Transforming to Digital Service Provider

How 5G Design, Virtualization and Automation enable operator’s transformation to Digital Service Provider

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India Meeting of 3GPP Executives on catalyzing 5G Launch in India
Le Meridien, New Delhi, 27-03-2018
Timeline (agreed at RAN#79 in Chennai)

- **RAN #79**
- **RAN #80**
- **RAN #81**
- **RAN #82**
- **RAN #83**
- **RAN #84**
- **RAN #85**
- **RAN #86**
- **RAN #87**
- **RAN #88**

2018
- **Q2**
- **Q3**
- **Q4**

- **Rel-15 NSA ASN.1**
- **Rel-16 package approval**

2019
- **Q1**
- **Q2**
- **Q3**
- **Q4**

- **Rel-16 Si/WI phase**
- **Rel-15 freeze**
- **Rel-15 late drop freeze**
- **Rel-15 ASN.1**
- **Rel-15 late ASN.1 drop**

2020
- **Q1**
- **Q2**

- **Rel-16 freeze**
- **Rel-16 ASN.1**

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Option 3: NSA LTE+NR with EPC

Option 2: SA NR with 5GC

Option 4 (NR main)
Option 7 (eLTE main)

Rel-15 freeze
Rel-15 late ASN.1 drop
Rel-15 late drop freeze

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Digital Transformation with 5G

- x10k traffic
- >10Gbps peak data
- 10 years on battery
- 1M devices/km²
- <1ms latency
- Ultra reliability
- "Unlimited experience"
- "For everything"
- "Instant action"
The economic incentive to find new revenue sources is clear for today’s CSPs

Value creation lies in novel services where network service performance is critical

**Traditional CSP service revenues in mature markets** ($B) are flat

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV</td>
<td>1,000</td>
<td>997</td>
</tr>
<tr>
<td>Voice</td>
<td>322</td>
<td>234</td>
</tr>
<tr>
<td>Data</td>
<td>200</td>
<td>207</td>
</tr>
</tbody>
</table>

**Cloud Services ($B) have strong growth but value captured by CSPs has been limited**

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud Advertising</td>
<td>194</td>
<td>359</td>
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<tr>
<td>BPaaS</td>
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<tr>
<td>Cloud Infra aaaS</td>
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<td>68</td>
</tr>
<tr>
<td>VOD/streaming</td>
<td>25</td>
<td>41</td>
</tr>
</tbody>
</table>

**Future DSP markets ($B in 2025) offer revenue expansion for CSPs**

- **Factories**
  - Low Estimate: 1210
  - High Estimate: 3700
- **Worksites**
  - Low Estimate: 160
  - High Estimate: 930
- **Cities**
  - Low Estimate: 930
  - High Estimate: 1660
- **Logistics & Transport**
  - Low Estimate: 560
  - High Estimate: 850
- **Health**
  - Low Estimate: 170
  - High Estimate: 1590

*Estimated 2025 value creation potential of the IoT - McKinsey Global Institute

**Source:** Gartner

BPaaS = Business Processes as a Service

* Western Europe, Canada, USA, Japan, South Korea, Singapore, Australia, and NZ

Source: Gartner
**The future of digital service delivery from Digital Service Providers (DSPs)**

**Traditional CSP**
- Focus on “elephant” mass-market services that can justify the cost & time
- Expensive and slow to get new service to market due to complex OSS/BSS systems, and manual processes

**Cloud Transformation**
- **Webscales** deliver rapid, personalized, on-demand services - leverage cloud automation but mainly over the top delivery
- **CSPs** starting to evolve with NFV/SDN to speed the delivery of network services

**Future DSP**
- Digital experience: broad array of new services that combine cloud services and network resources
- Tailor virtual networks for each use case: latency, bandwidth, security, choice of functions
- Agile network: services are rapidly trialed, deployed & scaled
- Open platform: ecosystem of cloud and network players

New Markets | Faster New Services | Faster Time to Revenue | Higher Customer Satisfaction
The Role of the Shared Data Layer – key enabler for 5G
A paradigm shift towards a data centric network architecture

Shared Data Layer is Cloud optimized data layer, provides

1. Framework for stateless VNF architecture with unlimited linear scalability
2. Unbreakable Core with Geo-redundant Session Resiliency
3. Open ecosystem for data exposure and unified data analytics

Analytics
API exposure
Shared Data Layer
Control plane
User plane

Shared Data Layer
A paradigm shift towards a data centric network architecture
Service Based Architecture

Micro-services Design
VMs decomposed to independent services with reusable micro-services.

Benefits
1. Simplified and independent deployments
2. Independent scalability, automation, testability, fault isolation, upgradability and manageability
3. Enables use of best of breed technology using Open interface

1. Simplified and independent deployments
2. Independent scalability and automation
3. API Driven well defined interfaces
4. Enables use of best of breed Technology
5. Independence testability and fault isolation
6. Enables speed and agility

Micro services are mapped to build Virtual Machines (VMs) that can be deployed, scaled, upgraded, managed independently

1. Cloud infrastructure agnostic
2. Service Based Architecture
3. Monolitic Architecture

Enables continuous Micro-service (MS) development & testing
Enables Continuous testing & integration in operator network
Continuous deployment & Automated life-cycle management
Distributed/Edge Cloud

Distributed cloud architecture driven by telco performance requirements

Datacenter facility solutions for multi-layer cloud
Scalable from centralized datacenters to distributed edge clouds

Leverage Multi-access Edge Computing as a platform for edge cloud for accelerating 5G use case creation
Network Slicing

Running multiple logical networks on a common physical infrastructure

Optimized service delivery for heterogeneous use cases

5G Network
(Network of Networks = Support of multiple Radio Technologies)

Flexibility to meet diverse requirements

Industry Verticals Examples

Utility
Automotive
Public Safety
Self service

Vertical Network Slices

Industry Vertical specific E2E Solutions

V2X Ecosystem
Transportation
Smart Airport & A2G
Stadium
V2X Ecosystem
Oil Field
Mining
Enterprise
Smart City
Connected Harbor
Retail & logistics

Public Safety
SmartMeter

Autonomous driving

Radio Head
Product
Cloud RAN
Cloud Core
Router Product

Clou###
Network Slicing - The foundation for future value creation.

Network slices are end-to-end ‘virtual private services’

Service Request

<table>
<thead>
<tr>
<th>Slice Request Attributes</th>
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<tbody>
<tr>
<td>Latency:</td>
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<tr>
<td>Throughput:</td>
</tr>
<tr>
<td>Reliability:</td>
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<tr>
<td>Mobility:</td>
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<td>Security:</td>
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<tr>
<td>Analytics:</td>
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<tr>
<td>Cost profile:</td>
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<td>...</td>
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Composable Network & Service Resources

- Application Logic
- Augmented Services
- Virtual Network Functions
- SW-Defined Connectivity
- Cloud Infrastructure

Network & Cloud Orchestration

Automated composition & operations

Service Delivery

High performance localized delivery

Service Specific Network Slices

E2E virtual network optimized for specific tenant, service or service class with dynamic adaption and automated monitoring and control

Network Slicing - The foundation for future value creation.

Transforming to Digital Service Provider, 27.3.2018, Delhi, Ulrich Dropmann

Public

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Network and Service Automation are essential to DSP economics

Without E2E automation NFV/SDN & network slicing add significant cost and complexity
Open Source and Standard Landscape for Network Automation

**Open Source**

- Implementation and validation
  - Provide uniform, comprehensive platform for orchestration and automation

**Standardization**

- Specification (architecture and solutions)
  - Architecture and solutions for the management of 3GPP based networks and services
  - Architecture and solutions for the automated management and orchestration of VNFs (Virtualized Network Function) and NSs (Network Services)

**Work Plan**

- 10.1. Kick-off (Jan 2018)
- 13.3. Second Meeting March 2018
- Proof of Concept Framework (April 2018)
- Means for Automation (June 2018)
- Reference Architecture (September 2018)

Achieve automated end-to-end network and service management, enabling agile service delivery and new business opportunities
5G Digital Service Provider transformation: Backbone for Digital India

Make your voice heard now: