

Security  
Level:

# Converged IT Infrastructure for virtual networking

UK NOF: Reading – 24th

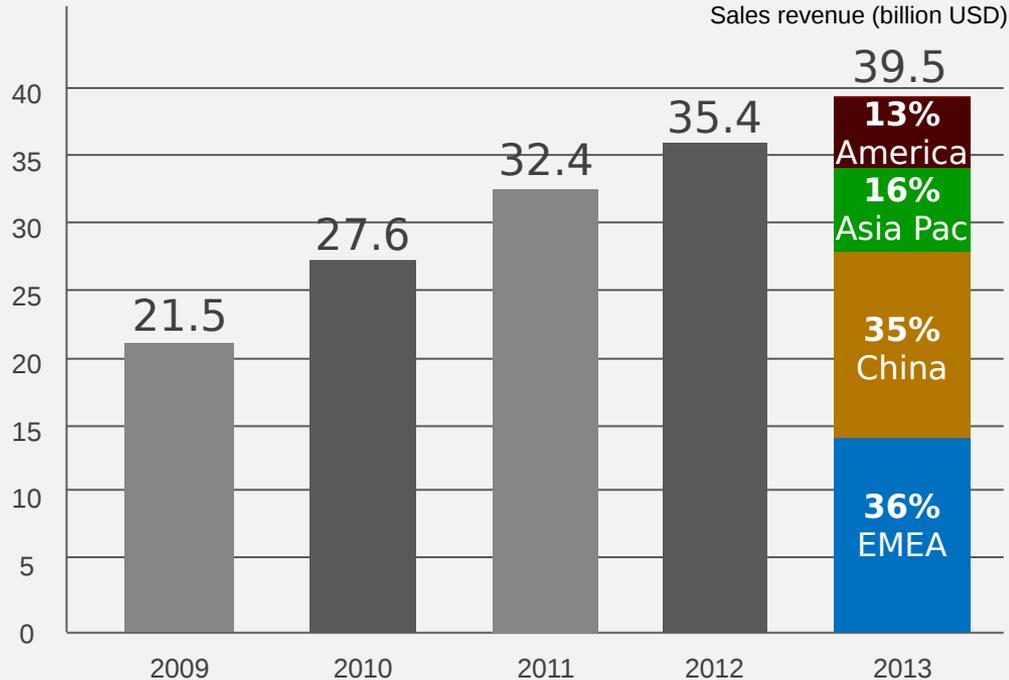
[www.huawei.com](http://www.huawei.com)

*Malcolm catling – Principal IT & Cloud Architect*

HUAWEI TECHNOLOGIES CO., LTD.



# Sustainable Growth



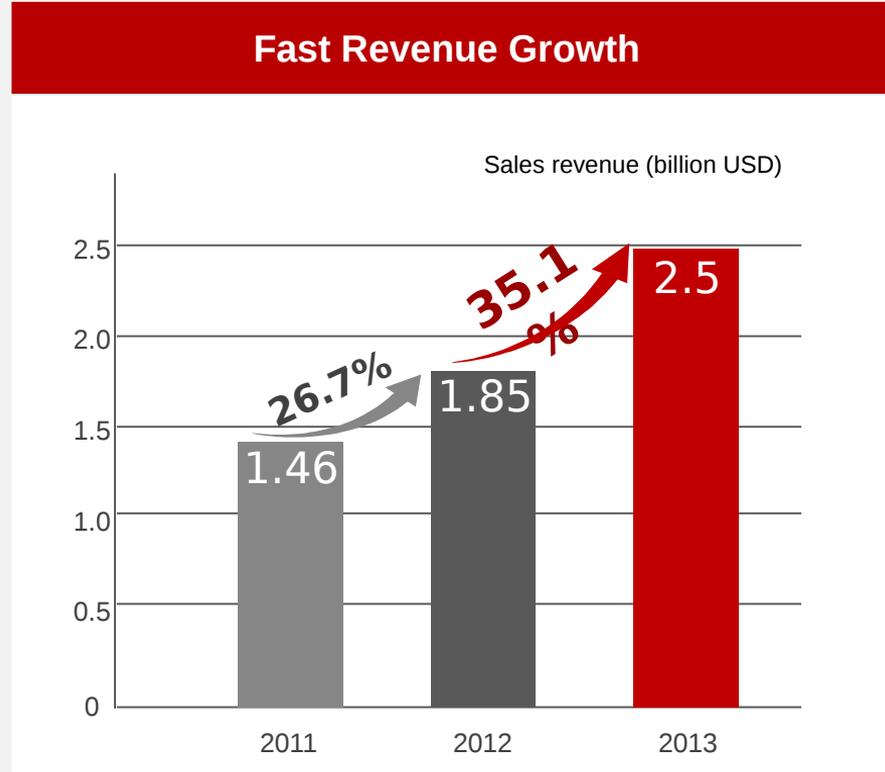
- Huawei Technologies releases an annual report with consolidated financial statements audited by KPMG. — *From Huawei annual report audited by KPMG*

## Who is Huawei?

- Leading global ICT solutions provider
- Rank 315th on the 2013 Global Fortune 500
- Customer-centric culture
- World-class management, process, and practice

# Enterprise Business: A Major, Fast-Growing Unit

Carrier Network Business	<b>Enterprise Business</b>	Consumer Business
		
Supporting Platform		



# Footprints Of Huawei IT



2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012

## Serve for Carriers

## Product Innovation

## New Era

- Start Server & Storage R&D
  - 1st-generation blade server T8000 V1
  - Commercial launched the first FC SAN F800
    - Commercial launched the 4Gb SAN product
    - 3rd-generation blade server T8000 V3
    - Full series NAS/SAN/VIS Product launched
      - Joint Venture from Huawei and Symantec
      - SSD PCIe cards (the first in the industry)
        - Start Cloud Computing R&D
        - RH1285 and RH2285 rack servers
        - High end and Middle range SAN,NAS
- High-end storage HVS
  - Cloud storage UDS
  - Converged infrastructure FusionCube
  - X8000 calculator server 4P/8P
  - New T series server SAN & Full SSD SAN
  - Huawei Acquires Symantec Stake in Huawei Symantec Joint Venture
  - High-density X6000 servers for datacenters
  - Cloud Platform Galax8800
  - E6000 blade servers, iNIC, and 2nd-generation SSD
  - Cloud Solution SingleCloud 1.0

# IT Global Innovation and Support Resources

150+

Technical standards  
approved



7

Global R&D centers



10000+

R&D Engineers



1000+

Patents and pending applications  
for technologies



2

Global Technical  
Assistance Center

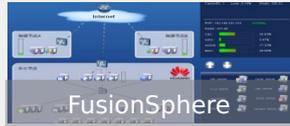
# WEU Storage Deployed Customer Overview

## Huawei Storage

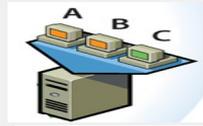
 datastore365 online hosted managed services	 CERN openlab	 IMG	 Deloitte	 MIGROS	 OmniPay	 pepper
 SES ASTRA	 CSS Versicherung	 PORT	 Deloitte	 obc	 arsys	 sohonet
 FERRERO	 PIRELLI	 FINECO	 H+ HOSPITALES	 SPIEGEL	 kpn	 indra
 trafficmaster intelligent driving	 GAS	 PUMA	 TelecityGroup	 UNIVERSITÄT SIEGEN	 vbi	 LNT
 BORDIER & CIE	 BT	 Heidolph <i>Research made easy</i>	 LCC calidad	 France Illuminations	 SAVENET SOLUTIONS	 T
 Guardia di Finanza	 RAIN HOUSE OF FINE PRODUCTION	 POLICE	 PINWOOD	 technicolor	 wildgen	 UNIVERSITÄT BASEL
 Basler Zeitung	 SCHULSTIFTUNG DER EVANGELISCHEN KIRCHE Berlin-Brandenburg schlesische Oberlausitz	 LNT	 SCHAUENBERG	 IBECO	 PRIME FOCUS	 theeditors postproduction.studio.cologne

# Complete Data Center Product Family

**Solution**



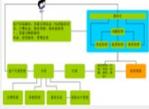
**Cloud Platform**



**FusionAccess**



**Micro DC**



**Server**



**RH1288  
RH2288**



**RH5885**

**Rack server**



**E6000/E9000**

**Blade server**



**X6000**

**Cloud server**



**ES 2000/3000**

**SSD Card**

**Storage**



**N8500**



**N9000**



**S2200T**

**S2600T/S5500T/  
S5600T/S5800T**



**HVS 85T/88T**

**SAN**



**Dorado**

**SSD Storage**



**VTL6900**

**VTL**

**Network & Security**



**CE series switches NE series router**

**Series of network equipment**



**OSN**



**USG2100 USG5100 USG5500 USG9000**

**Series of safety equipment**

**Facilities**



**Modular/Container**

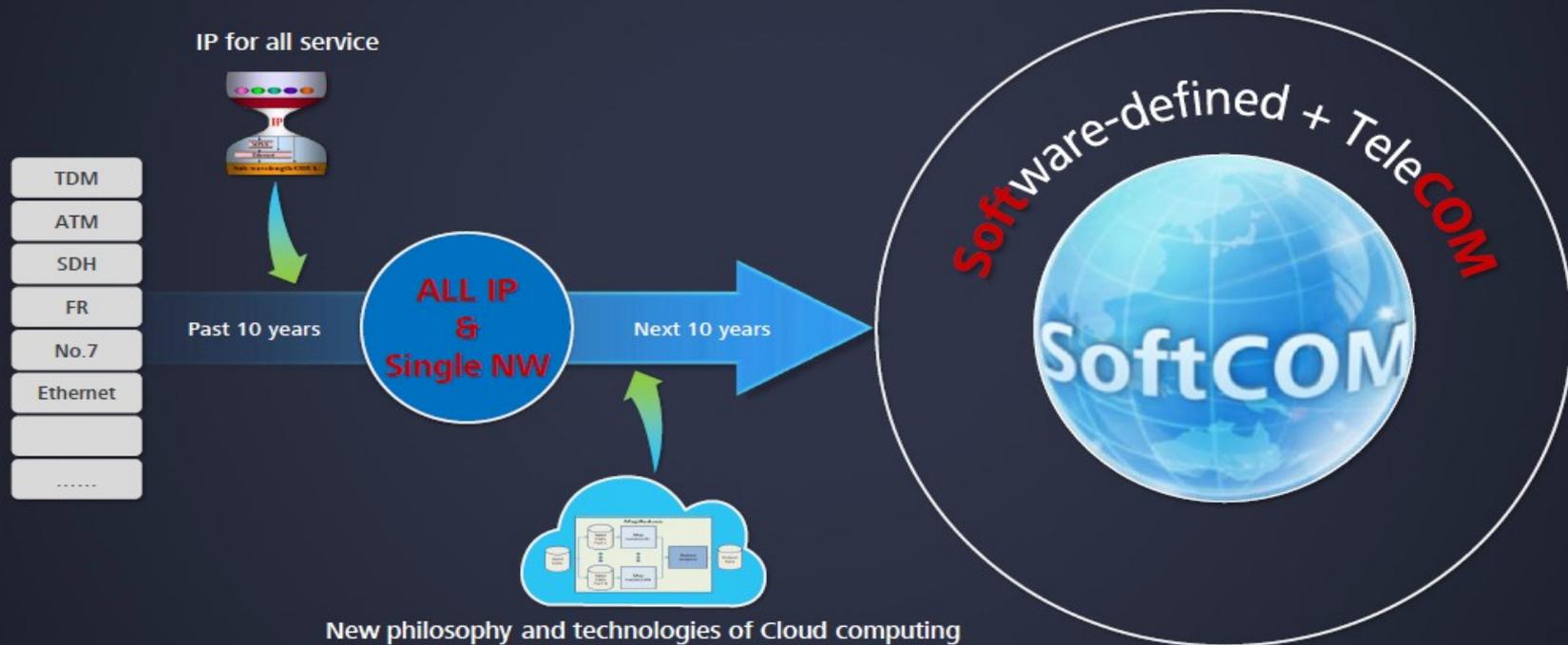


**UPS PDU Air Cooled Water Cooled NetEco®**

**Core product**

**ManageOne eSight (DC BOSS)**

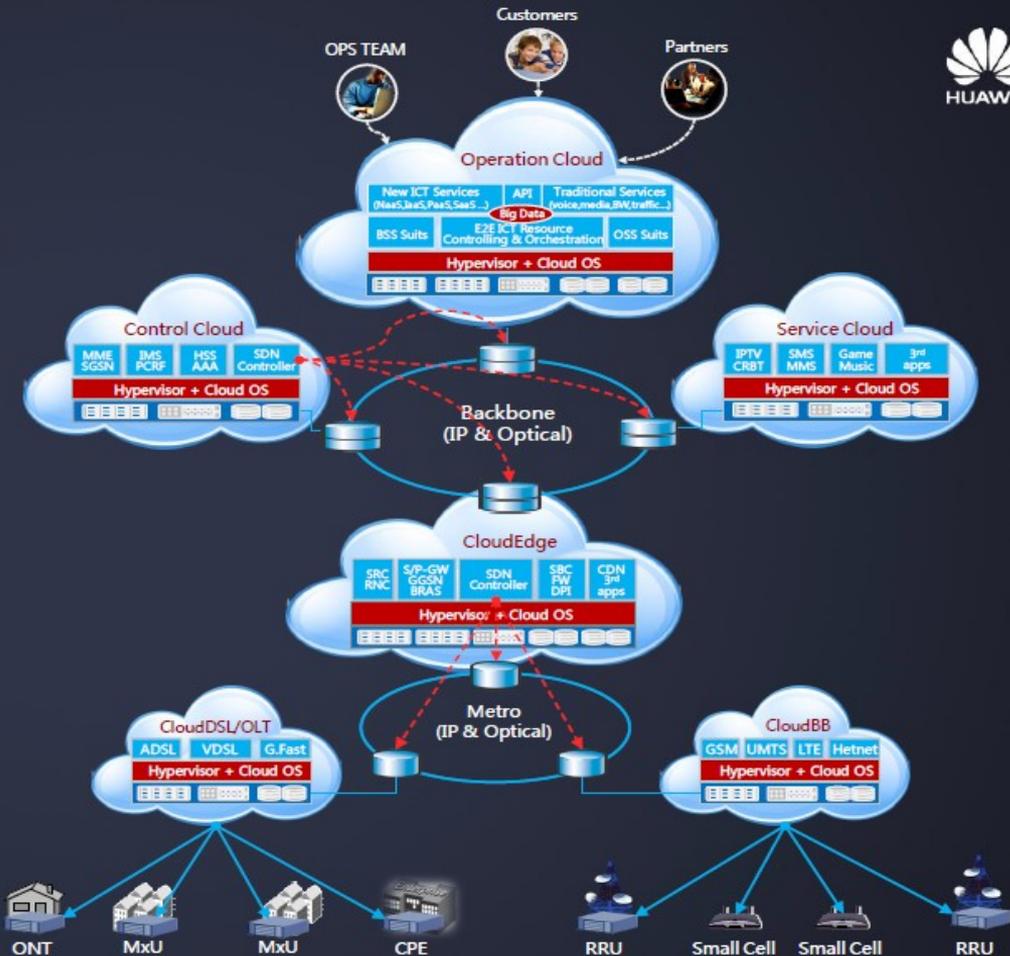
# SoftCOM is the future way of telecom .....



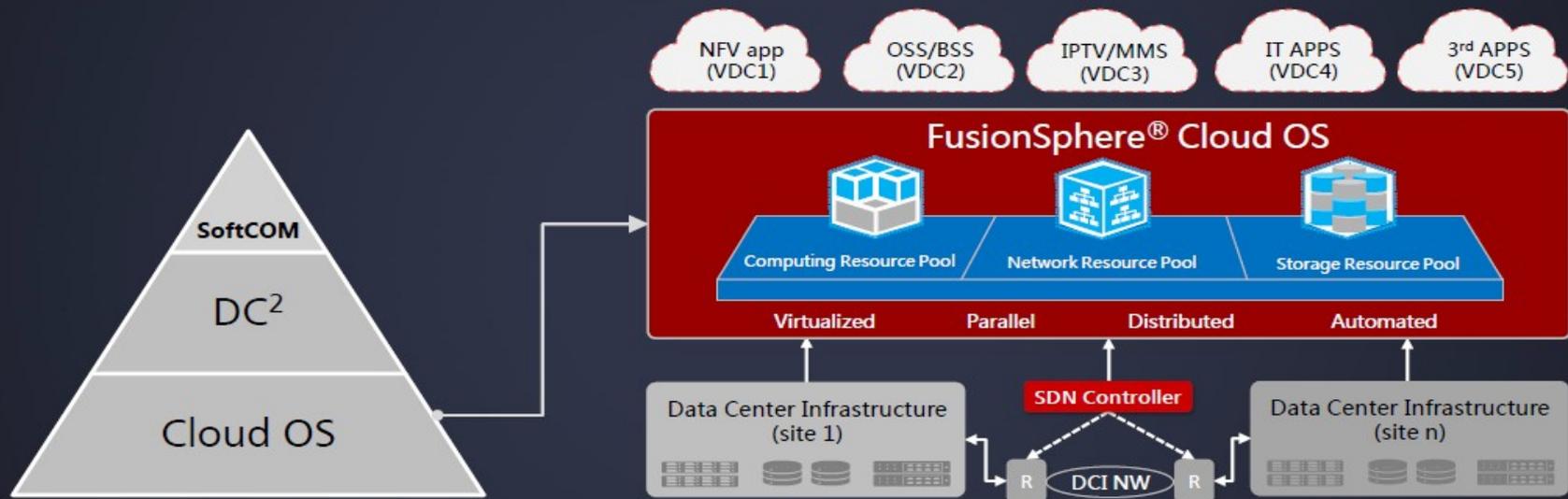
# SoftCOM

— Reconstructing the telecom industry.....

- *Service Reconstructing : beyond connection, E2E ICT service based on cloud model*
- *Network Reconstructing : Software defined network & Network function virtualization*
- *Operation Reconstructing : Internet style operation, all online, on-demand*
- *Architecture Reconstructing : data oriented, Datacenter centric networks*



# Cloud OS is foundation of telecom .....



DC<sup>2</sup> = Distributed Cloud Data Center

- **Openness,**
  - Based on OpenStack arch. ;
- **low latency, Convergence,**
  - IT and NFV convergence app; real-time;
- **Performance,**
  - Scale Out model, auto Scalability ;

# FusionSphere : OpenStack-based .....

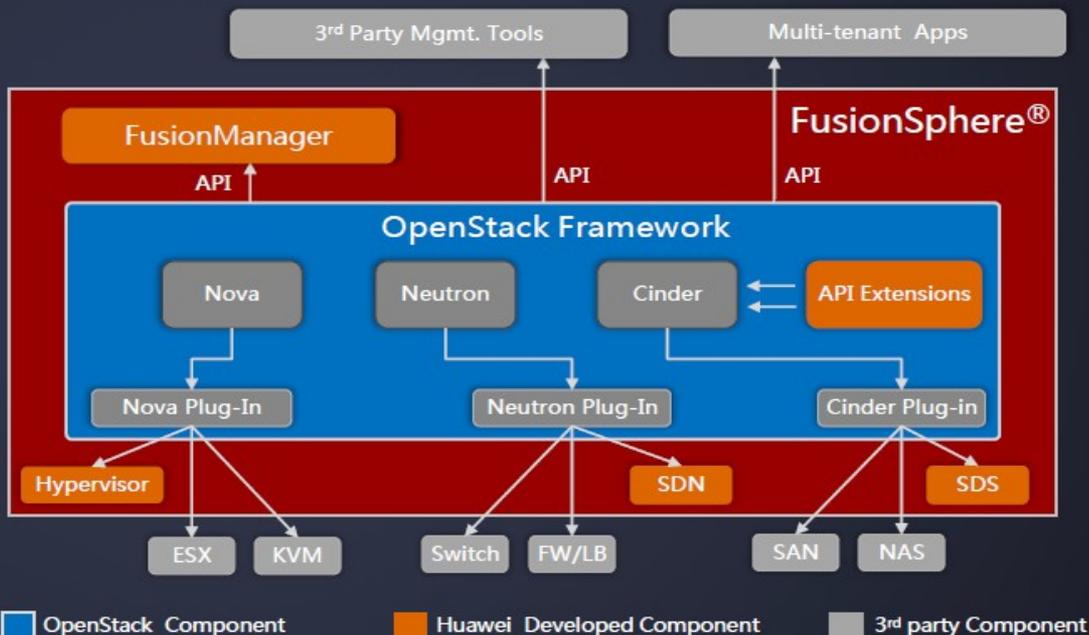
## ● Openness

- Based on OpenStack arch. ;

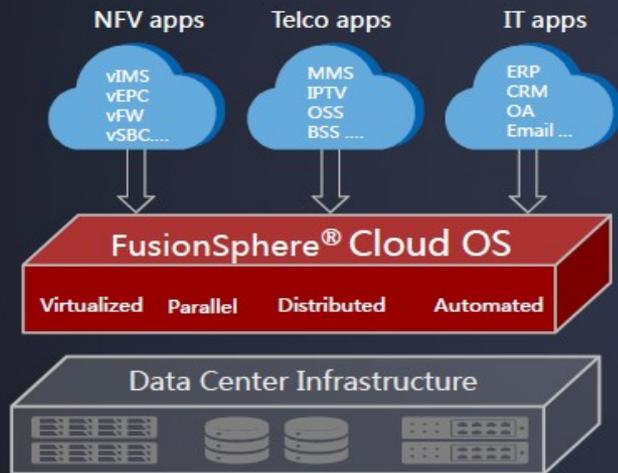
## ● Enhancement

- App. lifecycle management and automation
- Open APIs for telecom service optimization
- Carrier Grade Hypervisor, high performance and high availability
- SDN Overlay & Network Automation
- Ultra large Storage pool and I/O acceleration

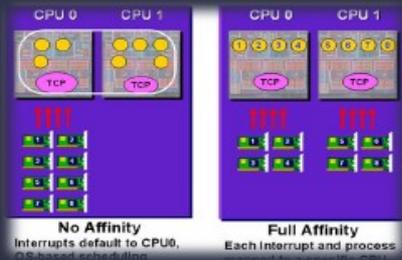
.....



# FusionSphere : Unified platform for ICT Services .....



## The BareMetal OS Model



- **Convergence,**
- IT and NFV app; real-time, low latency;

## ● Optimization for CT

- BareMetal model, Minimize the loss of virtualization;
- Affinity scheduling , Service aware , appropriate hardware to handle appropriate services

.....



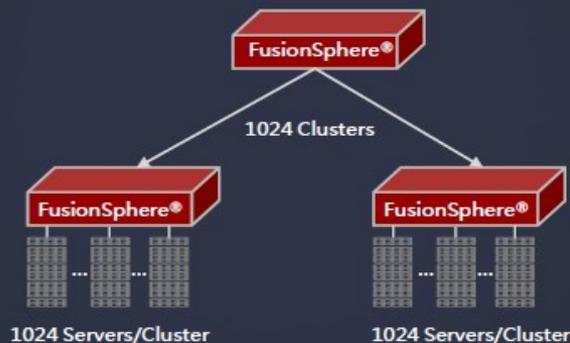
# FusionSphere : High performance .....

Virtualization Performance  
(SPECvirt/CINT Rates)

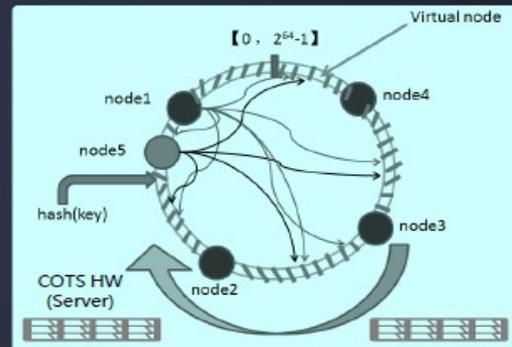


[http://www.spec.org/virt\\_sc2010/results/specvirt\\_sc2010\\_perf.html](http://www.spec.org/virt_sc2010/results/specvirt_sc2010_perf.html)

Two layers distributed Arch.



Full Distributed Storage Arch.



• No.1 Virtualization Performance

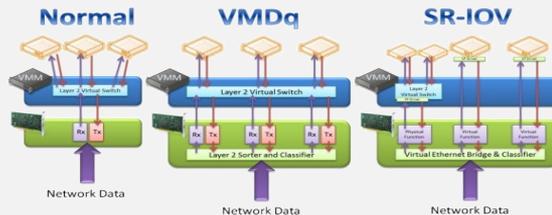
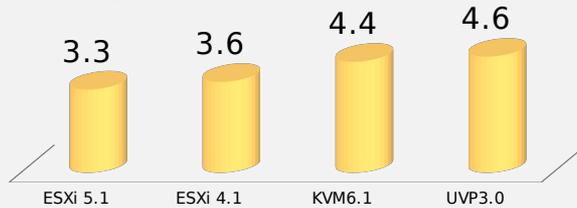
• Million Nodes Scheduling

• Exabyte/ Million Terabyte Storage

# Virtualization: Hardware Functions Implemented Through Software



Virtualization capability of each CPU (SPECvirt/CINT1)



- Computing virtualization must ensure high system reliability.
- Computing virtualization must ensure that hypervisors consume minimal physical resources so that applications have more available resources.
- Storage virtualization must provide better read-write performance than SAN devices.
- Big Data requires massive storage space. Storage virtualization significantly reduces investment in storage devices.
- Network virtualization must eliminate I/O bottlenecks for environments with high VM density, and reduce CPU consumption.
- Security virtualization must ensure that VM security is improved at the system level and provide the same security functions as those from physical security devices.

# Network Virtualization Performance Optimization

Stability &  
Reliability

Leading  
performance

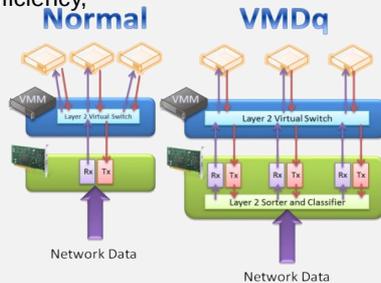
End-to-end  
solution



How can you improve network bandwidth and reduce network delay?  
How can you reduce resource overhead for virtual switching?

## Virtual Machine Device Queues (VMDq)

- Allows a NIC to provide multiple queues to function as the VM NICs for receiving and forwarding packets. This function offloads the packet-processing burden from the hypervisor to hardware, significantly improving I/O processing efficiency.



## Virtual network acceleration

- Implements layer 2 switching for hardware based on VMDq and provides various layer 2 security capabilities.
- Supports VM live migration and HA.
- Provides optimal network performance.



Standard PCI slots:  
2 x10 GE



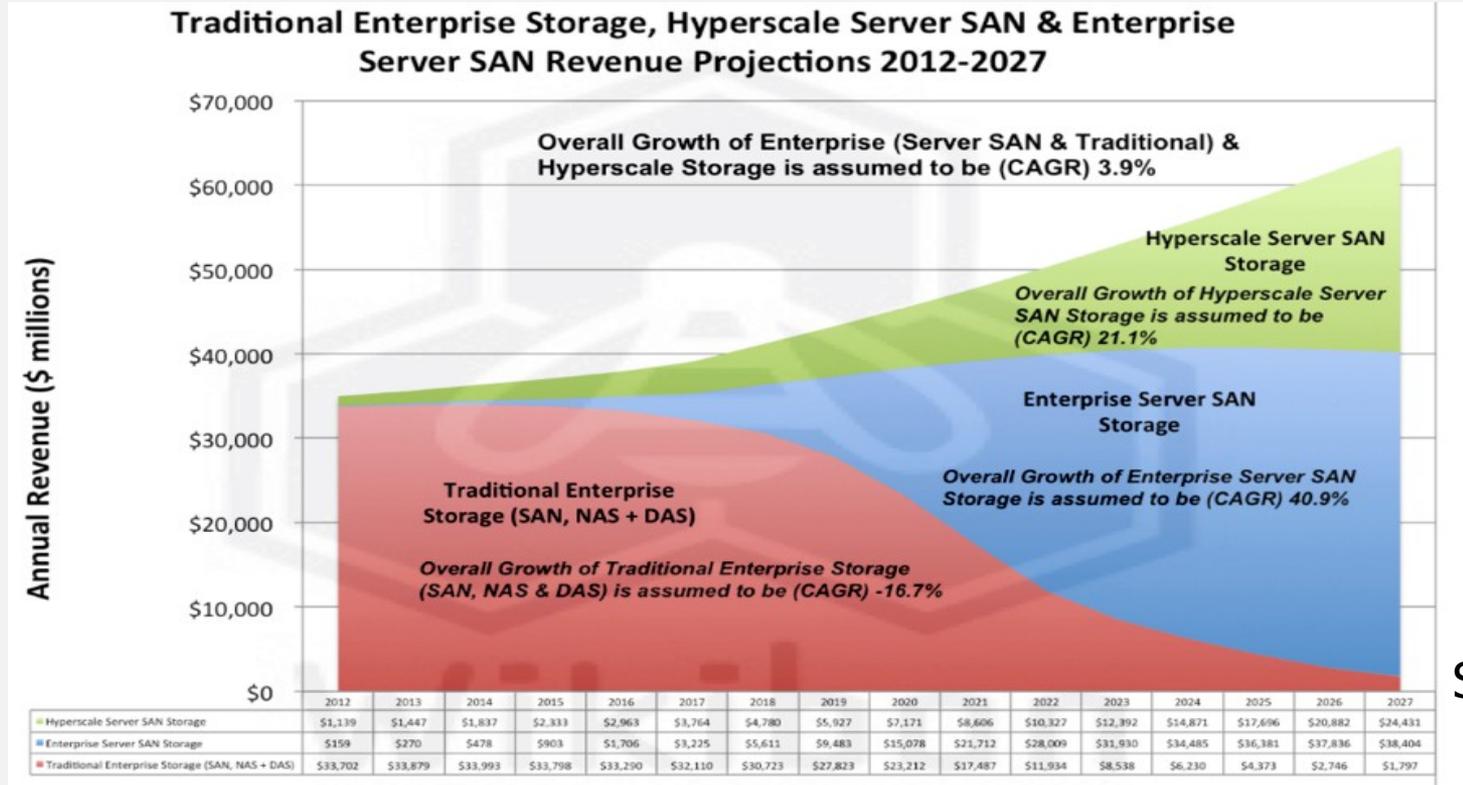
Blade server MEZZ modules:  
2 x 10 GE

## Benefits for customers

VMDq can be enabled to:

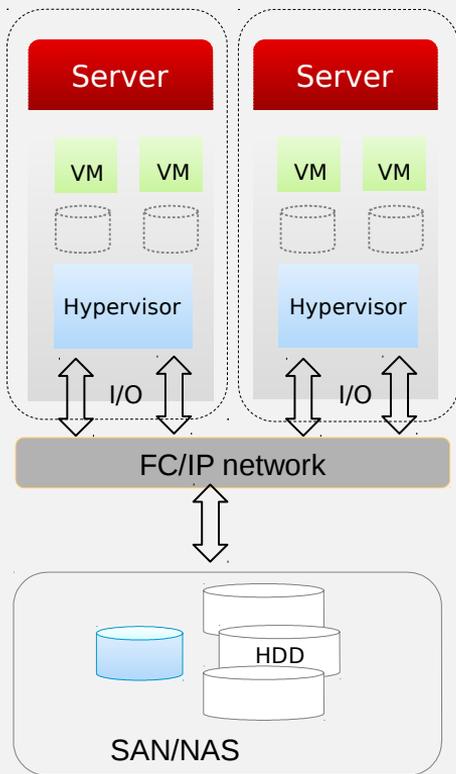
- Lower host CPU overheads by 40%.
- Improve network I/O processing capability by 3 times.
- Increase network bandwidth to 10 GE.
- Reduce server cable connections from 6 to 2.

# Traditional SAN/NAS unable to meet current and future requirements of high performance Hypervisors and virtual machines



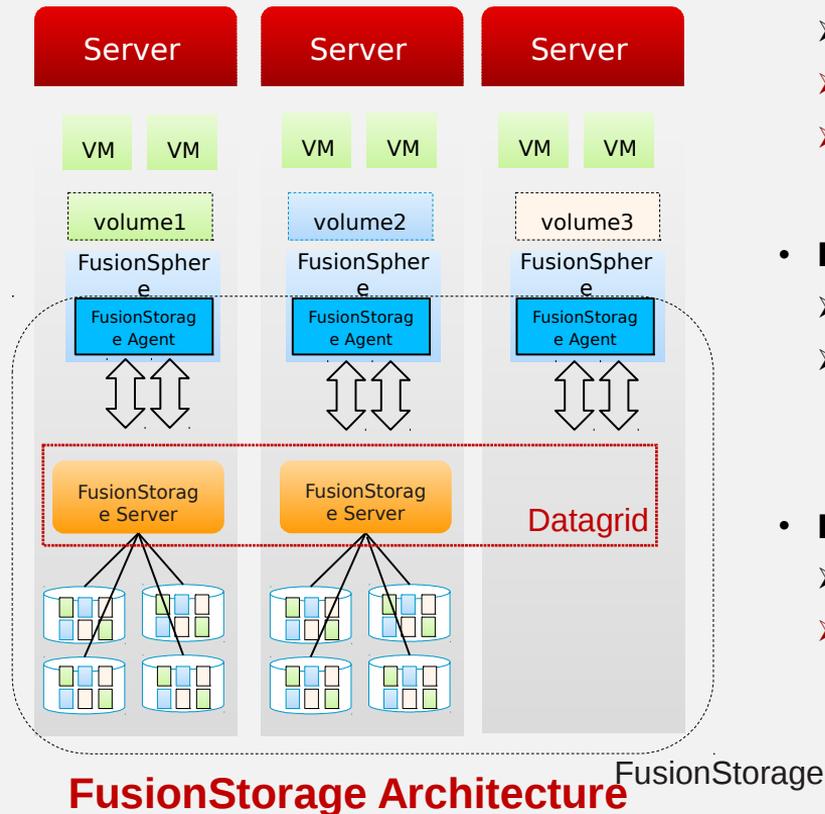
Source WikiBor

# FusionStorage: Distributed Storage Software



## Traditional Architecture

VS



## FusionStorage Architecture

- **High Performance**
  - Parallel I/O
  - **10X** total IO throughput
  - **3-5X IOPS** improvement
- **High Reliability**
  - Replications cross nodes
  - Quick data rebuild (**30min** vs. **12hrs** for 1 TB)
- **High Scalability**
  - Up to 2000 nodes
  - **Linearly scalable** in both capacity and performance

# FusionCube: Converged Infrastructure

Cloud  
Computing

Warehouse  
Acceleration

Critical  
Application

## FusionCube



- Compute, Storage, Network Converged
- Integrated virtualization and cloud management
- HW/SW optimization improves performance
- Preintegrated, Validated, Shipping in one box
- VM templates, application templates

**12U/64** CPUs

Highest computing density in the industry (2-socket)

**15.6** Tbit/s

Midplane bus bandwidth per chassis

**12** TB

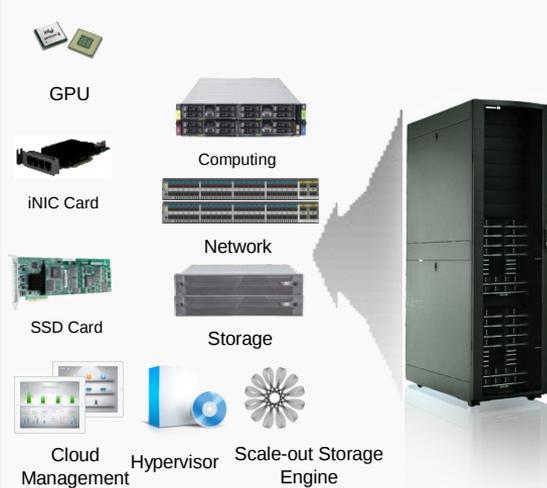
RAM per chassis

**55°C**

NEBS and ETSI Compliance

# FusionCube: In-depth Converged Infrastructure

## FusionCube



- Up to 10 rack, 3XE9000/rack
- 16 blade, 15.6Tbps/E9000
- 15X2.5' HDD/blade
- 4XCPU, 1.5TB RAM /blade

## Agile

- Template-based automated service deployment, **72X** faster
- Business workload intelligent optimization by three-layer (Memory-SSD-DAS) cloud storage, **3X** performance than industry

## Efficient

- 0.21\$/tpmC (laboratory test data), **NO.1** Price/performance ratio \*
- FusionStorage engine, improve **3X~5X** I/O performance

## Simple

- One-click installation, auto-discover and auto-configure; OPEX reduce **30%**
- Hardware/software pre-integrated, **10X~20X** application deploy efficiency than industry

\* [http://www.tpc.org/tpcc/results/tpcc\\_price\\_perf\\_results.asp](http://www.tpc.org/tpcc/results/tpcc_price_perf_results.asp)

# Scale On Demand Smoothly

- **Start from small**
- One chassis - Half configuration with 4 full-width blades



- Up to 8 chassis concatenation **w/o external switches**
- Up to 4096 vCores, 96TB RAM, and 1.9PB Storage



- Scale out with external switches
- **Auto-discover, auto-configure**
- Up to  $20 \times 3 \times 512 = 30,720$  vCores, 240TB RAM and 6PB Storage



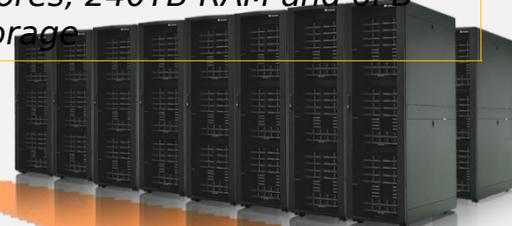
Single Chassis



One Rack with 3 Chassis



Multiple Racks



Up to 20 Racks

# Specifications of E9000

chassis

## chassis



### E9000 chassis

- Adopts the modular design for compute nodes, storage nodes, switch modules, fan modules, and power supply modules
- 12U high chassis, providing 8 full width or 16 half width slots
- Support next 3 generation Intel processors
- Support evolution of next decade network technology

## Computing node

Computing node

CH121



2P,24 DIMMs, 2 HDD, 1 PCIe x8, 2 Mezz PCIe x16

CH140



2\*2P,2\*8 DIMMs, 2\*1 HDD, 2 \*2 Mezz PCIe x16

CH220



2P,24 DIMMs, 2 HDD, 2 Mezz PCIe x16, 4 PCIe x8 FHHL

CH221



2P,24 DIMMs, 2 HDD, 2 Mezz PCIe x16, 2 PCIe x16 FHHL

CH222



2P,24 DIMMs, 15 HDD, 2 Mezz PCIe x16, 1 PCIe x16 FHHL

CH240



4P,48 DIMMs, 8 HDD, 2 Mezz PCIe x16, 1 PCIe x16 FHHL

CH242



4P E7,32 DIMMs, 8 HDD, 2 Mezz PCIe x16, 1 PCIe x16 FHHL

## Switch module

Switch module

CX110



GE switch module

CX116



GE pass-thru module

CX310



10GE converged switch module

CX311



10GE/FCoE converged switch module

CX317



10GE pass-thru module

CX611



QDR/FDR switch module

CX911/CX912



10GE/FC Multiplane switch module

# E9000 Switch Modules

- Enables data center TRILL large layer 2 network construction.
- Supports DCB lossless Ethernet to bear FCoE and iSCSI.
- Supports a converged network, virtual paths, and flexible Ethernet and FC configuration.



**CX110  
GE switch  
module**

32 x GE downlink  
ports  
12 x GE + 4 x  
10GE uplink ports



**CX116  
GE pass  
through  
module**

32 x GE downlink  
ports  
32 x GE uplink ports



**CX310, CX311  
10GE/FCoE  
converged switch  
module**

Supports DCB, and  
TRILL  
32 x 10GE downlink ports,  
16 x 10GE + 8 x 10GE/8 x  
8GE FC uplink ports



**CX610  
InfiniBand switch  
module**

16 x QDR/FDR  
downlink ports  
18 x QDR/FDR  
uplink ports



**C317  
10GE pass  
through  
module**

32 x 10GE  
downlink ports  
32 x 10GE  
uplink ports



**CX911  
10GE/FC switch  
module**

32 x 10GE/16 FC  
downlink ports  
16 x 10GE + 8 x  
10GE/8 x 8G FC uplink  
ports



## **HUAWEI ENTERPRISE ICT SOLUTIONS **A BETTER WAY****

**Copyright©2012 Huawei Technologies Co., Ltd. All Rights Reserved.**

The information in this document may contain predictive statements including, without limitation, statements regarding the future financial and operating results, future product portfolio, new technology, etc. There are a number of factors that could cause actual results and developments to differ materially from those expressed or implied in the predictive statements. Therefore, such information is provided for reference purpose only and constitutes neither an offer nor an acceptance. Huawei may change the information at any time without notice.