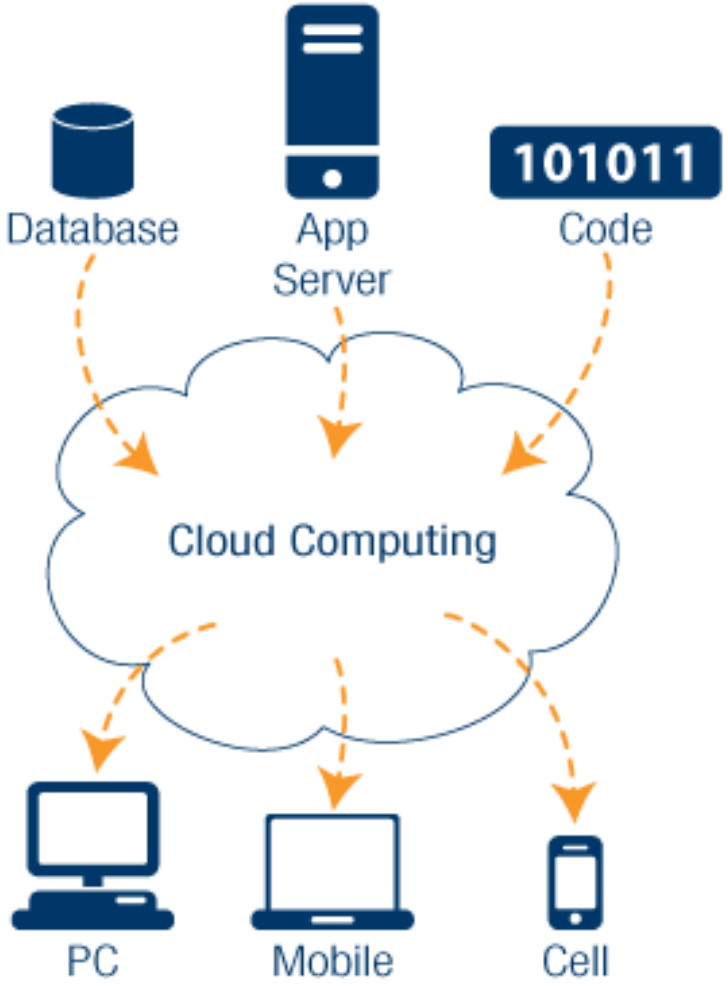

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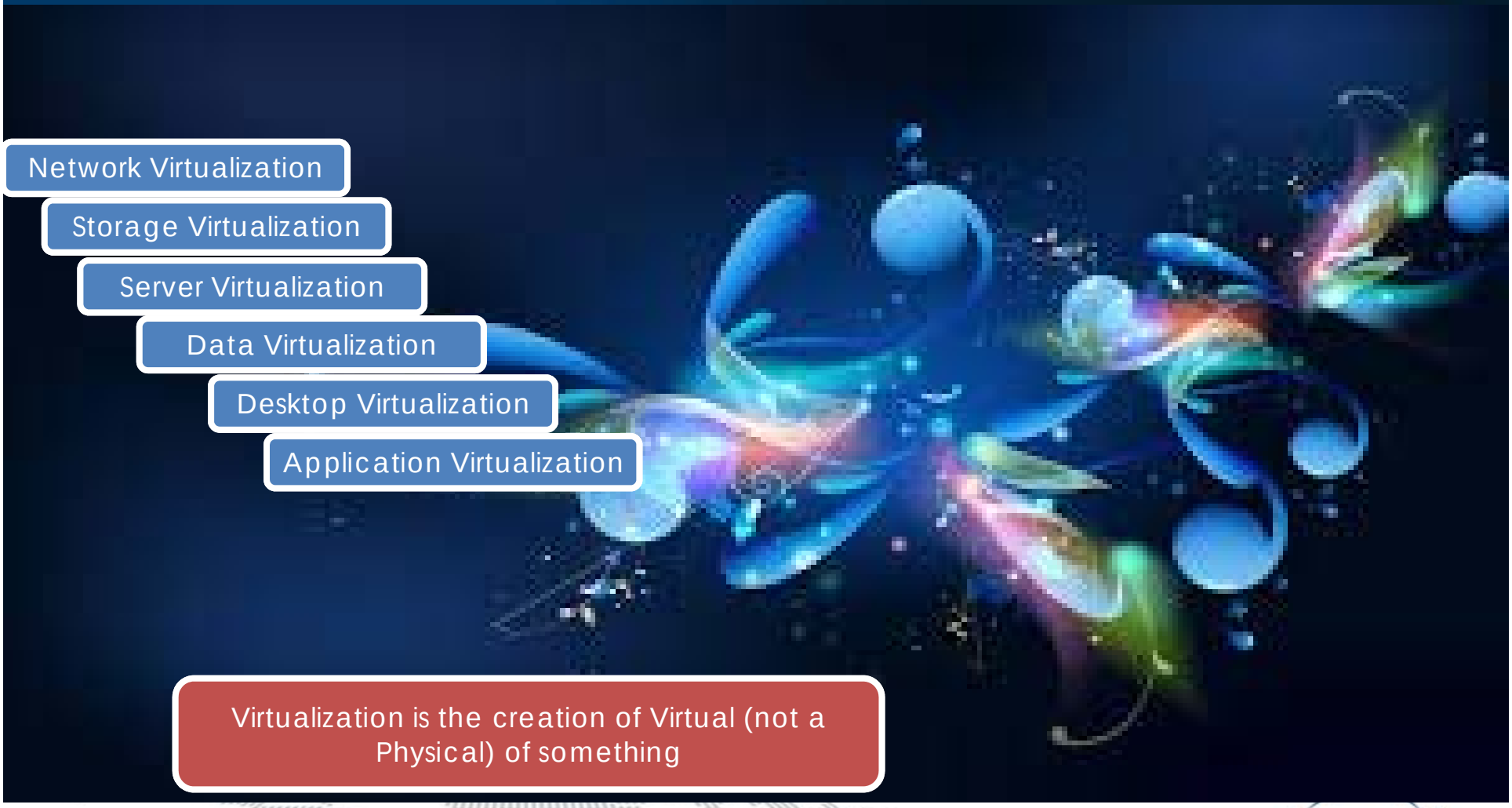
Virtualization



- Network Virtualization
- Storage Virtualization
- Server Virtualization
- Data Virtualization
- Desktop Virtualization
- Application Virtualization

Virtualization is the creation of Virtual (not a Physical) of something

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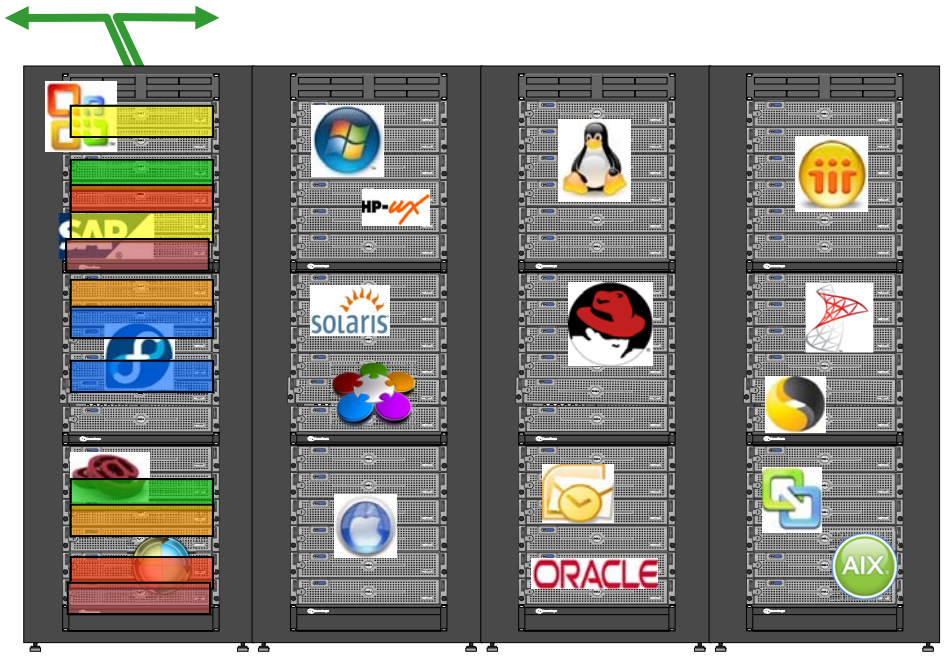
Server Virtualization

- Typical usage rate of stand-alone servers is only around *20%*
- Virtualisation allows multiple applications to run on the same server



Meantime to Restore
Maximizing the Server Utilization
Reduction in Maintenance cost
Efficient Management

Microsoft Virtual PC
VMWare Player
Oracle Virtual Box

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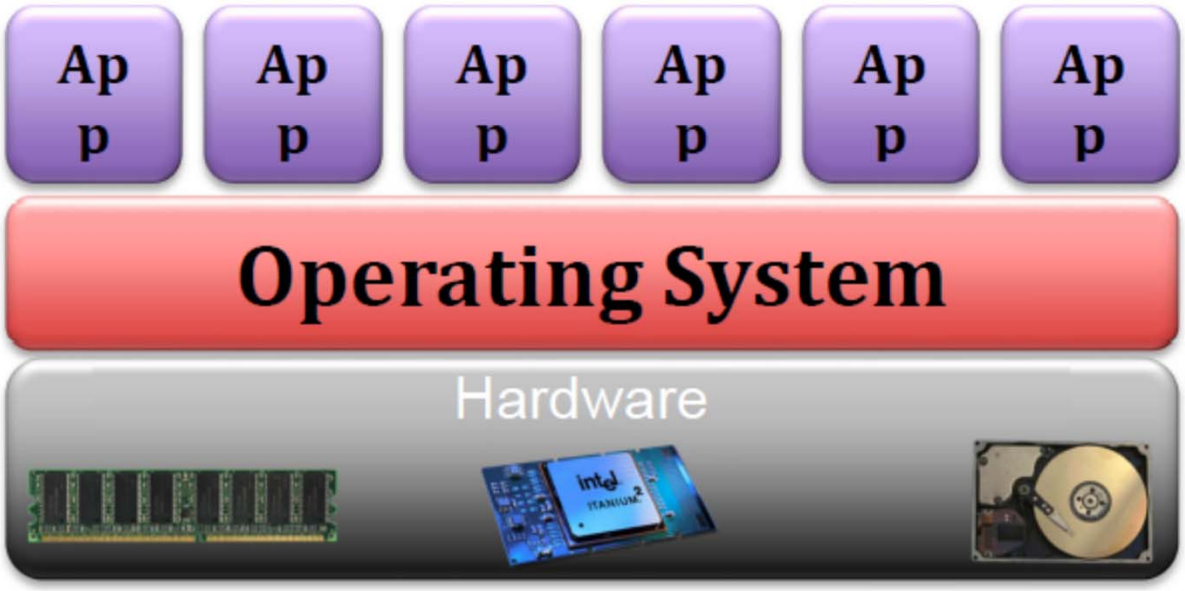
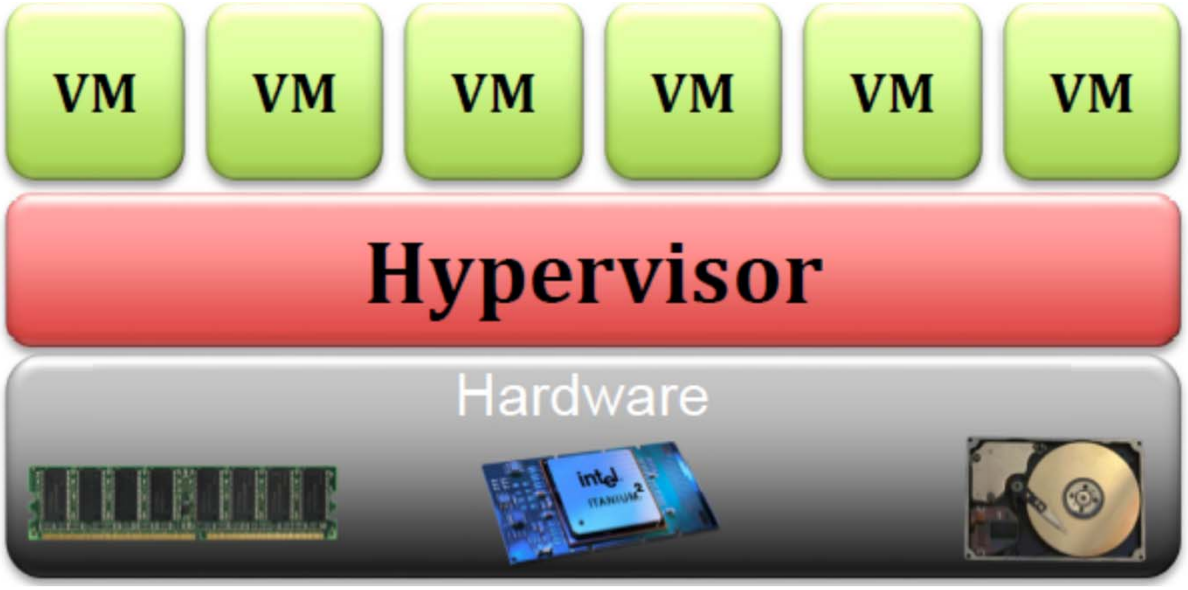
Traditional Approach



OS acts as the interface between the Hardware and the Applications

Hypervisor



Citrix XenServer
VMWare ESXI
Microsoft HyperV Server

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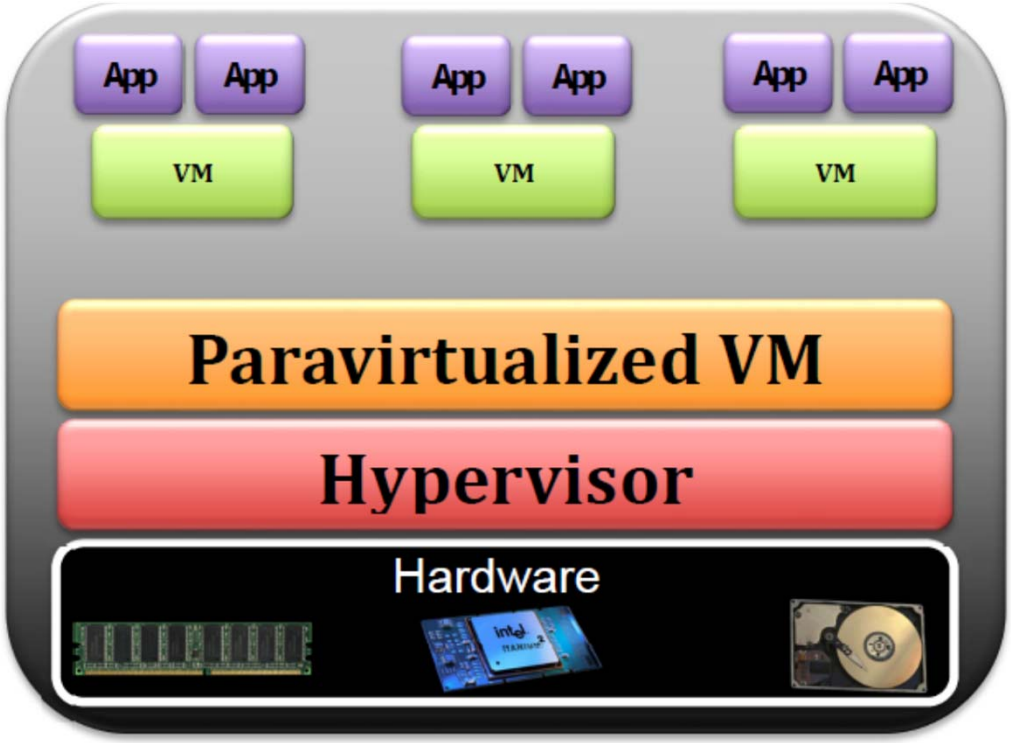
Paravirtualized VM



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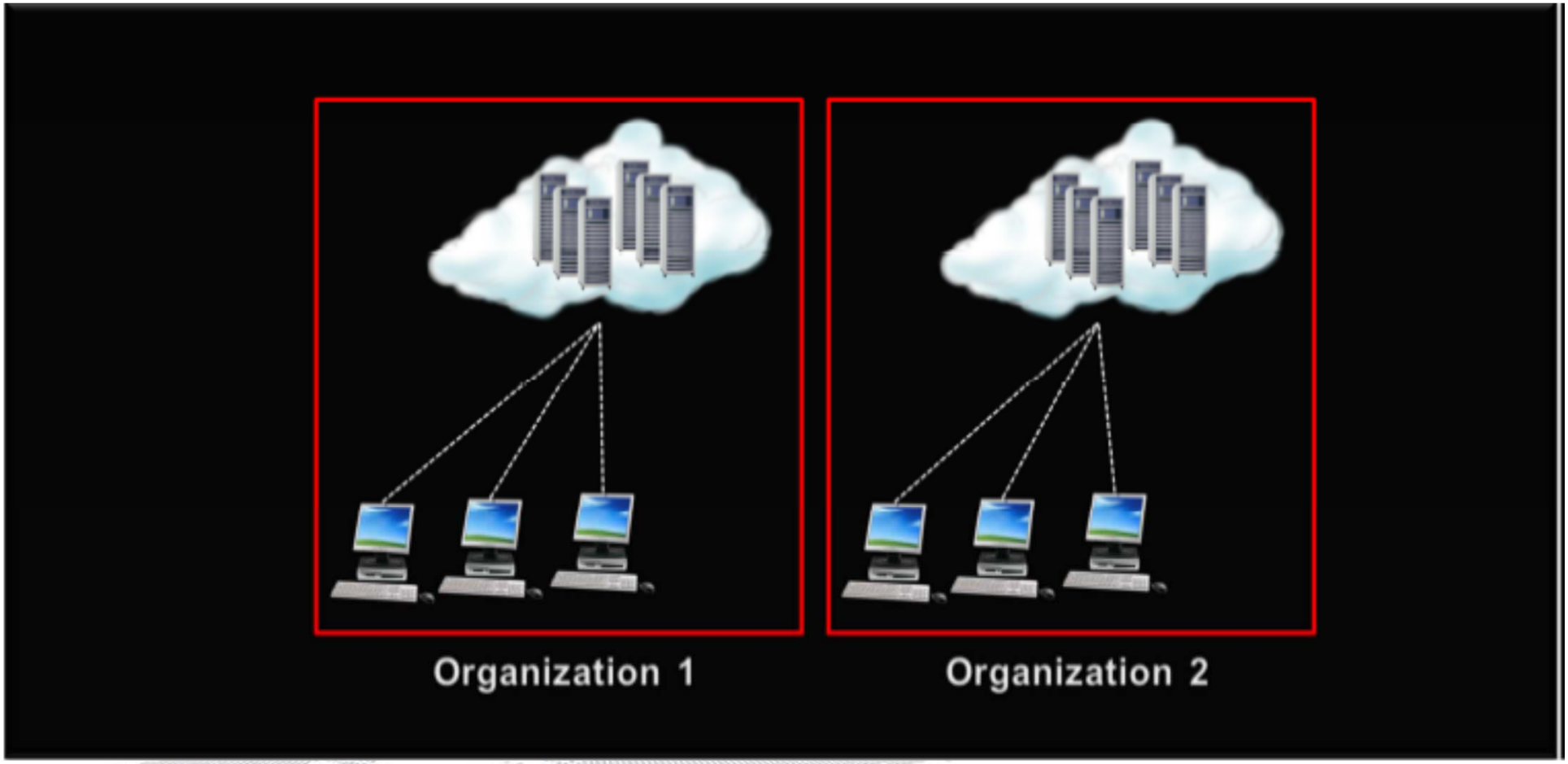
Private Cloud



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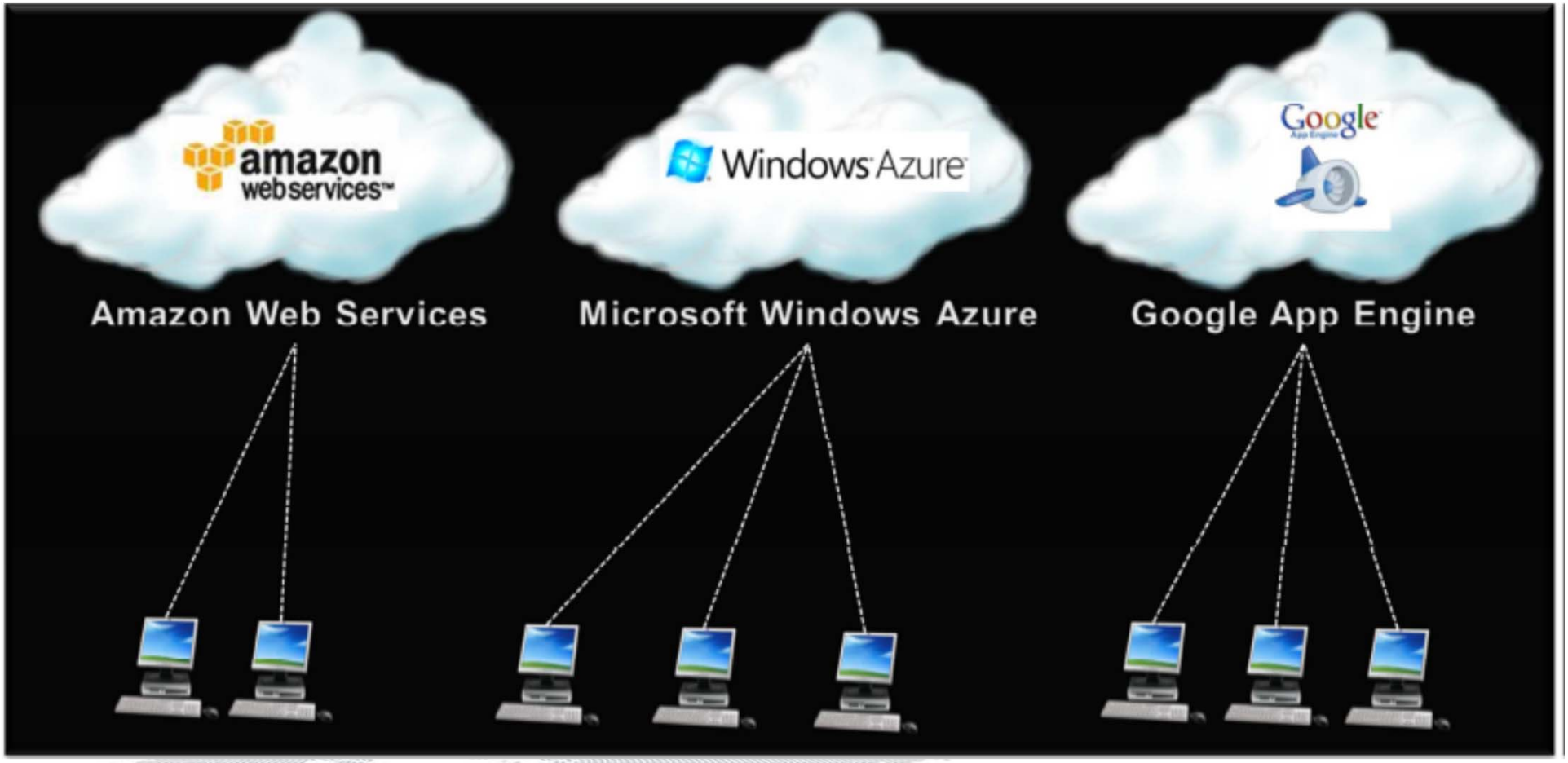
Public Cloud



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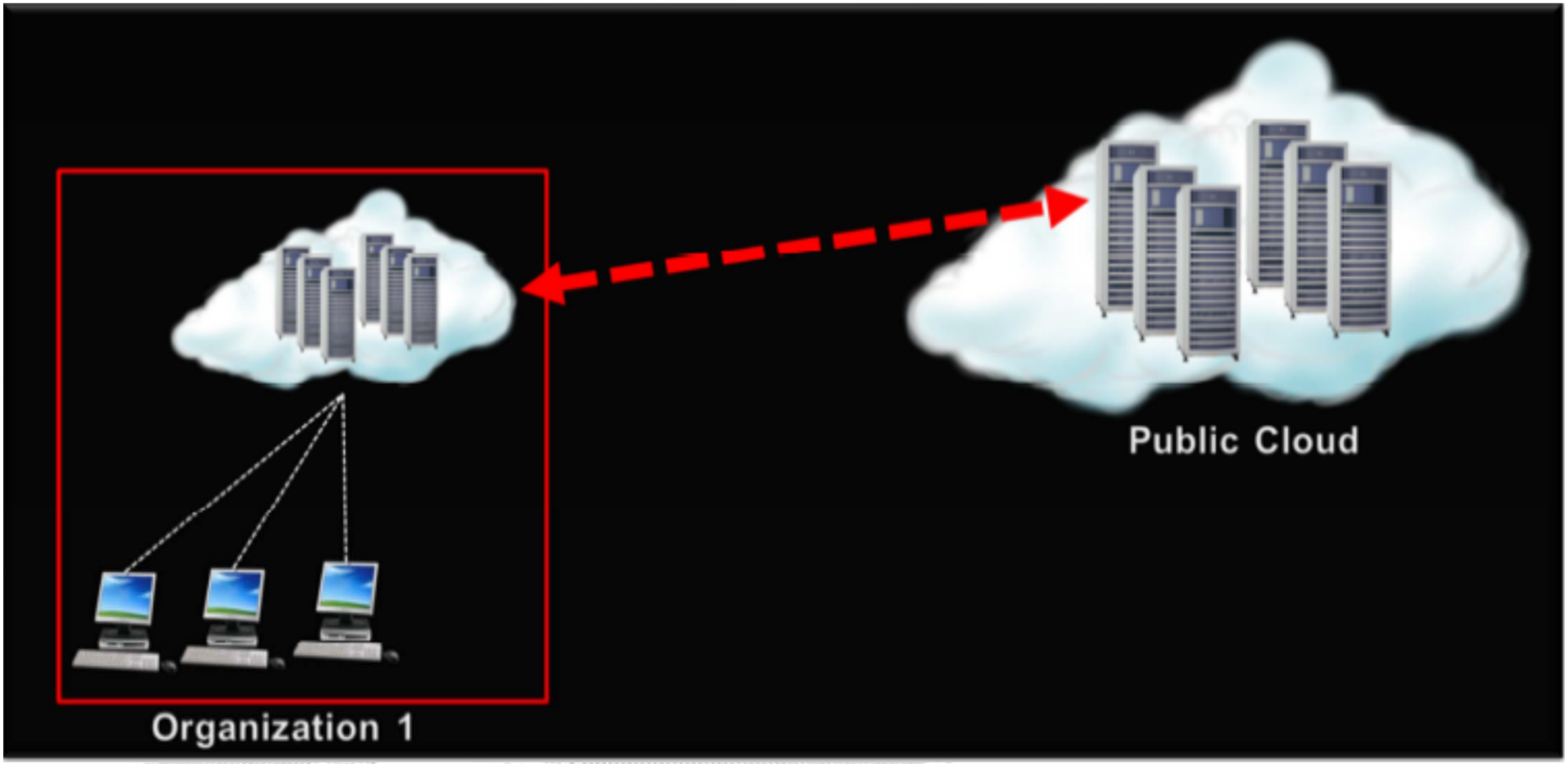
Hybrid Cloud



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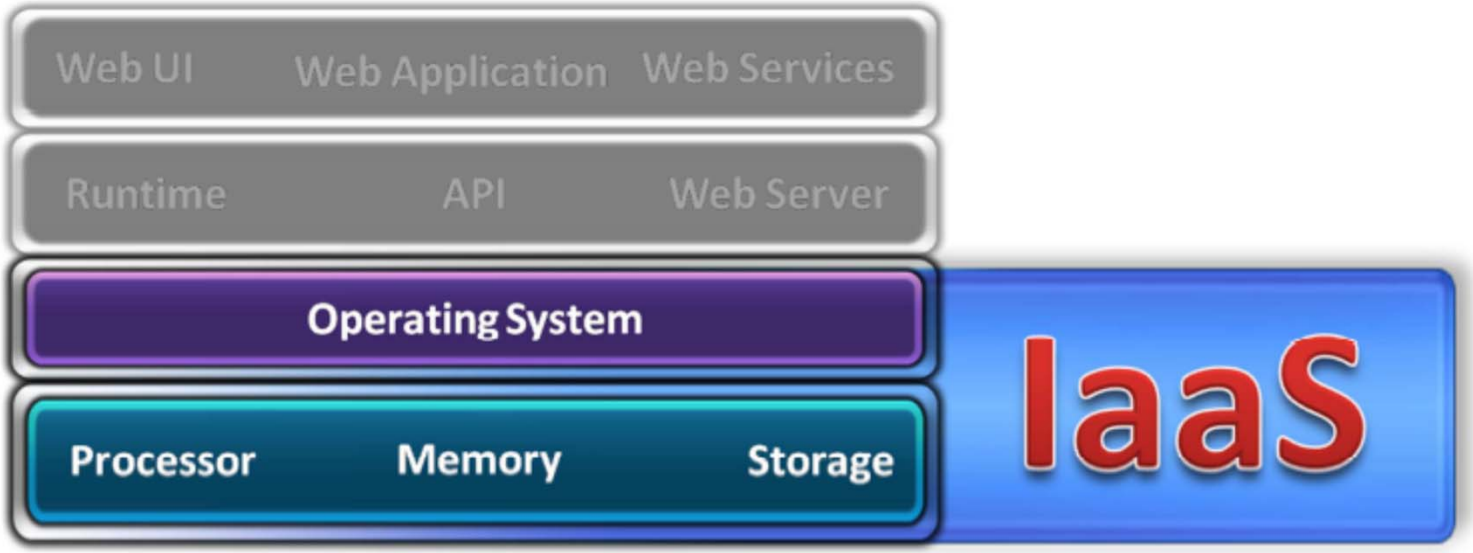
Service Model - Iaas

Infrastructure as a Service (IaaS):



– ***Examples: Amazon EC2, GoGrid, iland, Rackspace Cloud Servers, ReliaCloud.***

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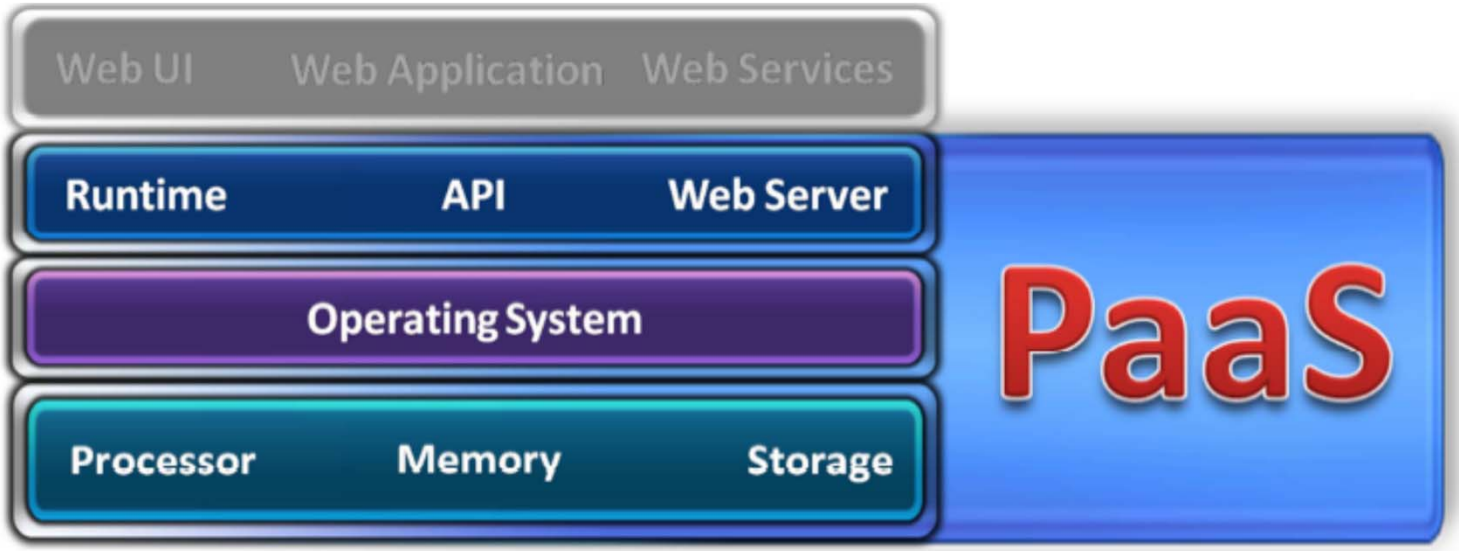
Service Model - Paas

Platform as a Service (PaaS):



– ***Examples: Windows Azure, Google App.***

Service Model - SaaS

Software as a Service (SaaS)

– ***Examples: Caspio, Google Apps, Salesforce, Nivio, Learn.com.***

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Characteristics of Cloud

Elasticity

Elasticity is the automated ability of a cloud to transparently scale IT resources, as required in response to runtime conditions or as pre-determined by the cloud consumer or cloud provider.

Resource Pooling

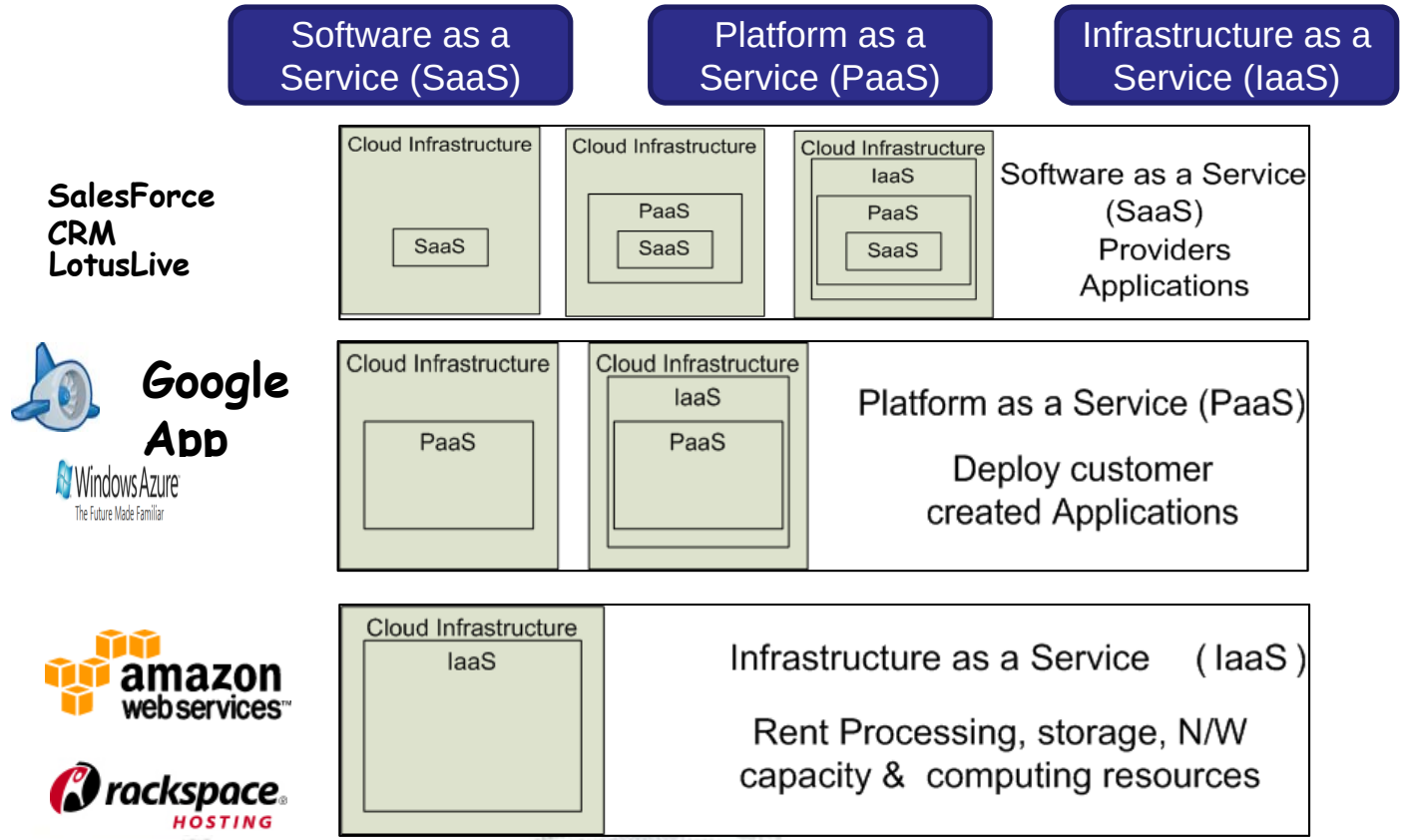
Resource pooling allows cloud providers to pool large-scale IT resources to serve multiple cloud consumers. Different physical and virtual IT resources are dynamically assigned and reassigned according to cloud consumer demand

Pay by Use

Payment structure in which a customer has access to potentially unlimited resources but inly pay for what they actually use

Self Service

With a Self Service (Using a GUI) cloud users access a web based portal where they can request or configure servers and launch applications



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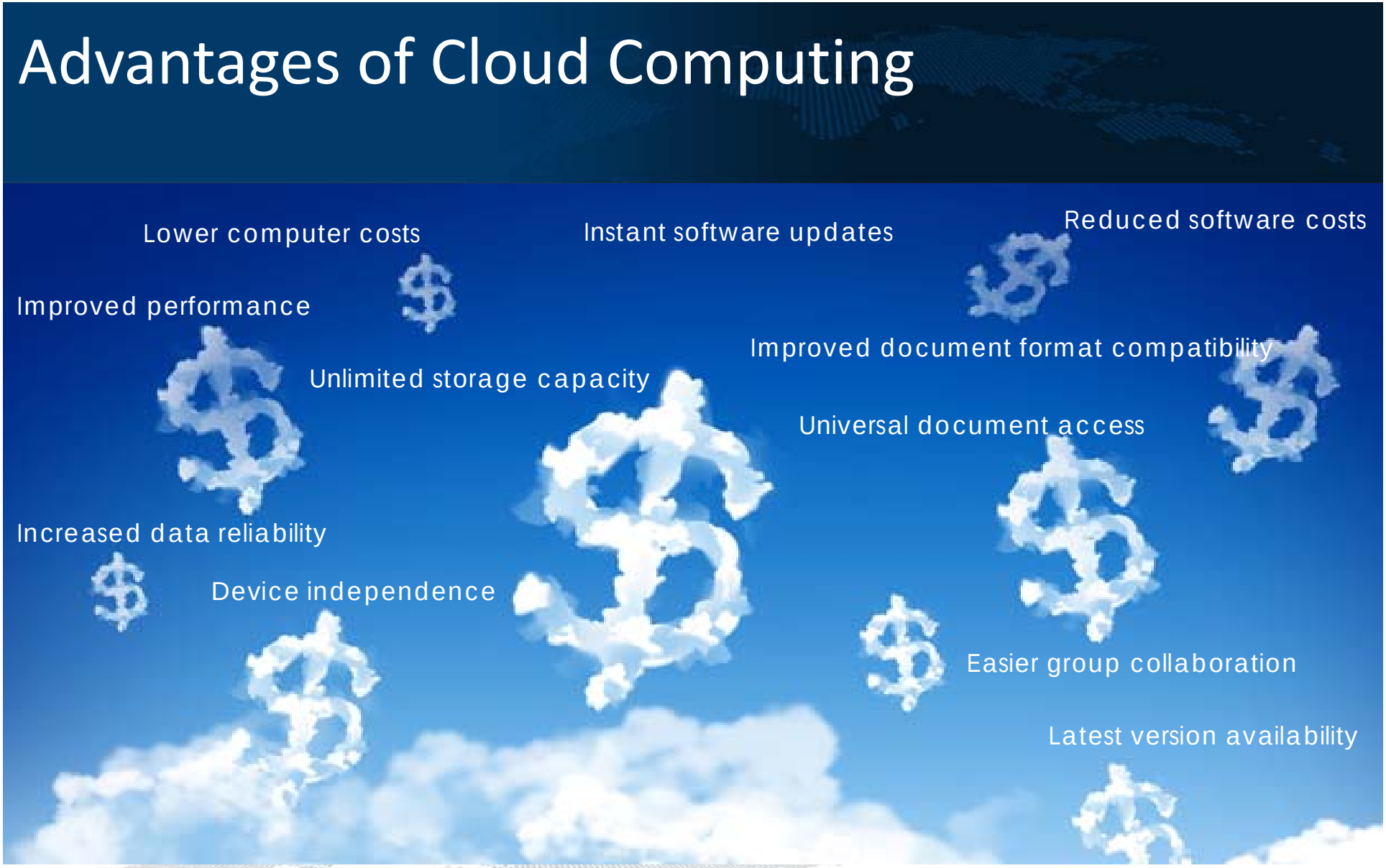
Advantages of Cloud Computing



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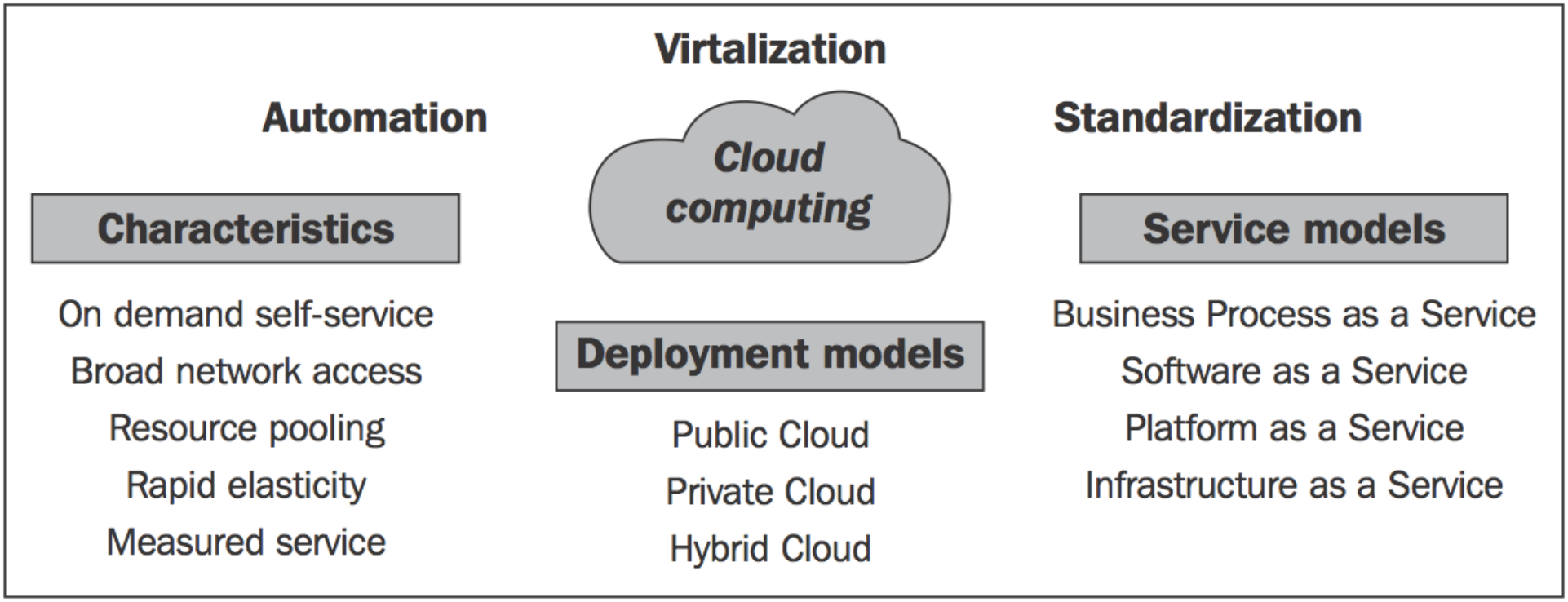
Cloud - Summary



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Data Centers undergoing change

Bandwidth Explosion

Cloud Computing

Internet of Things

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IoT Growth

IoT Growth in Buildings

30%

IoT growth rate
in commercial buildings

ANNUALLY

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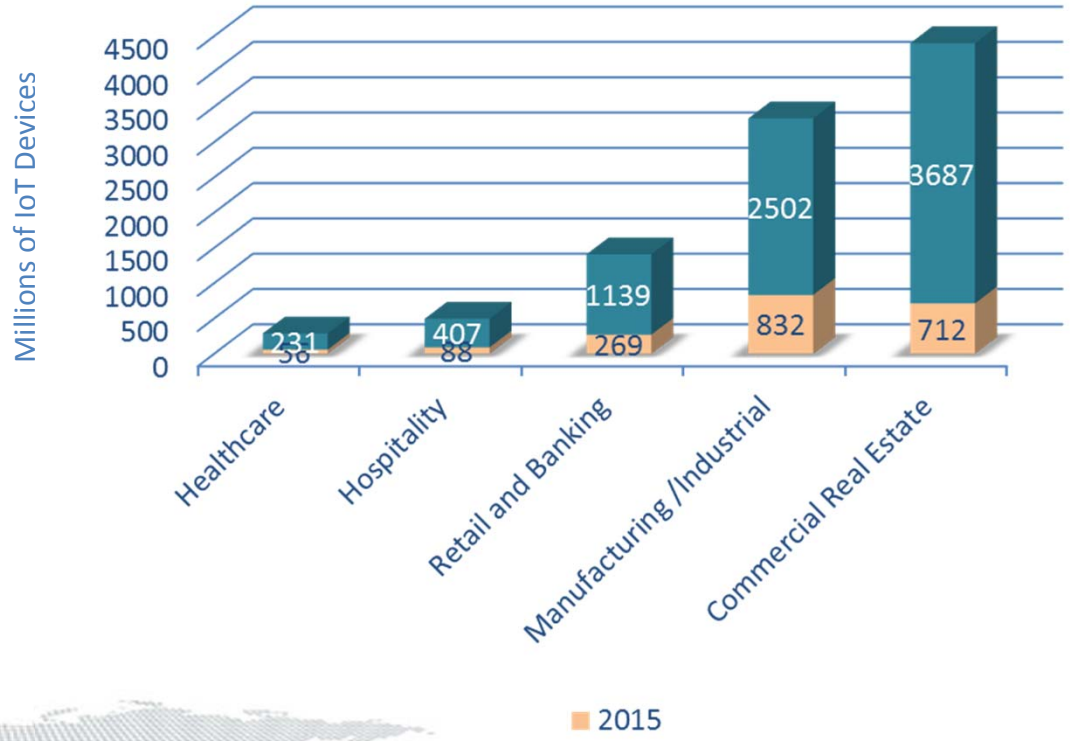

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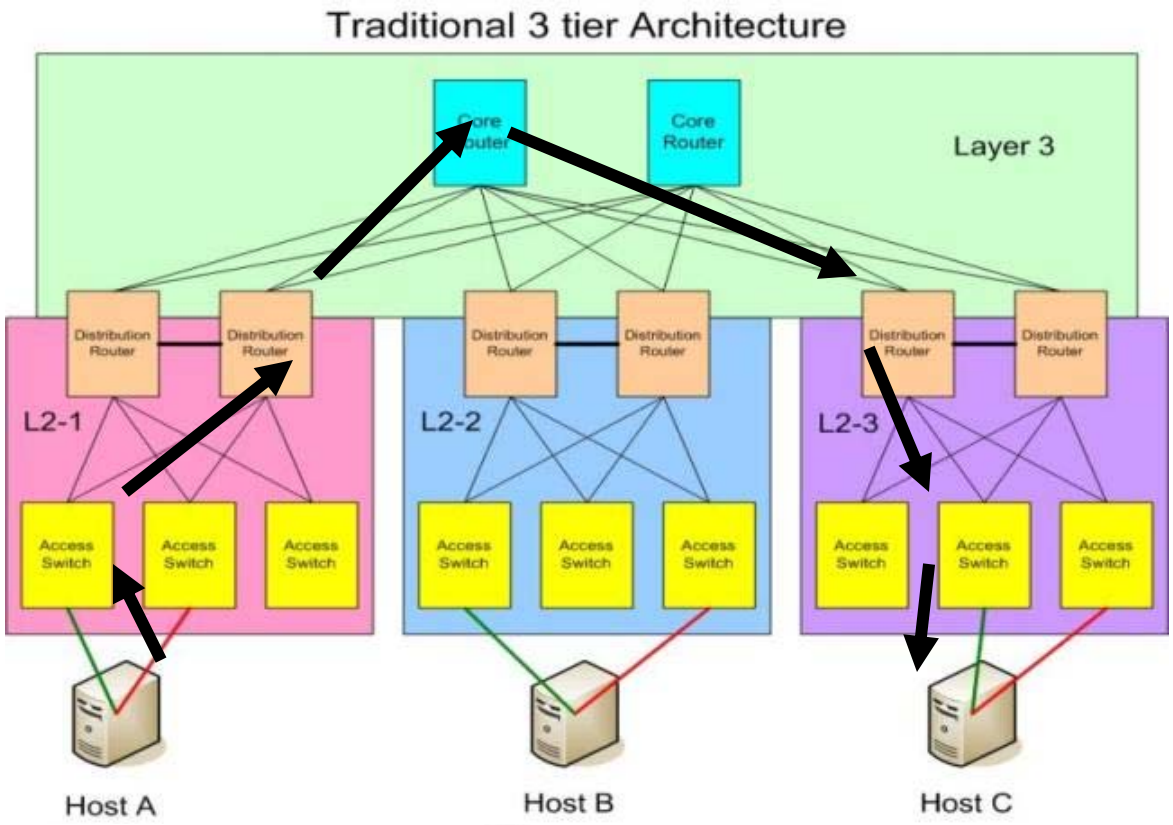
Traditional 3 Tier Architecture



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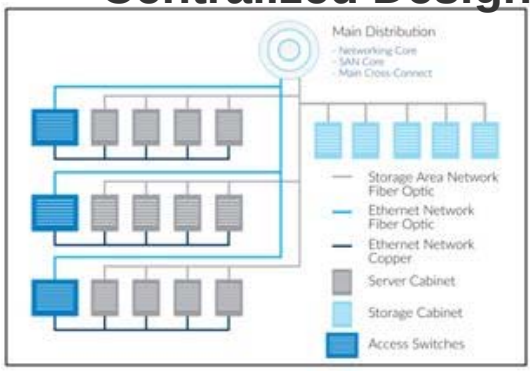
Design Architectures

Centralized Design



Separate LAN/SAN environments with home run cabling to each of the server cabinets and zones.

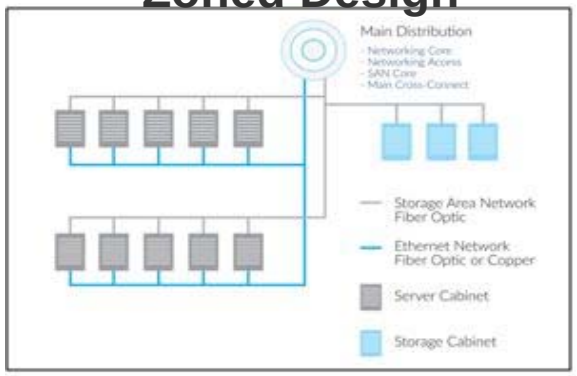
PROS

- Efficient use of switch port
- Easier to manage and add components

CONS

- Difficult to support expansion
- Extended cable length can cause congestion in pathways,
- increasing cost (particularly for larger data centers)

Zoned Design



Switches distributed in an end-of-row (EoR) or middle-of-row (MoR) location.

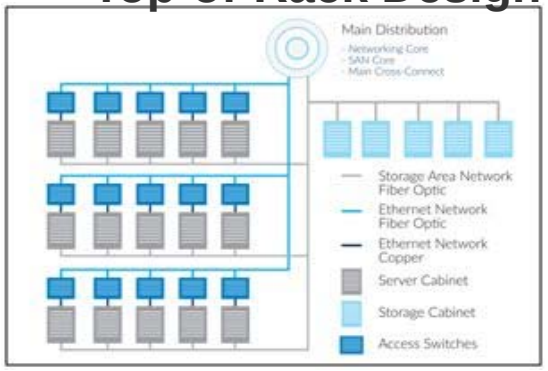
PROS

- Recommended by the ANSI/TIA-942
- Scalable, repeatable, predictable
- Cost-effective

CONS

- The need to run cable back to an EoR/MoR switch

Top-of-Rack Design



Two or more switches in each server cabinet, placed at Top of the Rack (ToR)

PROS

- Good for dense, one-rack unit server type
- Simplifies cable management
- Fast port-to-port switching for servers

CONS

- Increase in cost of switches and licenses
- Underutilized switch ports
- Difficult to manage in large deployments
- Potential for overheating

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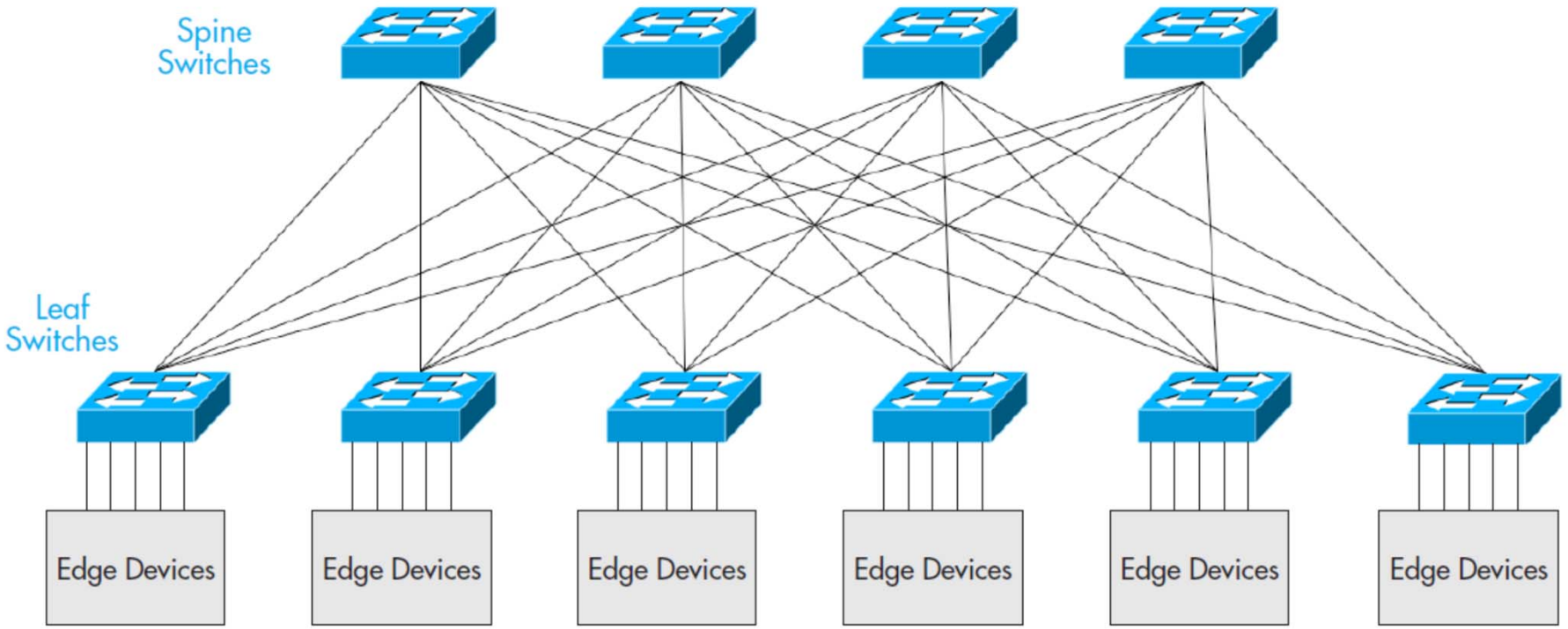
Cloud Aware



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Much of today's focus is on…

Gen Sets	UPS	Switches	Security

How important is the reliability, scalability, availability and capability of the data center physical layer?

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The body mirrors the data center

Body	Data Center
Brain	Server, Switch, Storage
Heart	Power Plant
Stomach	Carrier and Content Connections
Skin	Security Perimeter and Processes
Cardiovascular System	Power, Cooling and Data Transfer Infrastructure

The strength of the data center is in the Infrastructure to support the compute and storage.

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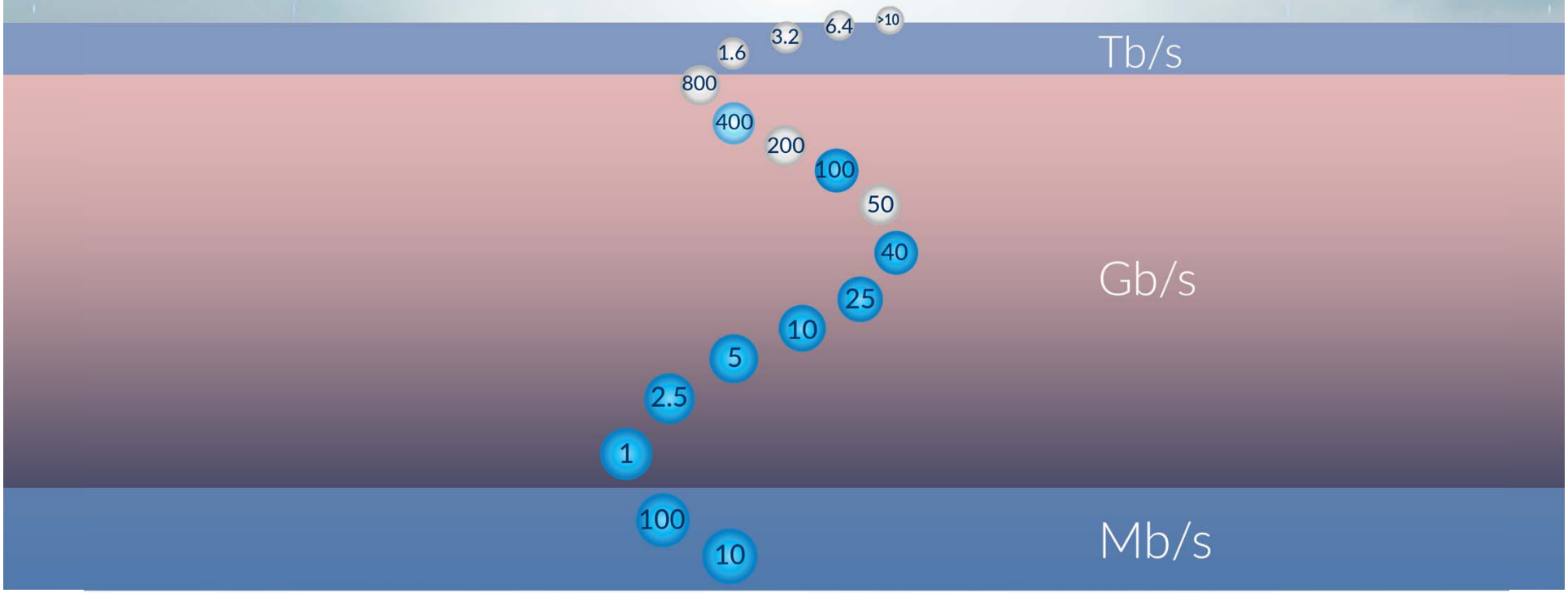
High speed migration roadmap



Ethernet Speed Speed in Development Possible Future Speed

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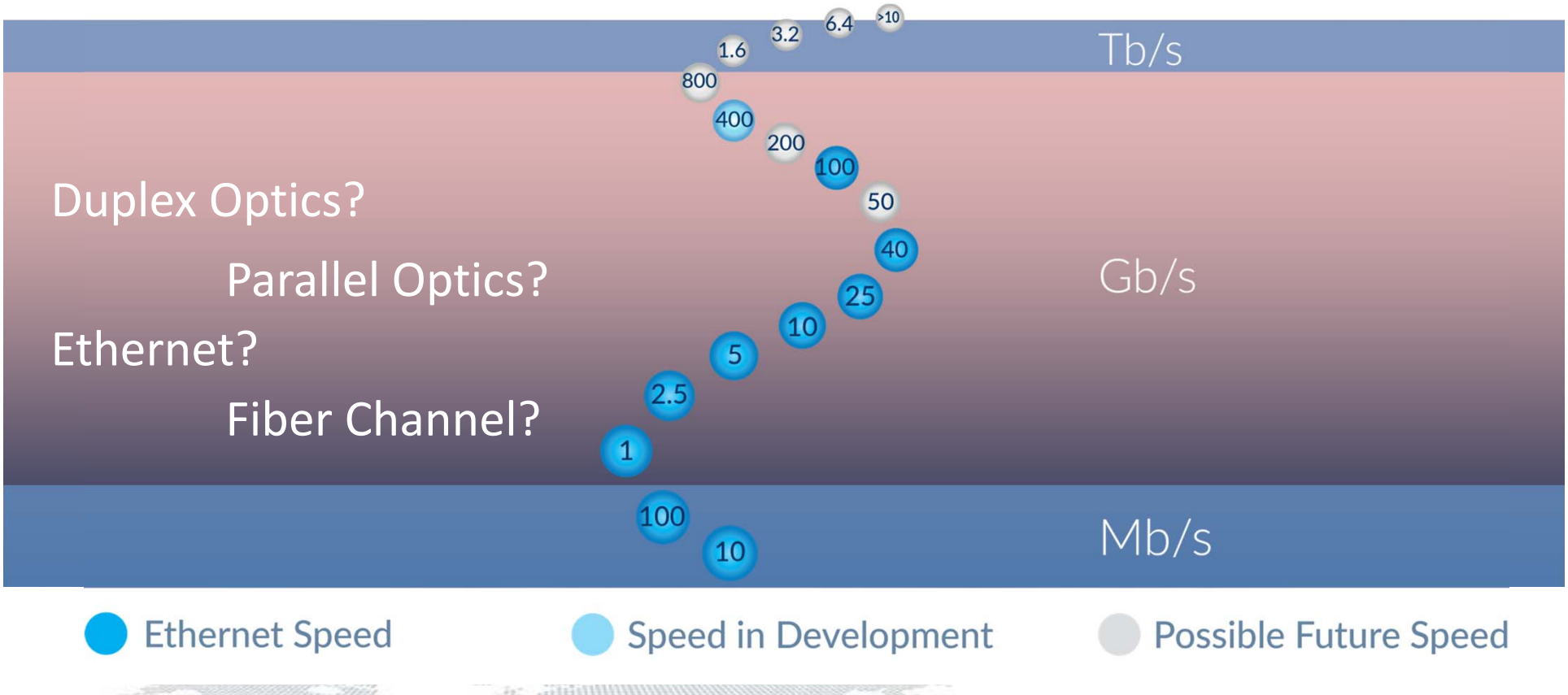
Where is it Taking us



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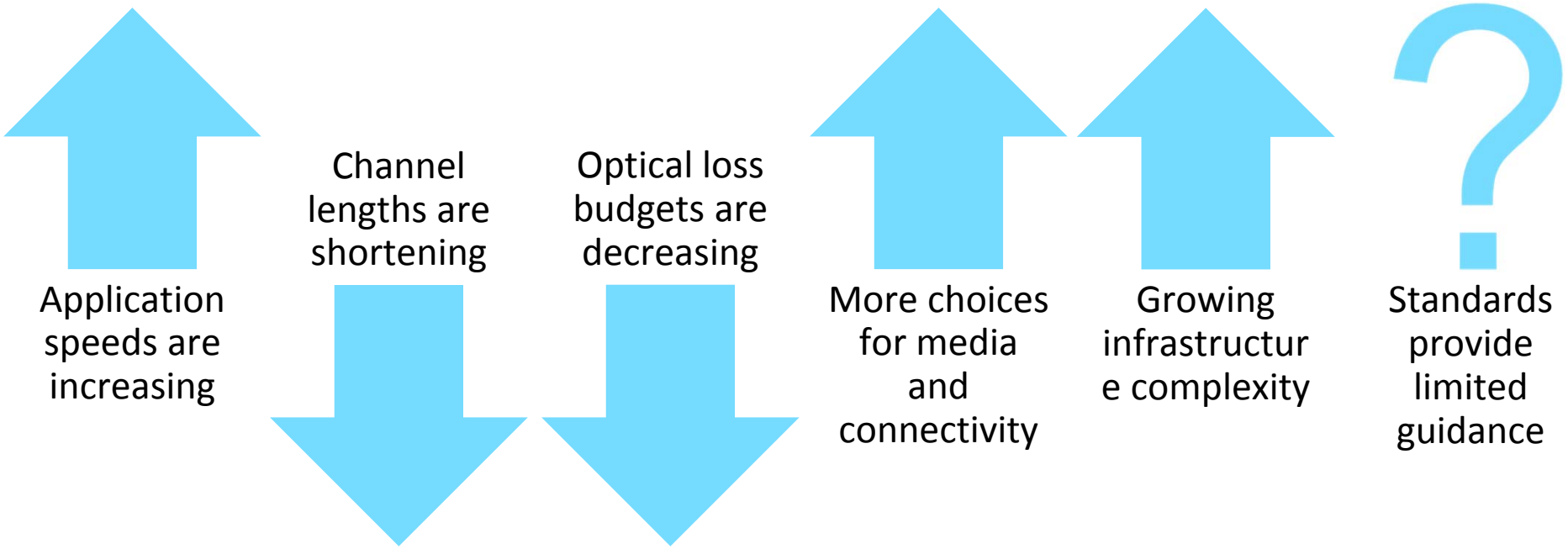
High Speed Challenges



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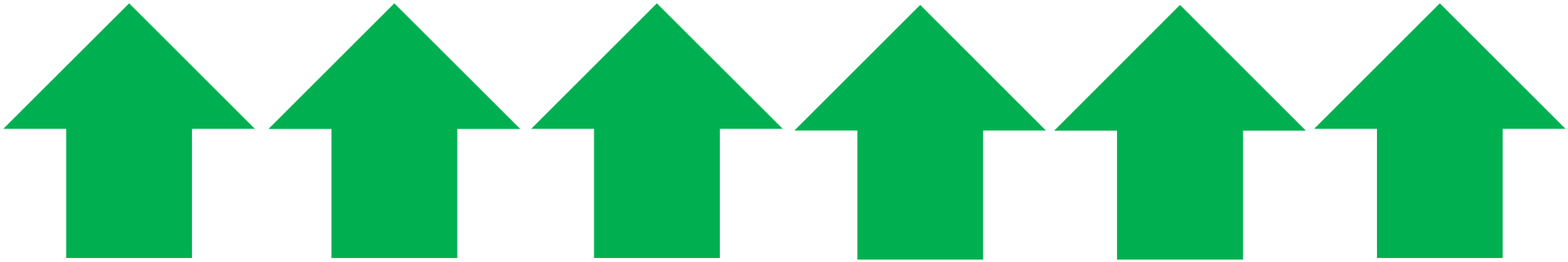
What should the Infrastructure be



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MPO

MPO-24	MPO-12	MPO-8
		
Future Ready Lowest Cost Duplex Support Highest Panel Density	Large Installed Base Existing Preterm Deployments Familiar Interface and Trunks	Support QSFPs For Transceivers and breakouts Lowest Panel Density

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Application Vs Distance

	Standard	# fibers	maximum distance
40G	**40GBASE-SR4**	**(8)**	OM3 100 m OM4/OM5 150 m
	40G-BiDi	(2)	OM3 100 m* OM4 150 m* OM5 200 m
	40GBASE-eSR4	(8)	OM3 300 m OM4/OM5 400 m
	40G-SWDM4	(2)	OM3 240 m* OM4 350 m* OM5 440 m
100G	**100GBASE-SR4**	**(8)**	OM3 70 m OM4/OM5 100 m
	100GBASE-SR10	**(20)**	OM3 100 m OM4/OM5 150 m
	100GBASE-eSR4	(8)	OM3 200 m OM4/OM5 300 m
	100G-SWDM4	(2)	OM3 75 m* OM4 100 m* OM5 150 m

*OM3/OM4 effective modal bandwidth only specified at 850 nm

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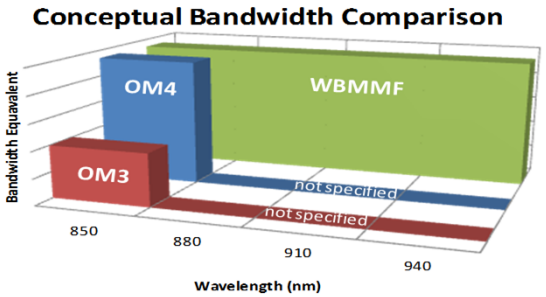
Wide Band Multi Mode Fiber



Data Rate \ Lane Rate	10G Parallel TX RX	25G Parallel TX RX	10G, 25G SWDM TX RX
40G		N/A	
100G			

Legend: parallel fiber transmission; SWDM transmission

OM5 benefits in buildings

- 4 x the capacity of OM3/OM4
- Single-pair Ethernet for 40G and 100G today
- Reduces fiber count by a factor of 4

OM5 in international standards

- Included in DIS ISO/IEC 11801-1
  - IEC standard in development

LazrSPEED 550 Wideband Products

- 24f [illegible] modules
- [illegible] Trunks
- [illegible] Cords & LC Jumpers
- [illegible] Distribution Cables

TIA 492-AAAE Standard Approved July 2016
OM5 name chosen in ISO/IEC October 2016
ISO/IEC 11801-1 FDIS circulated July 2017

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AIM – Automated Infrastructure Management

- ISO/IEC 18598 and TIA-5048 AIM Standards
- Panels with built-in sensors to detect insertion and removal of cords
- Real-time automated information about connectivity changes
- End to end visibility and location information for connected devices
- API for integration with external applications and processes

ISO/IEC 18598 AIM Standard published - September 2016
TIA-5048 AIM Standard Approved for publication - July 2017

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Standards – TIA 942-B

The completed TIA-942-B standard includes the following, among many other, changes from the "A" revision.

- It incorporates Addendum 1 to the 942-A standard, which addresses Data Center fabrics, as an Annex.
- It adds 16- and 32-fiber MPO-style array connectors as an additional connector type for termination of more than two fibers. The 16- and 32-fiber connectors were standardized when ANSI/TIA-604-18 was published.
- It adds Category 8 as an allowed type of balanced twisted-pair cable, and changes the recommendation for Category 6A balanced twisted-pair cable to Category 6A or higher.
- It adds OM5 (wideband multimode fiber) as an allowed fiber type. The TIA-492-AAAE standard specifies OM5 fiber, which is designed to support short-wave wavelength division multiplexing.

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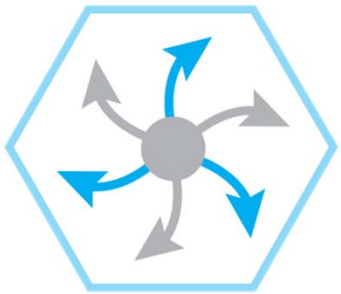
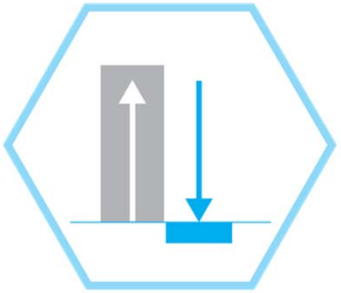
Infrastructure Vision



Cloud Friendly

Plug and Play Modularity to support today's higher speeds as well as tomorrow's new applications and technologies



High Density/Minimum Redesign

Keeps your growing fiber network accessible and manageable and scales easily

Agile and Flexible

Support your evolving strategies to reduce cost and complexity in the network

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Thank You

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