Enabling the software-defined data center

Steve Oakley
Enterprise Solutions Consultant - Dell
September 2015
### Change: The only constant

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2014</th>
<th>The future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet users worldwide</td>
<td>25%</td>
<td>40%</td>
<td>??</td>
</tr>
<tr>
<td>Tweets per day</td>
<td>2.5M</td>
<td>500M</td>
<td>??</td>
</tr>
<tr>
<td>Size of the digital universe</td>
<td>800K PETABYTES</td>
<td>4400K PETABYTES</td>
<td>??</td>
</tr>
</tbody>
</table>

**2009**
- 25% Internet users worldwide
- 2.5M Tweets per day
- 800K PETABYTES

**2014**
- 40% Internet users worldwide
- 500M Tweets per day
- 4400K PETABYTES

**The future**
- ?? Internet users worldwide
- ?? Tweets per day
- ?? PETABYTES
The CIO paradigm

**Business priorities**
- Deliver business results to shareholders
- Improve customer satisfaction & innovate
- Cut/maintain costs
- Keep us competitive
- Improve employee productivity

**Technology priorities**
- "Keeping the lights on"
  - Manage current workloads
  - Application rationalization
  - HW updates & migrations
  - Reduce costs
  - Protect our data
- "Accelerating the business"
  - Optimize workloads
  - Software-defined X
  - Utilize new IT benchmarks
  - Deliver ubiquitous mobility
  - Implement cloud computing

Software Defined Data Center
Which approach gives you **better results**?

### New proprietary solutions
- Closed management stack
- Limited interoperability
- Lock-in penalty

### Legacy systems
- Complex and monolithic
- High cost-per-transaction
- Proprietary to one vendor

### Commodity systems
- Hardware with no value added
- Technology transition issues
- Limited vendor support

### The Future-Ready Enterprise
- Rapid time to value
- Superior ease of use
- Unrivaled flexibility to adapt

Software Defined Data Center
Now you can **synthesize** traditional and new IT

- **Traditional IT**
  - Support traditional IT applications and architectures with efficient and scalable virtualization-based cloud solutions

- **New IT**
  - Support new IT applications and architectures with efficient, scale-out, hyperscale-inspired cloud solutions

**Future-Ready IT**

A common compute-centric, software-driven platform for traditional and new
Shift your focus from infrastructure to service

IT silos

Management

Server
Storage
Networking
Software

Enterprise applications & workloads

Orchestration stack
Infrastructure control

Open standards-based hardware

Multi-vendor, cross-platform unified management

Management
**SDDC delivers needed agility and efficiency**

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Hardware-defined (HDDC)</th>
<th>Software-defined (SDDC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Innovation</strong></td>
<td><strong>Slow</strong>&lt;br&gt;Long hardware/ASIC cycles</td>
<td><strong>Fast</strong>&lt;br&gt;Rapid software innovation</td>
</tr>
<tr>
<td><strong>Flexibility</strong></td>
<td><strong>No</strong>&lt;br&gt;Lock-in</td>
<td><strong>Yes</strong>&lt;br&gt;Choice of infrastructure</td>
</tr>
<tr>
<td><strong>Ease of insertion/deployment</strong></td>
<td><strong>Low</strong>&lt;br&gt;Requires forklift upgrade</td>
<td><strong>High</strong>&lt;br&gt;Non-disruptive</td>
</tr>
</tbody>
</table>

Software Defined Data Center
Evolution strategy
Embrace your legacy, control your destiny

IT Evolution

Future-Ready IT Design Tenets

- **Integrated**
  Built on open standards, making it quicker and easier to adapt

- **Modular**
  Cost-effectively scales up, down, or out as needed

- **Automated**
  Simplifies IT operations and service delivery

Best-of-breed systems

System of systems

Software-defined networking

Software-defined storage

Server-centric, software-defined systems

Software-defined | Hardware-accelerated | Standards-driven
Enabling the **unified** data center

- **IT services**
  - Private cloud
  - Enterprise applications
  - Desktop virtualization

- **IT services ecosystem**
  - Dell Software
  - 3rd Party

- **Automation engine**
  - Active System Manager

- **Integrated infrastructure**
  - Virtualization
    - Server
    - Storage
    - Networking
    - Converged

Software Defined Data Center
The building blocks

Software-defined storage

Software-defined networking
Enabling the **Future Ready Enterprise**

Workload ready + virtual infrastructure ready + software-defined & cloud ready

Software-Defined Computing

- **Software-Defined Storage**
- **Software-Defined Networking**

Software Defined Data Center
The future of SDS is **flexible**
SDS Series
Software-defined storage is an emerging paradigm

Technology that decouples the basic elements of a storage system

Multiple Implementations
- Hyper Converged
- Physical Appliance
- Software-only
- Virtual Appliance
Evolve storage

Hypervisor-based
Vmware, Microsoft, Open Stack
Fluid Cache for SAN
Software-defined storage
X86 Based
New paradigm

Performance-Intensive

Software Defined Data Center
Choose your software-defined networking approach

Open standards +
Open protocols +
Open source =
Open IT with **choices**

Overlay /Hypervisor Solutions
Vmware, Microsoft, Open Stack

Open Networking
Dell Networking

Software-Defined Networks

Programmable Solutions
TCL, Perl & Python scripting
REST-API, XML, OMI, Puppet, Chef

Controller Solutions
SDN Controllers
Open Standards, Open Source

Overlay/Hypervisor Solutions

Open Networking
Dell Networking

Software-Defined Networks

Programmable Solutions
TCL, Perl & Python scripting
REST-API, XML, OMI, Puppet, Chef

Controller Solutions
SDN Controllers
Open Standards, Open Source

Open Networking
Dell Networking

Software-Defined Networks

Programmable Solutions
TCL, Perl & Python scripting
REST-API, XML, OMI, Puppet, Chef

Controller Solutions
SDN Controllers
Open Standards, Open Source

Overlay/Hypervisor Solutions
Vmware, Microsoft, Open Stack
The future of SDN is **Open**

**Traditional approach**
- Proprietary architectures & mgmt tools
- Hundreds of protocols
- Proprietary OS (e.g., Cisco IOS, Jun OS)
- Proprietary ASICs

**Open Networking**
- Standard orchestration and automation tools
- Optional 3rd party SDN / NVO controller
- Any OS
- Open standard hardware
- Merchant silicon

**Dell**

**Global services & support**

Software Defined Data Center
Software-Defined Networking in the data center
Powered by Open Networking, choice + innovation

Dell Software-Defined Networking

Operating System Solutions
Disaggregating operating system software from hardware
- Cumulus Networks
- Dell
- IPinfusion
- Pluribus Networks

Hypervisor/NVO Solutions
Disaggregating virtual networking from physical networking
- VMware
- OpenStack
- Microsoft
- Nuage Networks
- Midokura

Control Plane Solutions
Disaggregating network control from forwarding plane
- Big Switch Networks
- NEC
- Open Daylight

Dell Open Networking
Disaggregating networking technologies to maximize capability and choice

Software Defined Data Center
Dell Networking data center strategic framework
Open Networking: choice & innovation

Application/Cloud environment
NVO/Controller software
Open system software
Standards-based hardware
Merchant silicon

Dell Networking Software
Dell M-Series, FN-Series
S-Series, Z-Series

vmware
Microsoft
openstack
Docker
Chef
Puppet

Plus open ecosystem for OS and L4-7 services
Dell PowerEdge servers and converged systems

Automation & Programmability
Management & Orchestration
Monitoring

Integrated solutions
for SMB & mid-market

Disaggregated solutions
for large enterprise & carriers

Software Defined Data Center
Enabling SDDC in your data center

1. Prioritize SDDC plans
   Watch for business needs that require flexibility, “carving out” of resources, and rapid, dynamic response

2. Maintain agility
   Stay open so you can leverage the technology you want, when you want

3. Choose the right partner
   Ensure your solution provider is committed to your needs, so when challenges arise, your outcome is assured
Thank you