



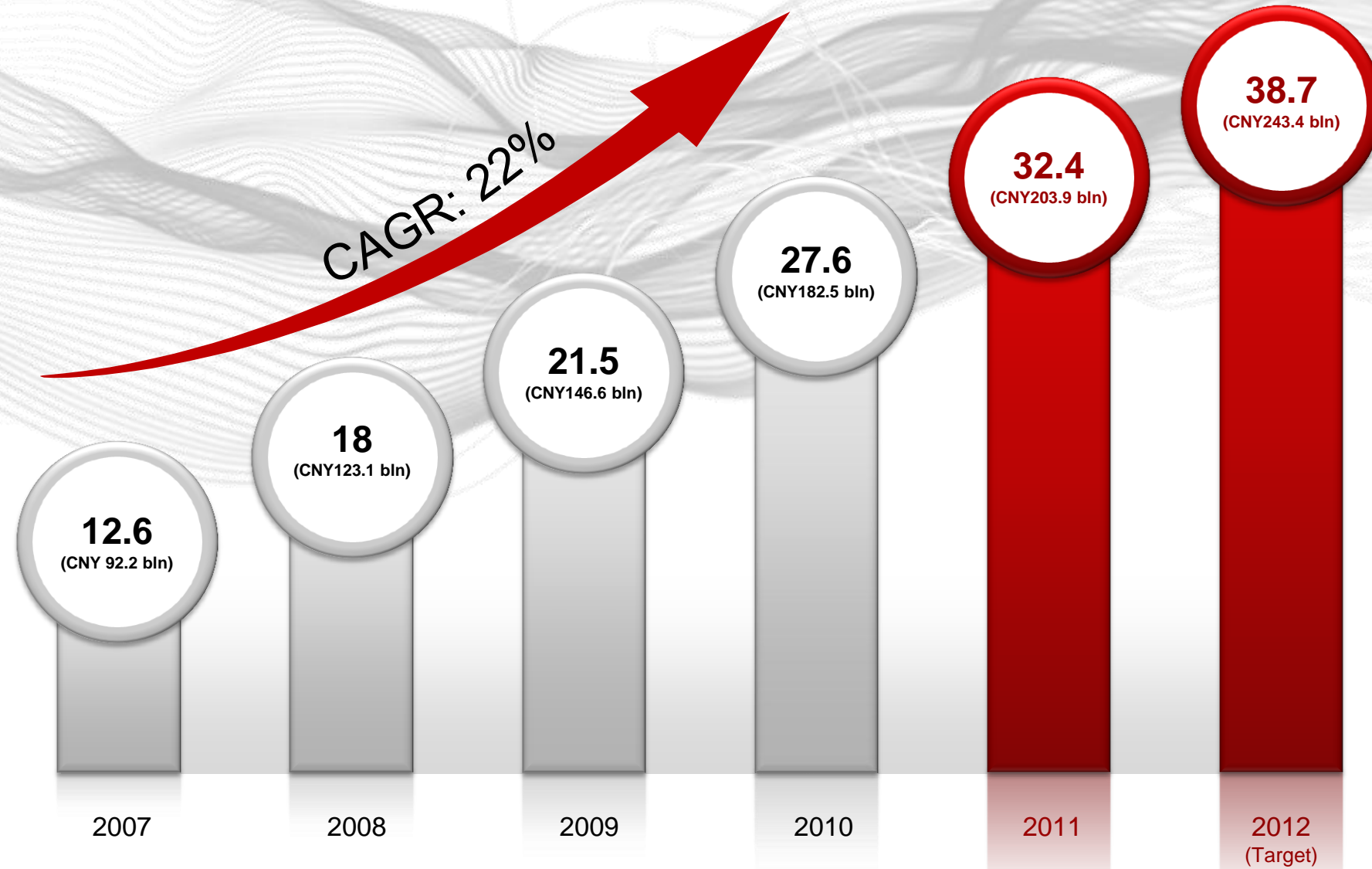
Huawei Enterprise Business

The Future of Networking: What's Old is New Again



Sustainable Growth

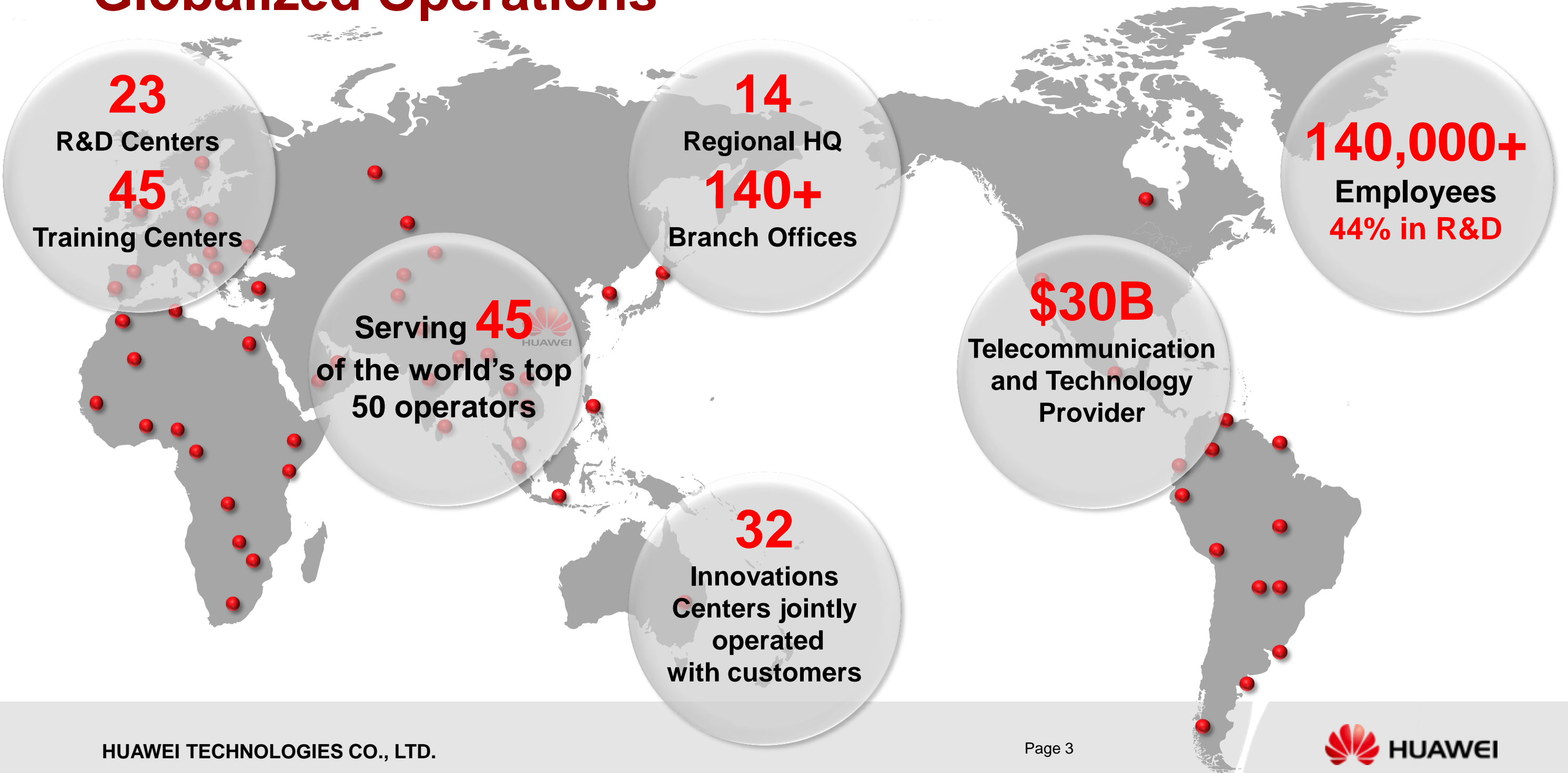
Revenue (USD in Billions)



- Leading global ICT solutions provider
- Serving 1/3 of the world's population
- “Corporate Use of Innovation”
- The Economist
- “5th Most Innovative Company”
- Fast Company

• Huawei releases its Annual Report with consolidated financial statements audited by KPMG

Globalized Operations



Huawei, A Global Company with Expertise Worldwide



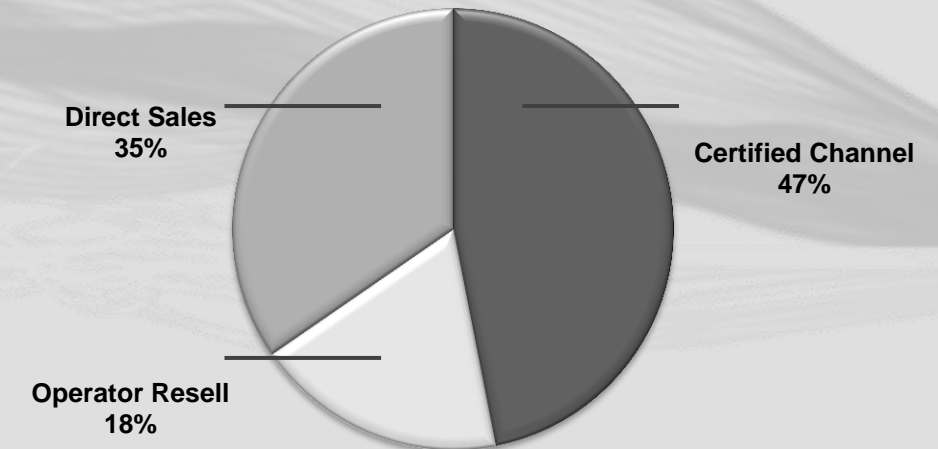
- **140,000+** employees with **150+** nationalities worldwide
 - **23** R&D centers
 - **45** training centers
 - **14** regional headquarters, operations in **140+** countries
- Localized Operations Powered by Global Resources**

Rapid Growth of Huawei Enterprise Business

Rapid Increase of Revenue

Contract Sales: **\$3.8 Bn**
Revenue : **\$1.59 Bn**
YoY Growth: **57.1%**

Direct Sales and Channel Sales



Open and Transparent = Strong Ecosystem

Channel	2200 + distributors, ISVs, VARs, VADs, SIs
Solution Partner	Nearly 1000 partners in products and technologies
Service Partner	224 service partners and 5000 certified service engineers

The IT Organization and CIO are under Huge Pressure

Security

Regulatory

Budget

INNOVATE LESS!



LEAD & DIFFERENTIATE

INNOVATE MORE!

CONSUMER

ECOSYSTEM

PARTNERS

MARKETING

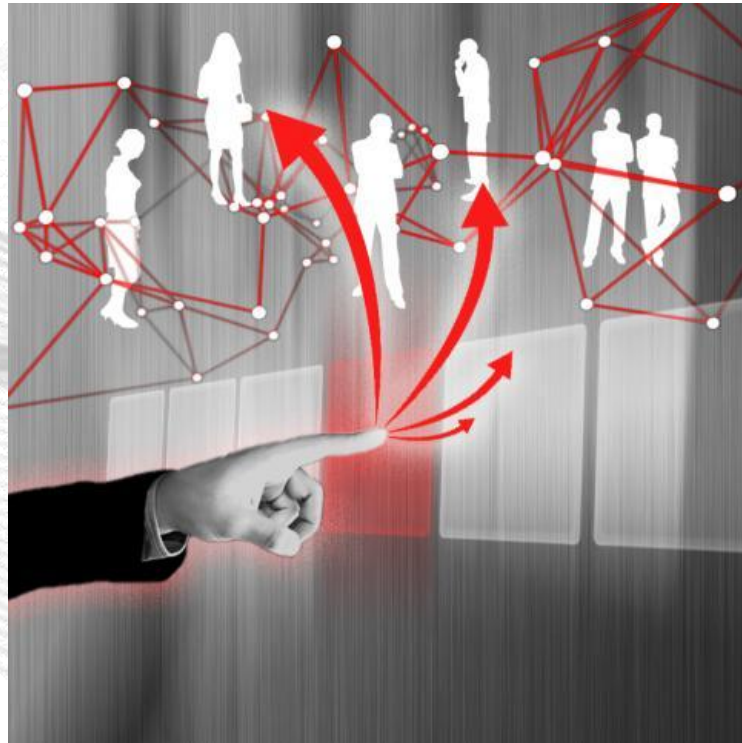
END USER

CEO



**ENTERPRISE
FUTURE**

New Class of Enterprise Problems and Requirements



DISTRIBUTED

Does your IT system scale to the number of employees you have, or the number of customers you want?



FEDERATED

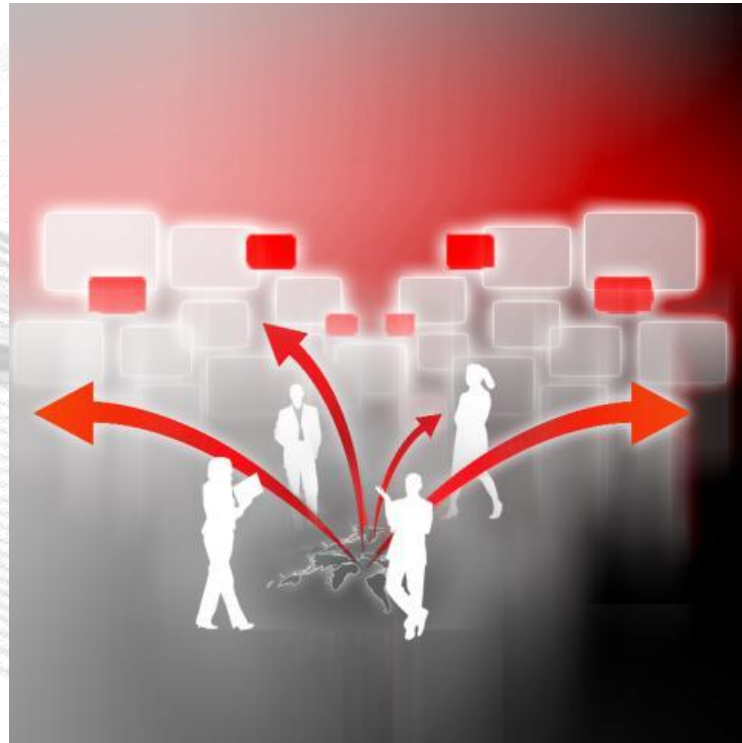
How will your IT environment interact with your entire ecosystem?



INTUITIVE

Are your IT end customers IT professionals, or are they teachers, doctors, or executives ... ?

New Class of Enterprise Problems and Requirements



EXTENDED

Will all of your IT services happen within your own IT environment?



MOBILE

Can you identify who won't be mobile in your enterprise environment?

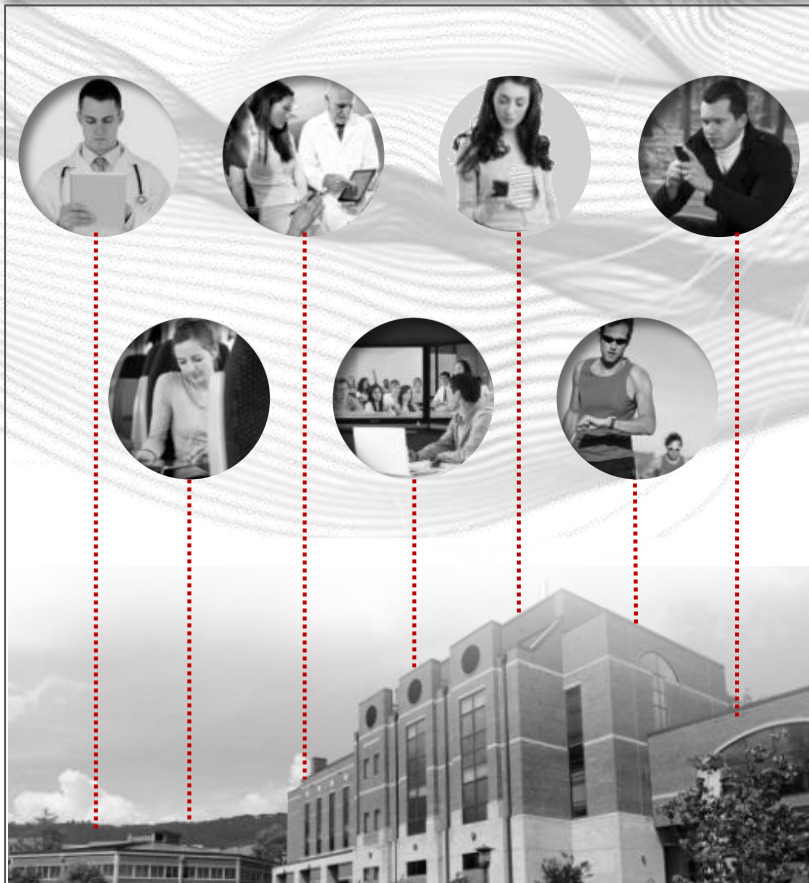


VIRTUAL

Can you afford dedicated hardware and software for every person, in every environment, all the time?

Future Enterprise Driven By Three Technical Trends

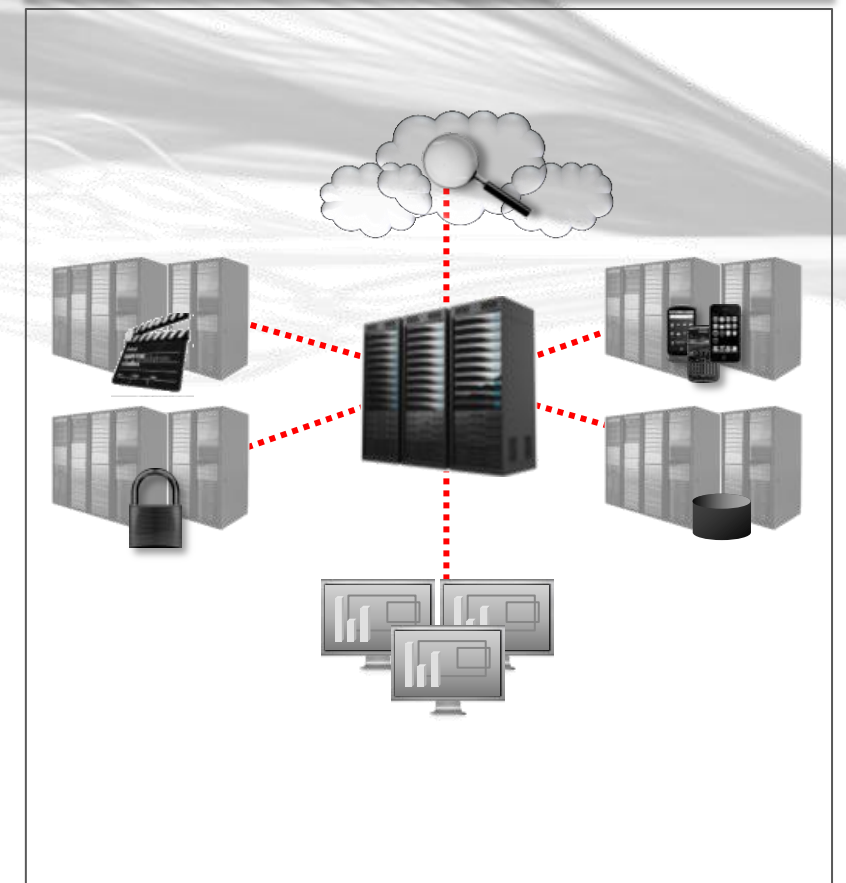
Consumerization of IT



Mobilization of IT

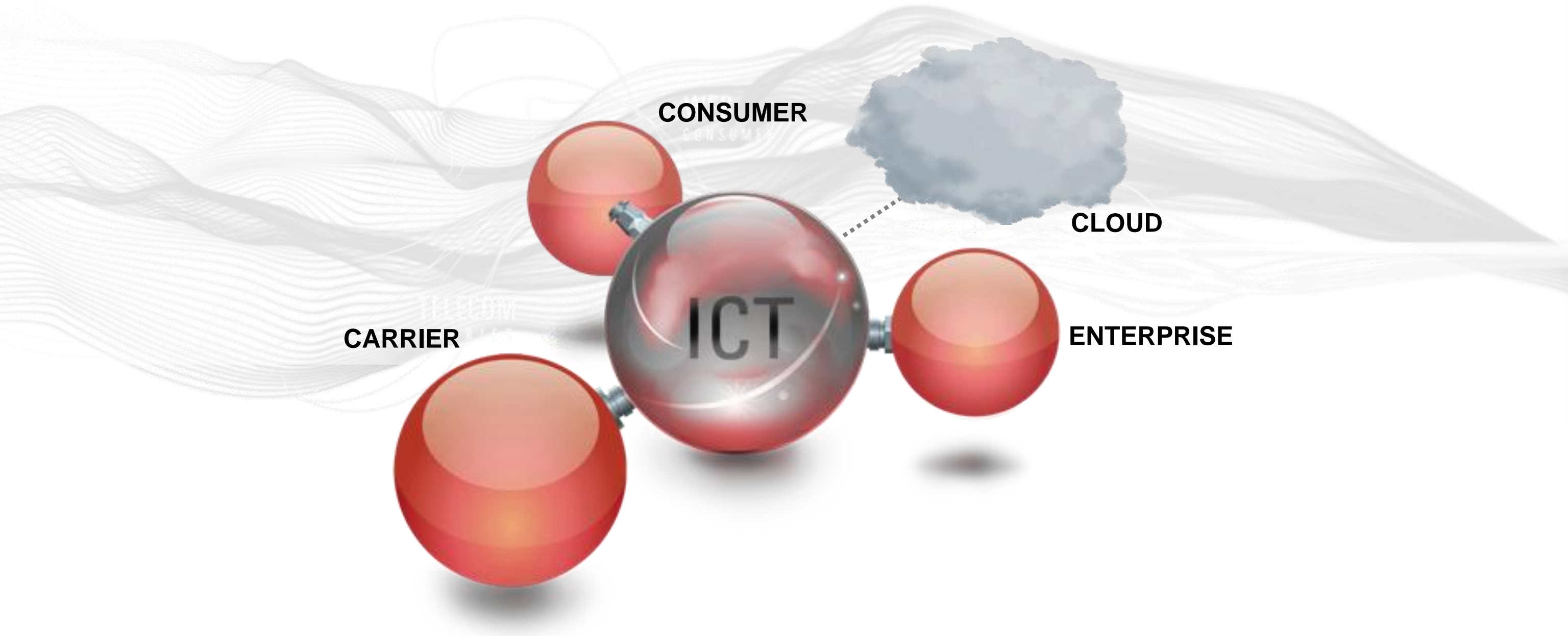


Distribution of IT



The Integrated Enterprise

ICT Intersection





Future of IT/Networking



The Future of IT/Networking

TOPOLOGY SHIFTING

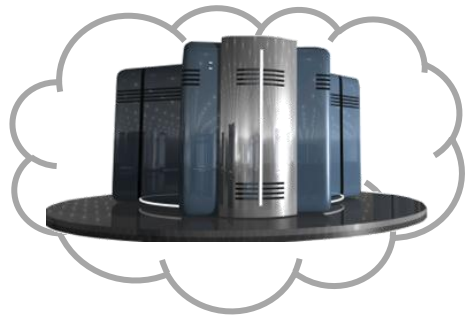
DISTRIBUTED
DATA CENTERS

NETWORK

MOBILE DEVICES
AND USERS

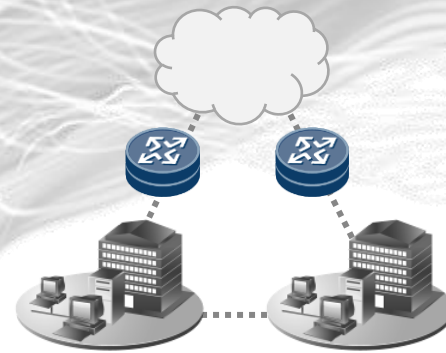
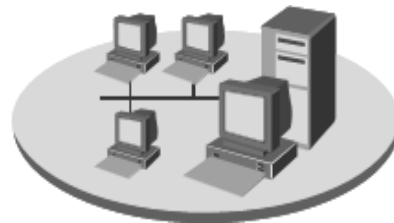


Private Data Center

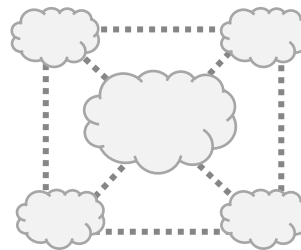


Public Data Center

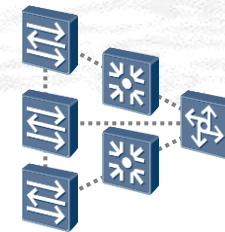
Massive Core



Back Haul



Aggregate



Wired
Access



Wireless
Access



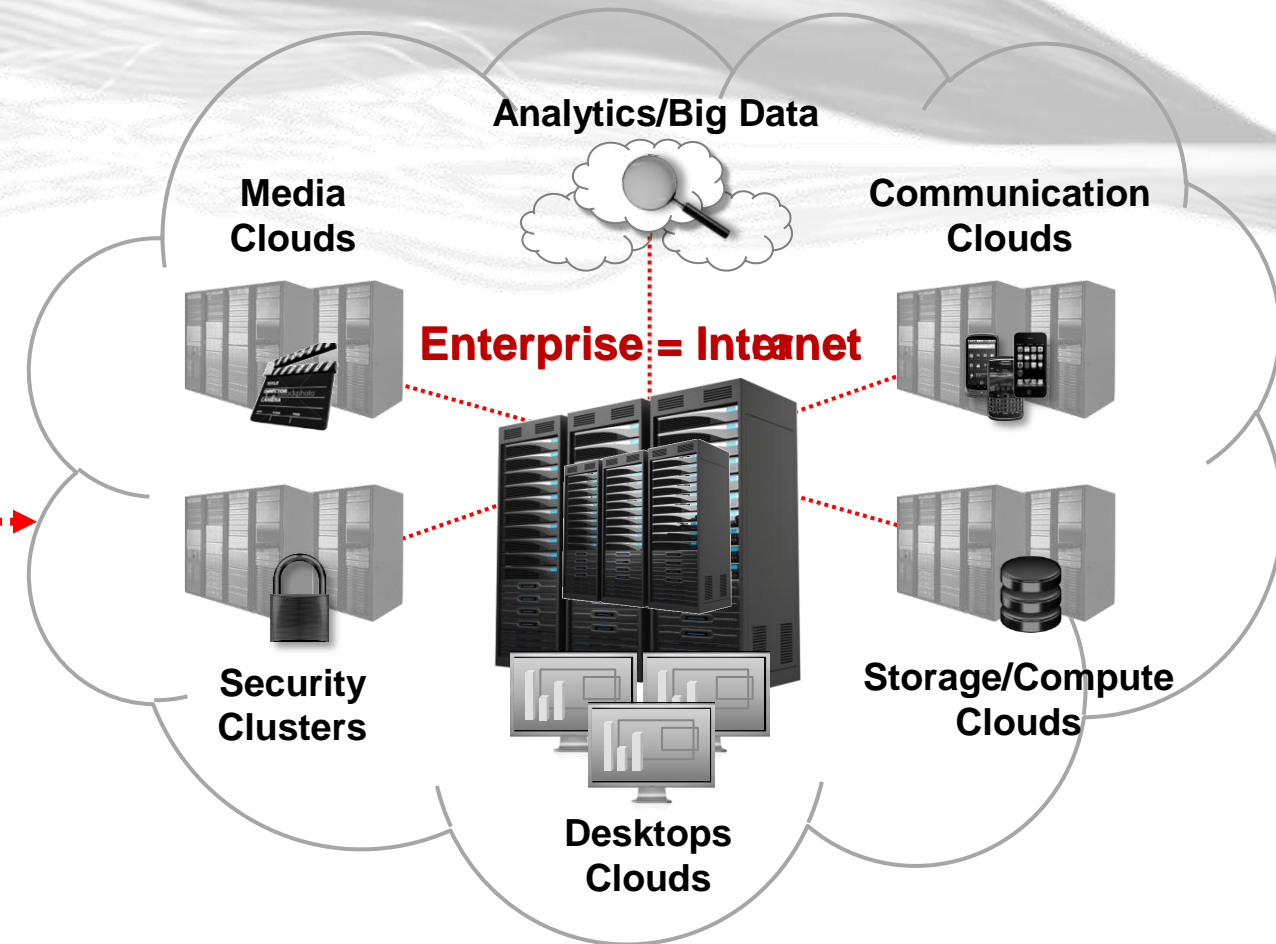
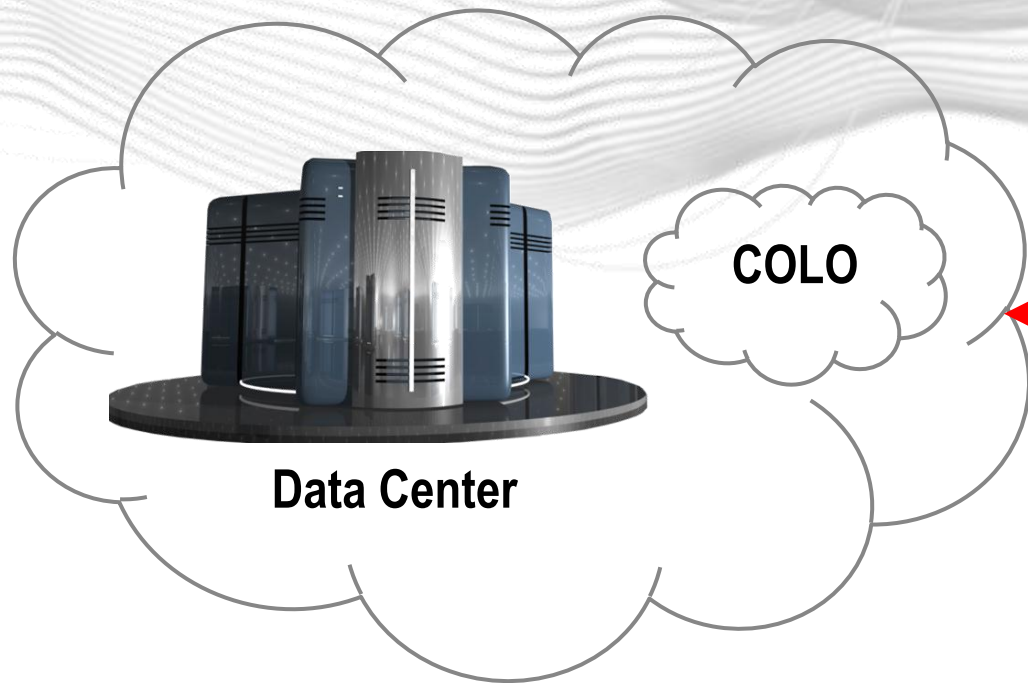
Where Will the DC Exist? Cloud (Public, Private, Hybrid)

TODAY

EVOLUTION

IMPACT

PRIVATE



What Will the DC Network Be? Agile, Precise, Diverse

TODAY

- Homogeneous flat topology
- Capacity oriented
- 1Gig LOM , 10 gig core
- Edge security model
- Some virtualization

EVOLUTION

- Increased virtualization
- Emergence of 40/100/400/1000Gb cores
- LOM (10GIG) -> 40/100G LOM
- New topology models (SPB, TRILL, OpenFlow)
- New programming models (restful, SDN)
- Convergence to all Ethernet transport
- Extension to public cloud
- Physical and Virtual Switch Layers and Interworking Topology

IMPACT

- Costs and power consumption per port may increase
- Core scalability of switches will need to be multi TB capacity
- SDN Rationalization and Interworking
- WAN interconnect will be 100G+
- Topology will become more complex and heterogeneous
- Security scale may be the bottleneck

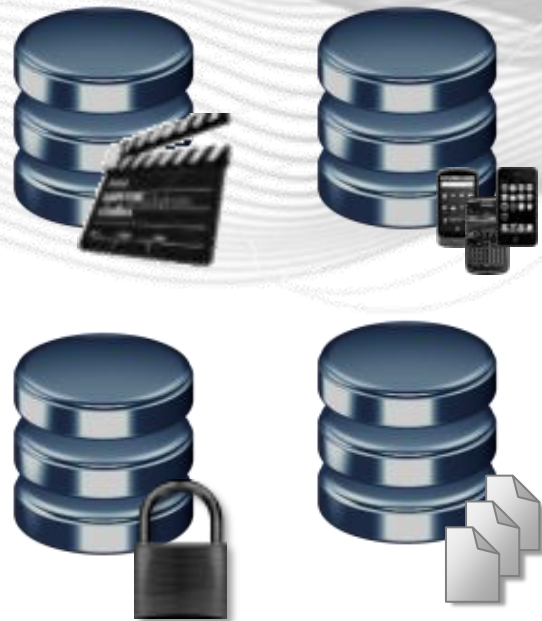
Where/How Will Data Be Stored? Hybrid Storage

TODAY

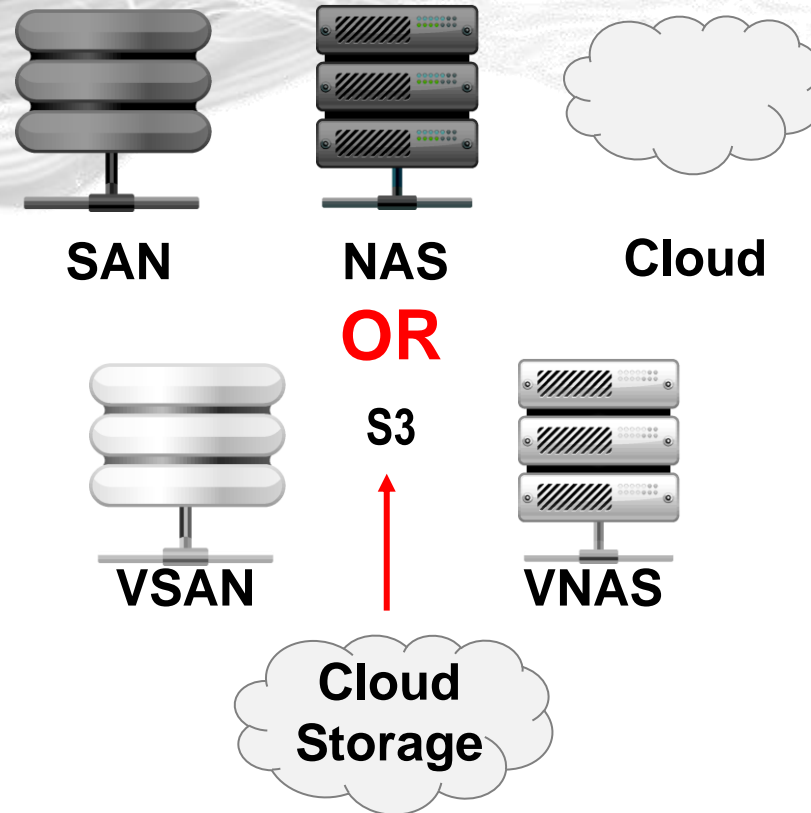
EVOLUTION

IMPACT

SAN/NAS



SAN/NAS/CLOUD



- Tape back up goes away (VTL)
- Fail in place operation
- 100s of PB scale +
- Each type of content maps to proper storage (scale, cost, structure, API. . .)
- Possible shift to virtual SAN/NAS based on cloud storage platform

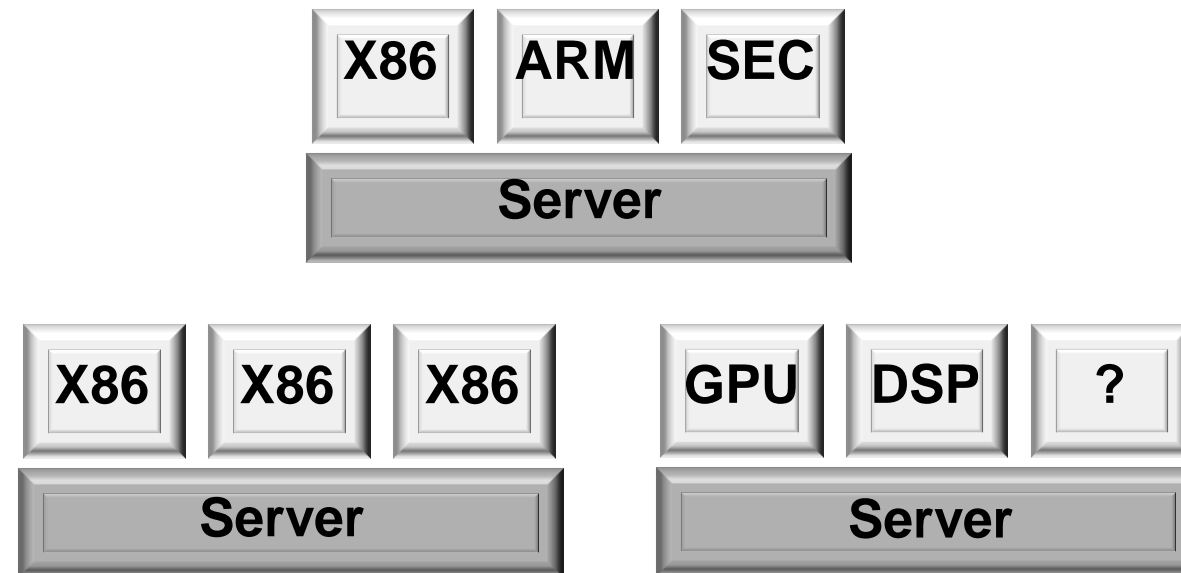
What Will Compute Look Like? Diverse & Virtualized

TODAY



EVOLUTION

Rack Scale Compute
Specialized Clusters
PROCESS LEVEL VMS



IMPACT

- Increased application flexibility
- Increased software complexity
- Heterogeneous Virtualization
- Orchestration challenges
- Cost will only be controllable with use of public DC capabilities
- VDI/Desktop cloud use increase for mobile and fixed clients

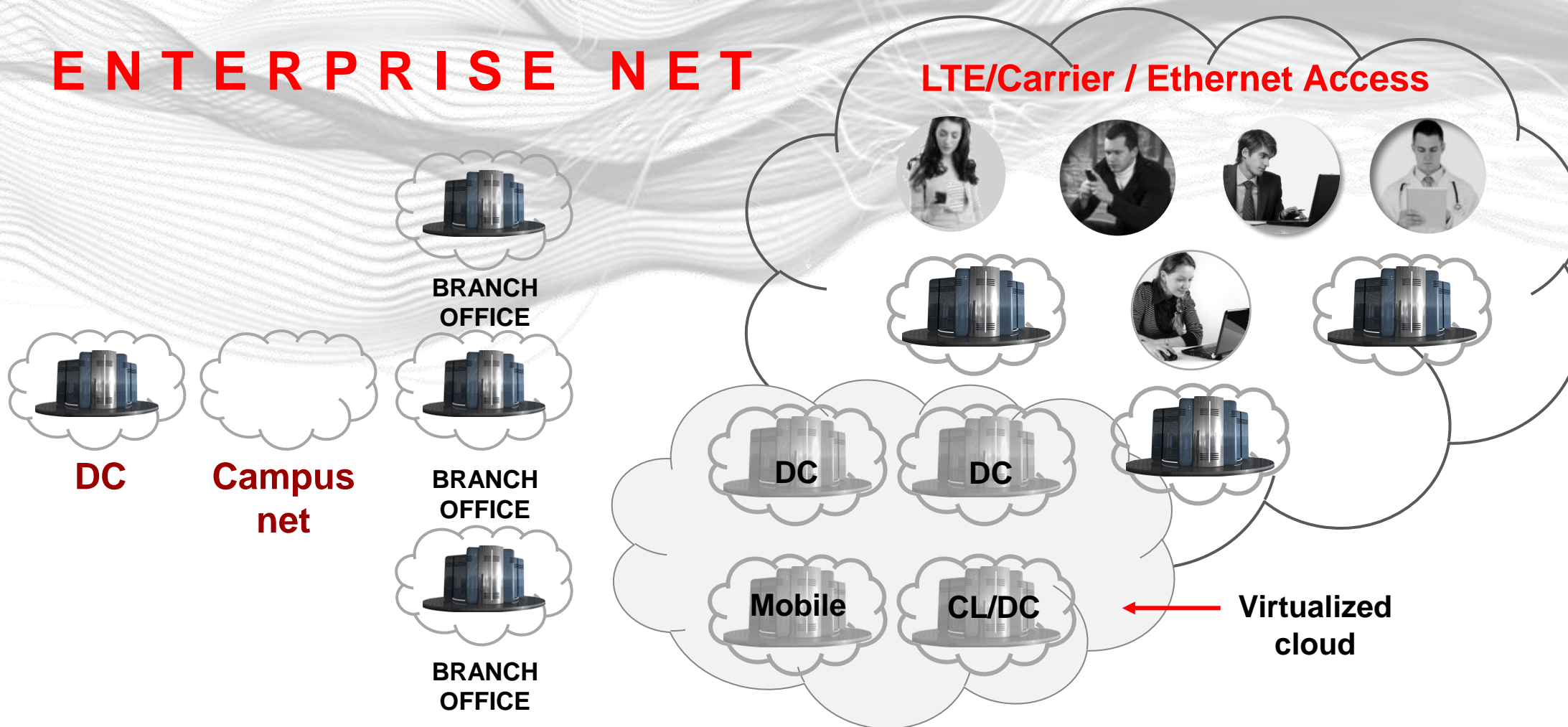
Who Will Use the Data Center? Mobile Clients

TODAY

EVOLUTION

IMPACT

ENTERPRISE NET



- User count will increase to match customer count
- User/device diversity will increase with BYOD
- User net cap will be limited by mobile network capacity
- New security issues (dual personality devices)
- **I N E V I T A B L E**

Who Else Will Use the DC? Machine to Machine

TODAY

EVOLUTION

IMPACT

A DIFFERENT KIND OF USER



PERSON
SOFTWARE
DEVICE



- User count will increase dramatically
- New security models will be needed (user-less devices)
- Session count will increase
- Bandwidth will vary greatly (video sensors vs HVAC example)
- Will introduce new applications to the DC to support IoT

How Will We Protect the Network

Scale + New Models Key

TODAY

- Limited internal DC security
- Edge focused model
- Physical security
- Traditional backup/protection
- Basic intra DC security
- Basic edge access control

EVOLUTION

- Incorporate MGMT into one model (restful, orchestrated DC mgmt – net, storage, compute)
- Edge security must scale to 1Tb+
- Security as and between virtual services
- Backup models will fail to scale (replaced by Fail in Place)
- Enterprise IDM, policy and roles will be projected into public cloud services (Cloud GW)
- User diversity and scale will increase security complexity

IMPACT

- Investment in DC security will increase
- External interworking will become necessary to support mobile and distributed services
- Mgmt complexity may simplify with integration of network into DC management
- Security scale may be the bottleneck again

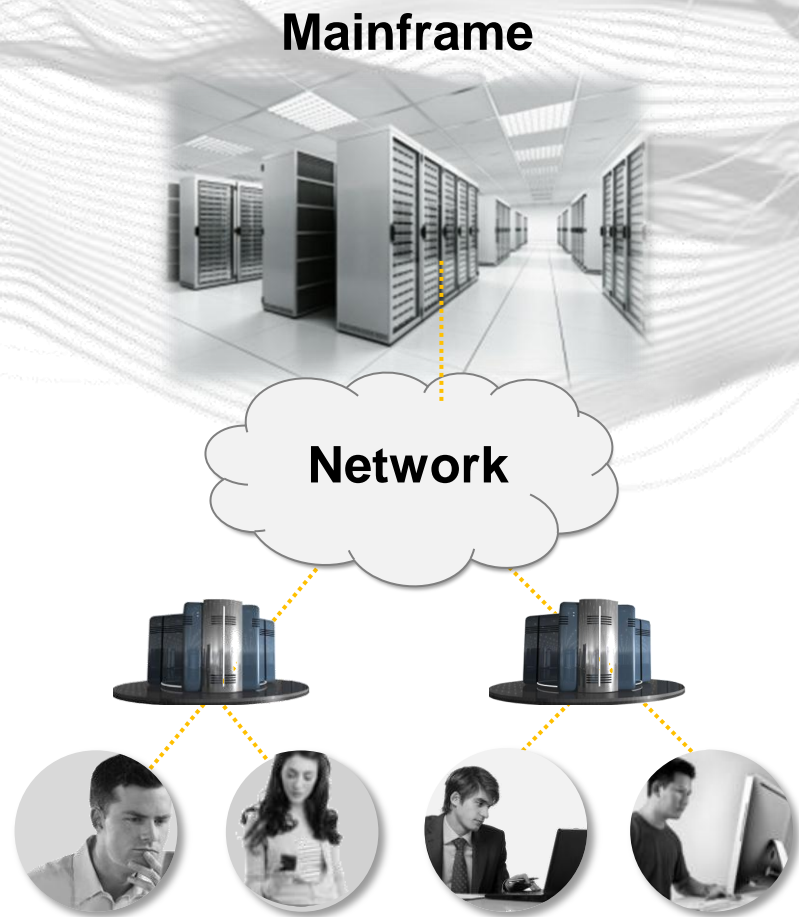
Does This Remind You of Something?

- Centralized Data Processing, Storage?
- Thin Clients?
- Minimizing the Role of Network?

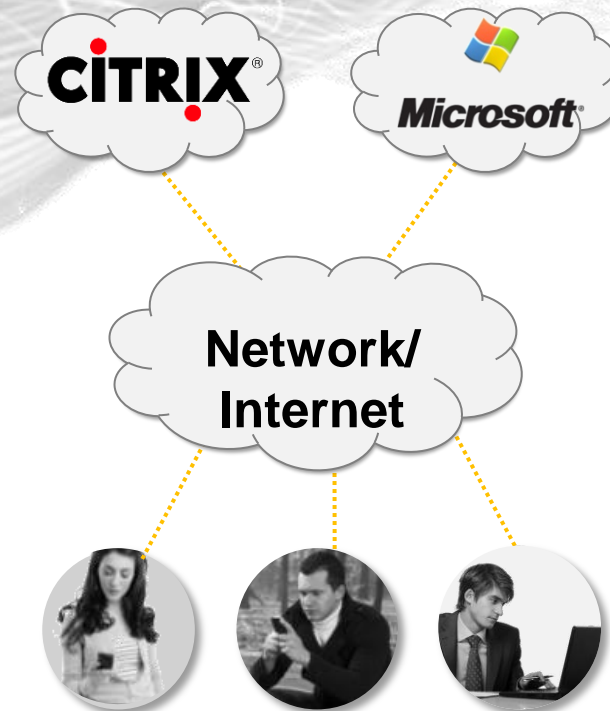
IT SHOULD!

Many Attempts to Do This

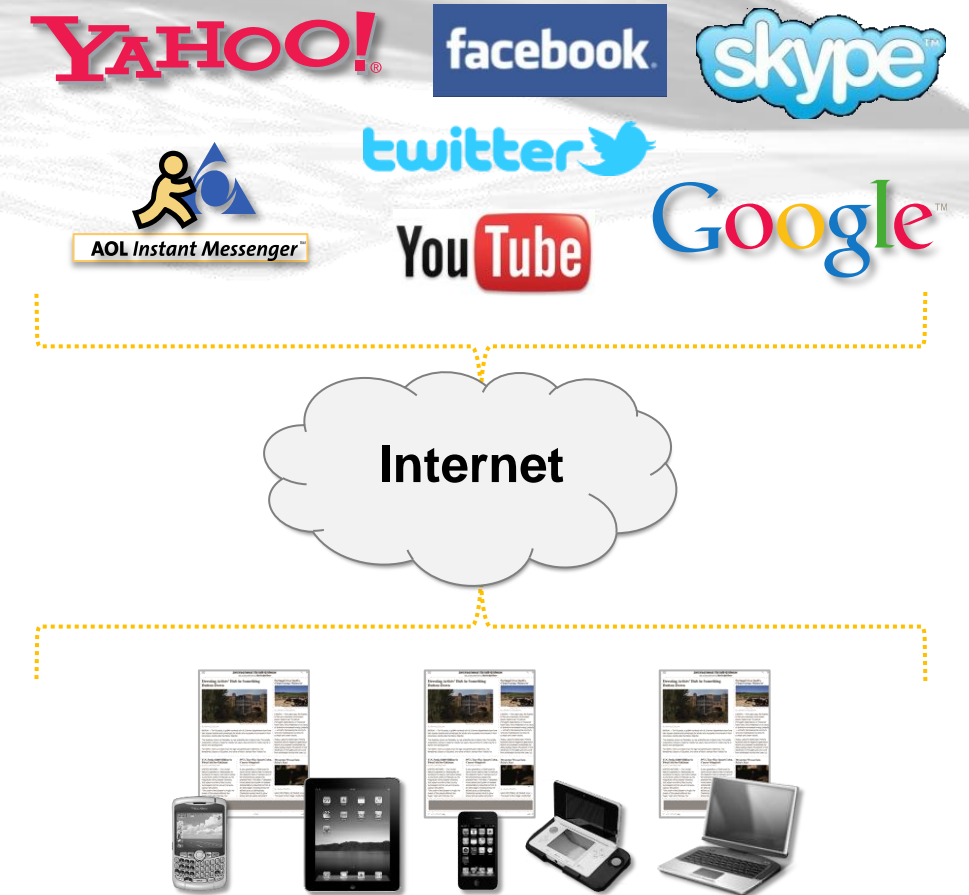
SNA



THIN CLIENTS



WEB PORTALS



Lessons Learned

1

The network is important

- No matter how fast, it's never fast enough

2

CoS and priority are usually good enough

3

Scale kills/aggregation solves

- Flows, sessions, states, . . . exceeds ability to manage

4

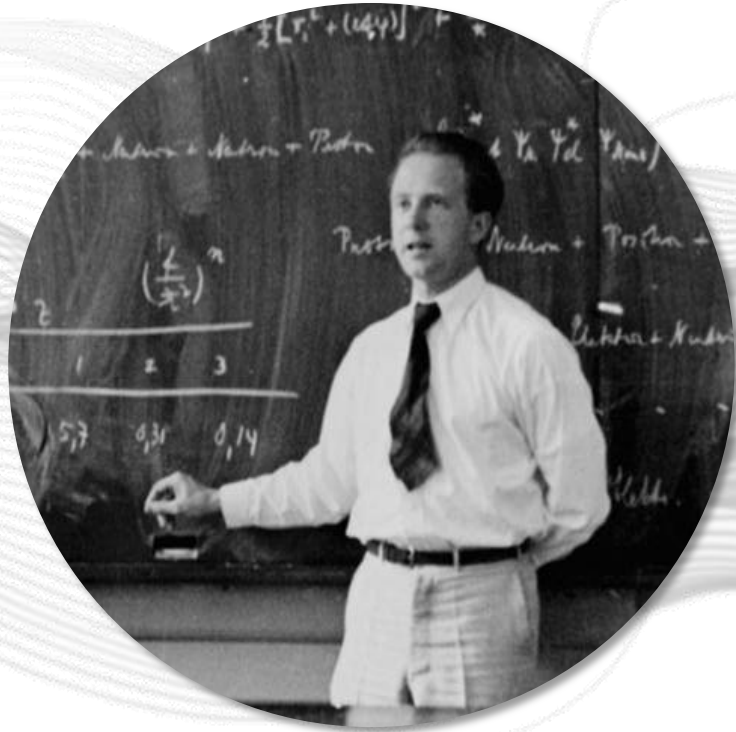
No matter how much you want predictable static structure . . . it never happens

- People are unpredictable

5

Don't assume bandwidth symmetry

- Capacity required change unexpectedly
- Both amount and direction



“An expert is someone who knows some of the worst mistakes that can be made in his subject and how to avoid them.”

- Werner Heisenberg

“Physics and Beyond”



Thank You

