Optimal Desktop Experience, Agile and Efficient Office
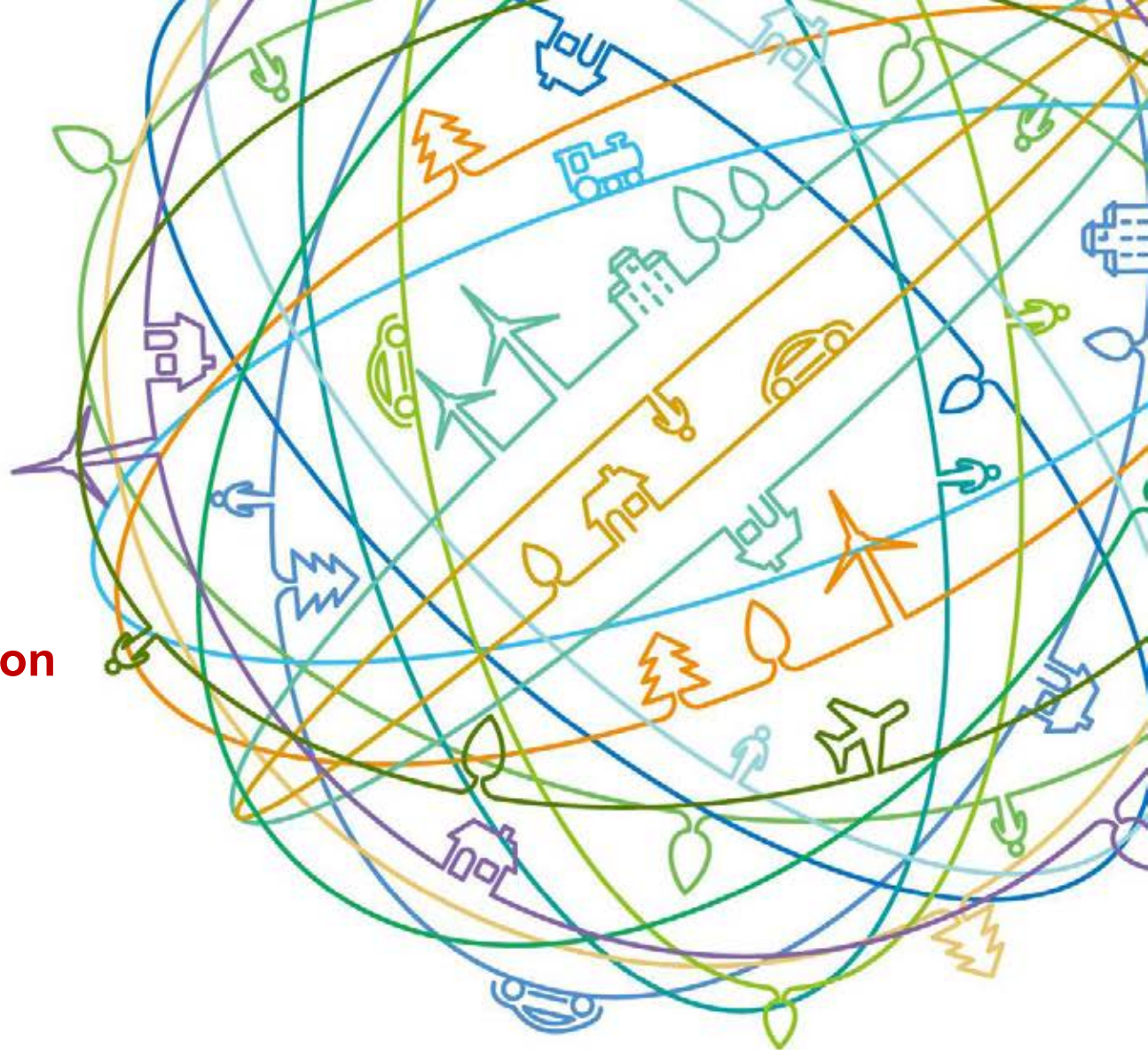
——Huawei FusionCloud Desktop Solution

Gus O'Brien
Principal Architect
Huawei

Huawei at a Glance

228
Ranking in the Fortune Global 500

~170,000
Employees

170+
Countries

A Global Leader of ICT Solutions

76,000
R&D employees

31
Joint innovation centers

16
R&D centers

HUAWEI

Joint innovation with open and collaboration

More than 500 business partners

100+ standard & Technology organizations

Huawei in Australia

585+ employees and
92.3 %
are recruited locally

HQ in Sydney

3 regional offices
Melbourne,
Brisbane & Perth

$428 million
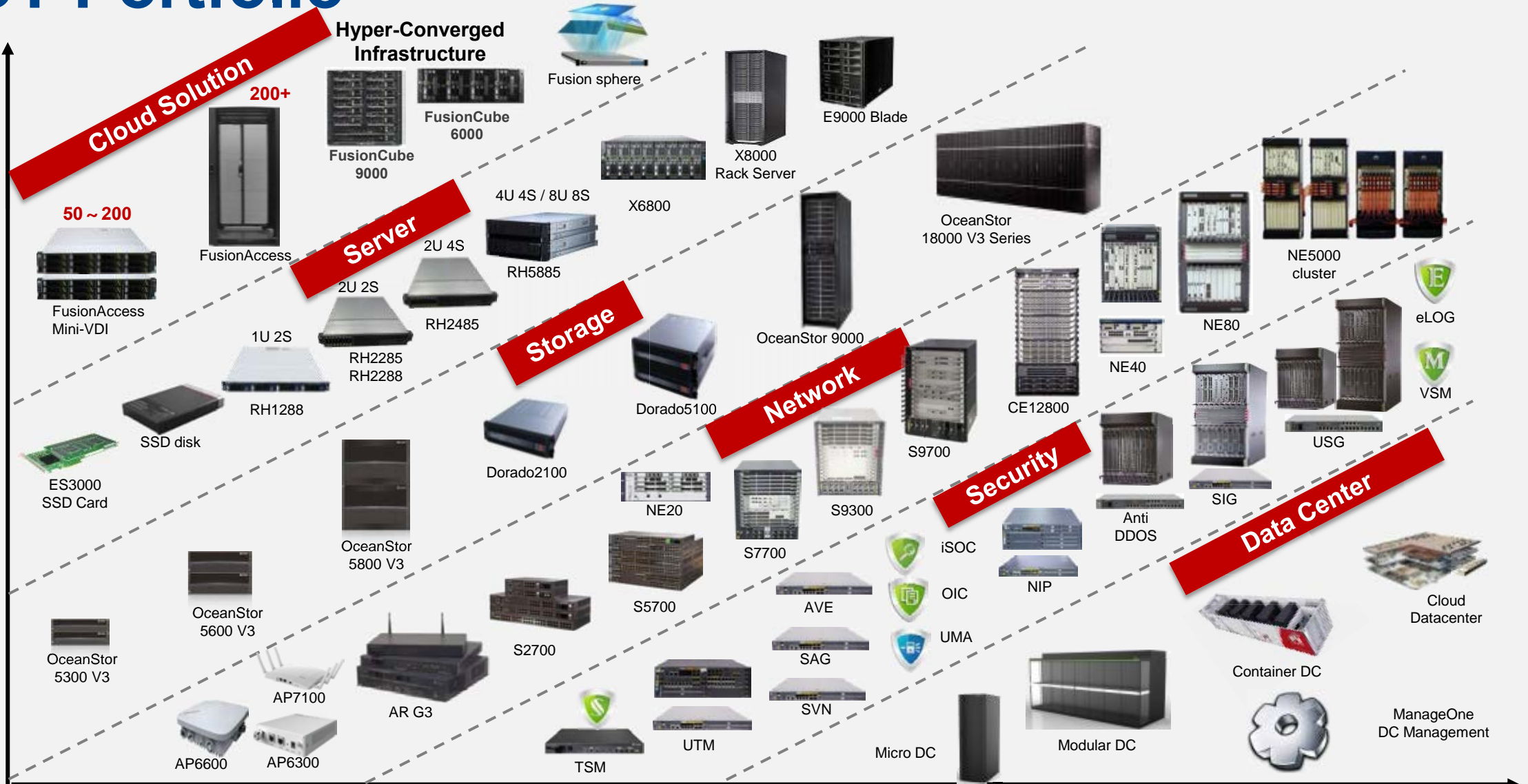2014 Sales Revenue
16.4%
Increase YoY

Carrier — 'yes' OPTUS · vodafone · Telstra · TPG · iinet connect better

Edu — Southern Cross University · THE UNIVERSITY OF MELBOURNE · RMIT UNIVERSITY · DEAKIN UNIVERSITY AUSTRALIA

Mining — FMG Fortescue The New Force in Iron Ore · chinova resources · GVK · bhpbilliton

Power — Powerlink

Transport — Transport Sydney Trains · UGL

Health — Ambulance Service of New South Wales

MSP — Empired · ASWIG solutions · icita

Others — SOUTHERN CROSS AUSTEREO First in Entertainment Media Solutions · Hallmarc Limited · aarnet Australia's Academic and Research Network

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ICT Portfolio

Cloud Solution

Hyper-Converged Infrastructure

Fusion sphere

200+

FusionCube 9000

FusionCube 6000

FusionAccess

50 ~ 200

FusionAccess Mini-VDI

Server

2U 4S

2U 2S

4U 4S / 8U 8S

RH5885

X6800

X8000 Rack Server

E9000 Blade

OceanStor 18000 V3 Series

1U 2S

RH2485

RH2285 RH2288

Storage

RH1288

SSD disk

ES3000 SSD Card

Dorado5100

Dorado2100

OceanStor 9000

Network

OceanStor 5800 V3

NE20

S7700

S9300

S9700

CE12800

NE40

NE80

NE5000 cluster

eLOG

VSM

USG

SIG

Security

Anti DDOS

Data Center

OceanStor 5600 V3

S5700

AVE

iSOC

OIC

NIP

UMA

SAG

OceanStor 5300 V3

AP7100

S2700

AR G3

SVN

UTM

TSM

Micro DC

Modular DC

Cloud Datacenter

Container DC

ManageOne DC Management

AP6600

AP6300

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Trend

ICT Development Trend

Customer Requirements for Desktop Cloud

How is ICT being applied to Education

Stages of ICT Usage

Becoming Aware of ICT
(Trained Teachers & Support Staff)

Emerging

Supporting Work Performance i.e. School & Teaching Management

Learning How to Use ICT

Applying

Enhancing Traditional Teaching i.e. Adapt the Curriculum to incorporate ICT / "Online Knowledge"

Understand How and When to Use ICT

Infusing

Facilitate Learning i.e. Embedding ICT into the Curriculum

Specializing in the Use of ICT

Transforming

Creative Innovation Open Learning Environments i.e. Personalized, MOOCs

Student Centric

Pedagogical Usages of ICT

| Approach 1 | Approach 2 | Approach 3 | Approach 4 |

Teacher Centric

Source: UNESCO Modeling ICT Development in Education

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Examples of ICT Transforming Education

Immediately Research / Access to Knowledge

Students search the Internet and Online eLibrary for class projects

Collaboration & Virtualization

Network
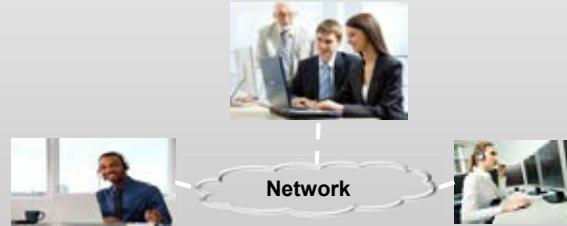
Teachers & Students work together in a virtualized community

Open Online Education

Self paced Distance Learning – Tutorials & Courseware, Q&A with Teachers, Examinations

Access to Knowledge and Course Material Multiple Channels

Smart Mobile Device

PC / Laptop

Distance Education

Remote Education and Virtual Classrooms

Self Defined Learning

Student defines a learning plan and follows the plan themselves via multiple learning resources

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Customer Requirements for Virtual Desktops

User experience

How to provide user experience the same as or better than that provided by conventional PCs.

O&M

How to quickly respond to user requests and rectify faults?

How to ensure system reliability, and security in terms of data, access, transmission, and O&M?

Security and reliability

- How to implement rapid delivery?
- How to implement flexible deployment and expansion?

Delivery and deployment

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2 Solution

Typical Scenarios

Huawei Solutions

Huawei FusionCloud Desktop Solution Architecture

User side

Data center

TCs

CT3100

CT5100

CT6100

S-Box8V40

FusionAccess desktop management software

Login page WI | **Connection control HDC** | **User information DB**

VM
Microsoft Windows XP / Windows 7

Graphics processing VM
nVIDIA

Application Virtualization /Shared desktop

Cloud platform software

FusionSphere Cloud OS

FusionCompute | **FusionStorage** | **FusionNetwork**

Hardware

RH2288H | FusionCube 6000 | E9000 | 5300/5500 V3

Unified management system FusionManager

ITA service management

VRM virtual resource management

UHM unified hardware management

End-to-end solutions optimize and consolidate resources to ensure comprehensive performance and user experience.

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Excellent Experience: Using the New Desktop Control Protocol HDP

Optimal Experience	Agility and Efficiency	System Reliability

Excellent experience: 32-bit true color display, high resolution of 2560*1600, better multimedia experience, and automatic reconnection upon disconnection

Enhanced security: SSL encryption, third-party security gateway, USB key authentication, protocol port dynamic allocation and switchover, and desktop system software protection

High efficiency: Users can easily manage VMs by themselves.

HDP protocol: Voice quality PESQ exceeds 3.4 and is the highest in the industry. Source voice is accurately restored

HDP

Server (VM)

USB Tunnel
Display Tunnel
Audio Tunnel
Management Tunnel
Media Tunnel
Mouse Client
Other ……

Client (TC)
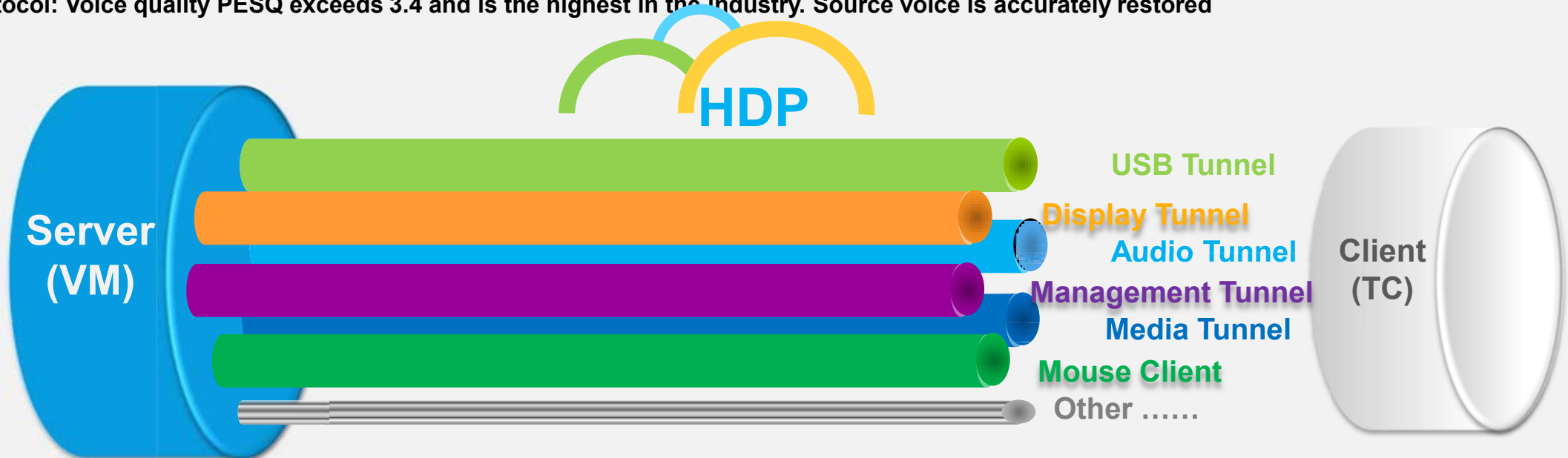
Thirty-two virtual channels that bear various upper-layer application protocols ensure communications security and support QoS priority settings.

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Display Experience: HD Display Quality

HDP display quality

VDI display quality

Key technology HDP@Display

- Lossless compression for non-nature pictures: **Automatically identifies** the non-nature pictures such as text, Windows figures, and lines in pictures, and implements **lossless compression** for them. Nature pictures, such as photos and images, are compresses at an appropriate rate.
- Does not repeatedly transmit same image data: **Automatically identifies** the unchanged data in an image, and transmits only the changed image data, which greatly reduces the bandwidth consumption.
- Multiple image compression algorithms: Uses **the optimal compression algorithm.**

PSNR of non-nature pictures is higher than 50000 dB, and SSIM is 0.999955, which is nearly lossless

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Efficient OA and O&M, High Resource Utilization
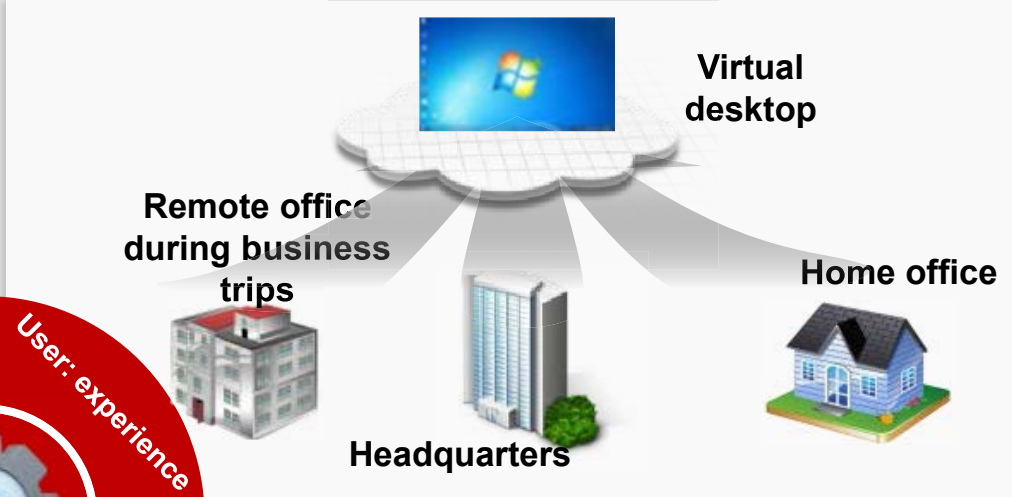
Optimal Experience | **Agility and Efficiency** | System Reliability

Simple installation and unified O&M

Unified physical/virtual resource management

Desktop cloud service and unified fault management

Simplified installation package and optimized installation process

Preinstallation and quick delivery for the all-in-one appliance

FusionManager

Mobile OA

Virtual desktop

Remote office during business trips

Home office

Headquarters

Administrator: high efficiency | User: experience | Administrator: high efficiency | Decision-maker: costs

Automatic O&M management tool

Software/Peripheral compatibility test tool

Health check and log collection tool

Connection repair tool

User experience optimization tool

One-click restoration tool

Performance collection and analysis tool

Self-service maintenance tool

High resource utilization
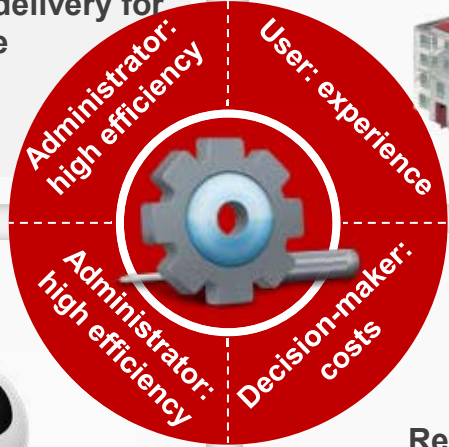
Resource over commitment

Storage thin provisioning

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All-round Reliability

Client connection

Network

Automatic reconnection after network interruption

Network status **automatic detection**

VM service reliability

Desktop protocol **supports port auto-negotiation** to resolve application software conflicts.

Desktop agent software **prevents inadvertent deletion.**
Desktop agent software **prevents inadvertent virus deletion.**

Distributed data Consistency check

Terminal

Content

Platform

Management

Platform reliability

Key component **HA resources reserved** in case of physical faults.

Local access at branch offices in case of network interruption.

Automatic clock synchronization
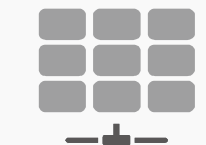
Node memory and CPU management, and automatic hard disk status monitoring

VM management reliability

Automatic VM restart in case of blue screens

VM snapshot In case of VM faults.

Service layer status monitoring, **automatic fault handling & automatic fault isolation**

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Cloud Workstation@GPU Hardware Virtualization

FusionAccess

| NVIDIA Driver | VM | ... | NVIDIA Driver | VM |

FusionSphere

vGPU Manager

NVIDIA GRID K1/K2

vGPU ... vGPU

Physical GPU

vGPU ... vGPU

Physical GPU
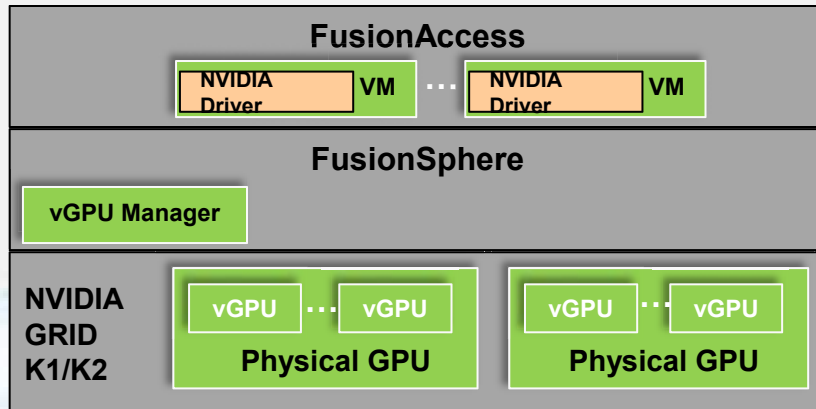
Up to **32** cloud graphics workstations / graphics card

Compatible with the latest DirectX, OpenGL standard 3D applications

Huawei Desktop Protocol (HDP): **low-latency** remote display

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TVTC in Saudi Arabia Builds an Efficient Multimedia Teaching Platform with the Aid of Huawei

Challenges

- The existing IT infrastructure is too old. When voice software is used to make calls, **latency** is serious. It cannot meet the customer's requirements on high-definition videos.

- The customer does not have a **unified, simple, and centralized system** to manage many branches. Excellent training materials cannot be quickly pushed to branches. It is difficult for unified deployment.

Huawei Solution

- Provide FusionCloud desktop cloud solution:

- Solve the problem of HD video playing using Huawei high definition video encoding desktop cloud terminal **CT5000**. By providing an improved IT desktop solution, the problem of **voice software latency is resolved**.

- Use **FusionManager** to perform unified and centralized management and solve the problem of pushing training materials.

Customer Benefits

- Service **140+** technical institutes nationwide. Unified management through **FusionManager**. The efficiency can be improved by over **10 times**.

- **Centralized** deployment of training materials and one button push.

- **Advanced video** experience and support for high definition interaction teaching.

"One of the essential objects for TVTC is to promote educational plans and make the best use of innovative technologies. Huawei's work help us with this object, by building a new platform. We are enabled to promote a series of educational projects and prepare our students for the future."

—TVTC manager, Doctor Ali bin Nasser Al-Ghafis

Philippine APC University Develops Education Clouds with the Aid of Huawei

Huawei desktop cloud has greatly supported the teaching and management work in APC University. The students like to use remote access for learning. The project is a great welcome in our students and the cloud computing courses are also popular. We look forward to more cooperation with Huawei in cloud computing."

Challenges

- **Maintenance is** inefficient. Patches have to be installed for over **700 computers**, which contains a lot of work. What's worse, the students often install games and software randomly, making the computers vulnerable to **viruses**. It generally takes **2 to 4 hours** to repair a computer fault.

- As Computer and Information Science is a major discipline for APC University, new courses need to be added to increase competitiveness and reputation of the University, to attract more students.

- **Remote teaching** is needed to reduce student cost.

Huawei Solution

- Huawei proposes its desktop cloud solution for the Asia Pacific College (APC) to build PC labs **in pool mode**. In this mode, students access virtual desktops that are managed by time-sharing with fast response. It can also meet the **management and control** requirements of related departments.

- Gradually migrate education applications such as Moodle and DB2 to the cloud platform to **increase resource utilization** rate.

Customer Benefits

- **Unified management** for teaching software of electric rooms. Students are **restricted** to install software and games on the PCs. The maintenance efficiency is improved by over **80%**.

- **Remote teaching** enables students to access school desktops for learning and online examination. This **reduces the class hours** for classroom teaching and **lowers the costs** of students.

- In combination with the cloud platform for online utilization, **build advanced and special cloud computing courses**, which gain wide popularity in the industry.

Northumberland College Constructs Electronic Classrooms with Optimal User Experience with Huawei Desktop Cloud Solution

Northumberland College, founded in 1957, is a college of extended education located in Northumberland, Britain. Northumberland College has eight campuses and provides a series of extended education and high education courses covering a wide range of study area. Moreover, Northumberland College also provides apprentice courses and professional training sessions.

Challenges

- Northumberland College has **several campuses in four areas**, which must be covered by the desktop cloud system.

- Unified **O&M** is required for all virtual desktops in various campuses to **reduce O&M costs**.

- User experience must be ensured during use of electronic classrooms.

Huawei Solution

- The **local deployment solution** is adopted for various branches. Computing and storage resources are deployed locally allowing for local access. In this way, **user experience of local users** is ensured even upon remote network faults.

- The management system is centrally deployed so that all branches are managed in a centralized manner to **decrease O&M costs**.

- The **link clone technology** is adopted to implement standard and batch management of electronic classroom desktops, fast restore the initial desktop environment, and **increase management efficiency.**

Customer Benefits

- Unified O&M is achieved, greatly **decreasing O&M costs**.

- Resources are deployed locally with no interference from the backbone network, bringing **best user experience.**

Huawei Desktop Cloud Eliminates Bottlenecks in Virtual Desktop Development

Optimal User Experience

- PESQ higher than 3.4, **and 1080p** video experience
- GPU virtualization allowing up to 32 cloud graphics workstations per graphics card
- Consistent experience in mobile office scenario and differentiated services for VIP desktops

User

Administrator

Agile and Efficient

- Software pre-installation and rapid delivery
- Unified O&M platform and eight maintenance-assistant tools improve serviceability.
- Application virtualization quickly delivers applications.
- Quick adaption to peripherals

Decision-maker

Secure, Reliable, Flexible

- Standard reference architecture and integrated hardware and software delivery allow flexible deployment.
- E2E security protection covers access, platform, network, management, and data.
- Comprehensive reliability protection from terminal connections to platform services.

Cost-effective enterprise virtual desktop architecture ensures optimal user experience

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