The Amdocs Open Network

Evolve into a service driven network

Oren Marmur
Head of NFV, Amdocs Open Network
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Agenda

• Evolution of the Amdocs Network Offering
• How are service provider networks evolving?
• The Service Driven Network
• The Open Network Ecosystem
• The road to 5G
• Amdocs Open Network – why will we win?
Building our network offering since 2006

- AT&T
  - Small cell rollout

- Telstra
  - Order Orchestration On AWS

- Bell
  - ONAP

- Comcast
  - SD-WAN

- Vodafone
  - VoLTE Quality

- Netlink
  - Fiber Rollout

- TELUS
  - QoE Management

- ECOMP/ONAP

- Small cell rollout

- Inventory centric solutions

- OSS fulfillment solutions

- Order delivery orchestration

- Virtual PCRF

- Network optimization & SON

- Amdocs NFV powered by ECOMP/ONAP

- Autonomous Service assurance

- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
Amdocs network offering
Driving the network evolution

HYBRID NETWORK OPERATIONS
Continued investments in network upgrades – $82B in 2019 for global network infrastructure

Harmonize operations such across hybrid physical and virtual networks

VIRTUAL NETWORK EXPANSION
NFV market continues to grow at a 36% CAGR

Accelerate service agility, innovation and time to delivery through virtualization and orchestration

AUTONOMOUS OPERATIONS
Significant pressure on OPEX reduction due to 1-2% top-line revenue growth through 2025

Pave the way for full autonomous / zero-touch operations

NETWORK ROLLOUT ACCELERATION
30% annual growth in the rate of new non-residential deployments of small cells by 2025

Boost network densification through highly automated rollout for Fiber and RAN deployments

MOBILE/5G REALIZATION
$120B 5G investment worldwide by 2020, with 1.3B 5G connections by 2025

Optimize current & transition to 5G using design, deployment & operations

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Optimize current & transition to 5G using design, deployment & operations
Virtualizing the network

What Is It All About?

Physical Network

Future Virtual Network

Service Agility
Deliver services in seconds/minutes—NOT weeks/months
Design and launch new services in weeks—NOT 9–18 months

Operational Efficiency
On-demand service selection and delivery
Automation of network operations

Cost Reduction
Standard hardware
High resource utilization
Multiple vendors
What should service providers aim for?

High degree of automation, service agility

- **Digital marketplace of capabilities**
  Customers can order at click of a button and are delivered in minutes, not weeks-months

- **Agility to on-board and expose partners & vendors capabilities**
  Introduce new service in weeks, not months

- **Autonomous network operation**
  Remove manual complexity – reduce operational costs

- **Scale out quickly**
  through a cloud based environment

- **High degree of automation, service agility**
  Compute

  Storage

  Networking

  Tools

  Security

  Database

  Analytics
Current network reality
No automation – manual complexity, limited agility

Amdocs Core

- Manual stitching & complex service processes
- Multiple stacks – service gaps, poor resource utilization

Network Equipment Providers

- WiFi
- CBRS
- 4G/5G New Radio
- Small cell
- vRAN
- MEC
- IMS
- Cloud
- EPC

Business Enablement

- Commerce & Care
- Partner Mgt
- Customer Engagement
- Customer 360 Profile
- Digital ID & Entitlement
- Connected cars
- Ultra-fast Internet
- AR/VR

High cost of service innovation
Long service introduction cycles

Current network reality
No automation – manual complexity, limited agility

- Smart homes
- Connected cars
- Smart cities
- IoT
- Industry 4.0
- AR/VR
- Gaming
- Customer Engangement
- Digital ID & Entitlement
- Backhaul
- Access
- Billing
- Charging
- Manual stitching & complex service processes
- Multiple stacks – service gaps, poor resource utilization

Manual

EPC
Backhaul
Core
IMS
Cloud
Access
vRAN
Small cell
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Service driven network

It’s all about Automation
Service driven network
It’s all about Automation
Service driven network
It’s all about Automation

Amdocs Digital
Amdocs Play
Amdocs Open Network - NFV
Partner Ecosystem

Network Products – OSS, NFV, Mobile
- Service Design & Onboarding
- Service Orchestration
- Order Management
- Network Inventory
- Network Rollout
- Data Collection & Analytics

Network Services
- Service Assurance
- Network
- IT Infrastructure
- Operation
- Service onboarding & testing
- NFV & Assurance platform
- NFV lab & lab management
- Implementation

Customer Engagement
- Customer 360 Profile
- Offerings Catalog
- Partner Mgmt
- Digital ID & Entitlement

Ultra-fast Internet
- Connected cars
- Smart cities
- Industry 4.0
- IoT
- Smart homes

Design
Operate
Orchestrate

Consulting
Training
Strategy & Planning

Core
- EPC
- Cloud
- IMS

Backhaul
- Fiber
- MEC
- CORD

Access
- vRAN
- Small cell
- New Radio
- CBRS
- 4G/5G
Open Network ecosystem

Standardization
Faster innovation
Break the vendor lock-in
Expedite market adoption
We are leading the Open Network initiative

Track record, experience and best practices form the world’s first production projects

Strong services play – to leverage the best parts in the industry: standards, open source, open ecosystem, own technology
Service driven network

ECOMP / ONAP
Open Network Automation Platform

Network-as-a-Service (NaaS)

Automation Platform
Service Network Automation Platform

E2E Network Automation, Virtualization, Cloudification, Orchestration

Creating a bridge between Network and IT

Same goal. Different approach.

1. SD-WAN solution
   - SD-WAN specific capabilities
   - Generic arch capabilities
   - 1. Enterprise connectivity (SD-WAN)
   - 2. Automation Platform
   - 3. Core and Enterprise use cases

2. SNAP
   - SDC
   - NCSO
   - A&AI

3. Additional UC’s support
   - VFW
   - SMB Voice
   - VIMS
The road to 5G

Pay for what you use
Voice, SMS

Bundles, GB plans
Mobile Internet
Mobile Apps

All you can eat
Voice, text and data

Pay for what you need (QoS), when you need it
Capacity Enhancement
Massive Connectivity
Ultra-low latency

‘connectivity’

High CAPEX investments - Frequencies, RAN, Core, Operation systems...

Brand Awareness - Competition, innovation

Monetization - evolving opportunity
5G enabling technologies

Virtualization

Elastic and dynamic network, with move to white box appliances

Slicing

Reconfigurable network with disparate demands - low latency, high density, high speed

Edge Computing

Connected compute and storage resources closer to the user
5G – further drives for a service driven network

Break down IT-Network barriers – automate network complexity

**Business Enablement System**

<table>
<thead>
<tr>
<th>IT</th>
<th>Self Service Portal</th>
<th>Customer management</th>
<th>Billing</th>
<th>Partner Settlements</th>
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<td>Design</td>
<td>Fulfill</td>
<td>Monitor</td>
<td>Manage</td>
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<tr>
<td>Driven Layer</td>
<td>Service model</td>
<td>Fulfill service</td>
<td>Sense intent</td>
<td>Learn better policies</td>
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<td>definition</td>
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<td>Issues</td>
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<tr>
<td>Network</td>
<td>Mobile Broadband slice</td>
<td>Massive IoT slice</td>
<td>Mission Critical IoT slice</td>
<td>Other slice</td>
</tr>
</tbody>
</table>

**Programmable & Hybrid Network**

- Mobile Broadband slice
- Massive IoT slice
- Mission Critical IoT slice
- Other slice

- Service intent driven
- Customer centric
- Continuous learning
- Proactive
- Autonomous

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Amdocs Open Network – why will we win?

01 Network world is in transformation
- It's all about automation
- Evolving into an agile Service Driven Network
- Avoiding silo'd operation, maximizing resource efficiency

02 We are providing the critical “glue”
- Enabling service agility & automation
- Provide seamless interoperability to ordering & monetization
- Open supporting multi-vendor innovation

03 We are the new domain experts
- SPs view Amdocs as a disruptor to the network
- Proven track record in delivering telco-grade software – world’s 1st production projects
- Broad network offering – product, services & skilled experts

Network world is in transformation
We are providing the critical “glue”
We are the new domain experts
Thank you