SERVICE PROVIDER SDN & CLOUD

- APIs, Exposable Services & Assets
- Cross-Domain Orchestration
- Integrated Network Control
  - Access Mgmt & Control
  - IP & Transport Mgmt & Control
  - Cloud Mgmt & Control
- Abstraction & Virtualization

Network

Data Center
SDN & CLOUD
SDN AS NFV INFRASTRUCTURE
SDN, CLOUD & & NFV
NFV IN SDN CONTROL DOMAIN

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CLOUD, SDN & NFV
NFV IN SDN CONTROL DOMAIN
Service trigger, dynamic connectivity, service scaling, real time: ~second

Cloud, SDN & NFV
NFV in SDN control domain

Cross Domain Service Orchestration

Policy

East/West signaling, Forwarding state control. High transaction rate & sub second domain

OSS NMS/EMS

SDN CTL

VNF Managers

Control

Forwarding

Cloud Orch.

Service Catalogue, BSS interface, Subscriptions, near real time ~minute

Policy

East/West signaling, Forwarding state control. High transaction rate & sub second domain

OSS NMS/EMS

SDN CTL

VNF Managers

Control

Forwarding

Cloud Orch.

Service Catalogue, BSS interface, Subscriptions, near real time ~minute
SOFTWARE DEFINED NETWORKING
USE CASES & DOMAIN APPLICATIONS

IP Services

Connectivity service

Transport

Access

Aggregation

Datacenter Network Infrastructure

IP Core

SDN

Service Chaining

VPN connectivity

Optimizations

DPI

Security

Multi-Layer optimizations

SDN Transport

NFV Network infrastructure

vRouter

vEPG

vBNG

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SDN driven service delivery
SUBSCRIBER AWARE SERVICE CHAINING & AUTOMATION

Differentiated service bundles

Price

Penetration

Firewall/AV

Parental Control

TCP/HTTP Web optimization

CDN & TIC

Media live compression

IPv6 transition/NAT

DPI, Charging and analytics

Advertising, profiling, enrichment

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SMART SERVICE CONTROL

On-Net

Off-Net

OTT-Specific

Per Destination

SDN + NFV

Health

QoS KPI

Performance

Residential, SMB, Enterprise

Package

Fixed / mobile

Per Subscriber

Video

Interactive Multimedia

Business Service

E-commerce

Per Application

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APPLICATION AWARE
SELECTIVE NFV OFFLOAD

1. Elephant flow detect
2. Flow bypass

SDN network

DPI, Security, URL

70% offload

Video, Software updates

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BEHAVIORAL & CONTEXTUAL
SELECTIVE SECURITY FILTERING

1. Suspicious flows
2. Update chain

SDN network

Security Analysis  Cleaning Filtering  Logging & Tapping
DESTINATION BASED SELECTIVE OPTIMIZATIONS, ENRICHMENT

Cloud optimizations
Routing distance, AS policies
Content specific offload
SDN network
SDN
CTL
PGW
Peering Router
Any internet destination
Enterprise Application Destination
Latency measurement Domain mapping
DPI

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SDN driven
IP transport
DATA-CENTER CONNECTIVITY
INTRA AND INTER/DC CONNECTIVITY

Load balancing & traffic engineering

Fast & reliable failure detection

Dynamic WAN connectivity

Geo-Redundancy

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SDN DRIVEN VIRTUAL ROUTING
TRANSPORT & DC INTERCONNECT
**WAN DC INTERCONNECT**

**SDN & ROUTING DOMAIN INTEGRATION**

- **Routing**
  - Interwork with VPN
  - Proven scalability
  - Flexible transport: L2/L3, P2P, MP2MP

- **OpenFlow**
  - Large momentum among vswitch and white branded chipset / boxes
  - Optimized for fast protection
  - Scale by distribution
  - Continue to build extension

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SW Overlay solution
- Transparent to DC infra
- No DC / HW requirements – tunnels MPLS over L2/L3
- Tunnels MPLS frames to VM public VNI IP@

WAN interworking
- Interconnect natively with WAN Residential Gateways and business PE's
- Support L2/L3 VPN and multicast services

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TRANSPORT SDN
AGGREGATION & INTER-DC CONTROL

- Application aware traffic engineering
- Optimal load balancing – leveraging segment routing

- IP Routing control plane
- Dynamic topology optimizations
- Control plane coordination

- Aggregation
- CO
- Metro
- Big CO & IO
- Core

- Internet
- Peering
- SDN Control
- Optical
APP TRAFFIC ENGINEERING
AUTOMATED SDN EDGE CONTROLLED TE

Orchestration

DC SDN

App1

DC SW1

App2

DC GW

App1 & App2 NH SW2 Label

VS2 Label

BW request (App1, DST SW2)

OF Push SRC/DST specific VPN label

OK + App (SRC+DST) specific labels

IP Core routers (non SDN)
w/Segmented Routing

DCB SDN SW

App3

DC SW1

App4

Blue path 10Gbps, 30ms

Red path 100Gbps, 75ms

IP Core routers (non SDN)

Application specific QoS requirements

Neutron++ API

OF Push Label for App3 & App4 VNI

DCB SW

DC SW

FWD VS2

POP POP

OF Push SRC/DST specific VPN label

Of Push Label for App3 & App4 VNI

IP Core routers (non SDN)

w/Segmented Routing

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ODL evolution
ERICSSON ODL PRIORITIES

OpenFlow driven southbound interface
- Drive fully open hardware ecosystem
- Allows for hybrid integration model (SDN control overlay)
- Fine grained flow control (application awareness, offload…)

IP / MPLS driven DC connectivity
- Extensive and proven toolbox
- Native WAN interworking
- Programmable with OpenFlow

Evolved northbound API’s
- Extends Neutron for more advanced VPN use cases
- Support both higher and lower level of abstraction