Design principles for 5G

Toward a new paradigm, All-IT Network architecture

“Unbundling”
- Software/Hardware Decoupling
- Unbundled Function Blocks
- Control-/User-plane Separation

“Open Source”
- Open Source Software (OpenStack, CORD)
- Open Source Hardware (OCP, TIP)
- Open Interfaces (Fronthaul, API)

“Softwarization”
- NFV (Network Functions Virtualization)
- SDN (Software Defined Networking)
- Orchestration & Network Slicing (XaaS)

“Cloudification”
- From CAPEX model to OPEX model
- Virtualization & DevOps Environments
- Dynamic & Automated Operation
SKT’s approach – ATSCALE / COSMOS

Static and monolithic mobile network is no longer viable. Distinguished 5G values can be efficiently offered via new telecom infra architecture.

**Today Infra**
- Fixed
- Unaware
- Manual
- Fat & Monolithic
- Domain-Specific

**Future Infra – All IT Network Architecture**
- Scalable
- Composable
- Cognitive
- Open
- Automated
- Scalable
- Lean
- Mission-critical
- End-to-end
- Optimized System

“ATSCALE” & “COSMOS”
New Services

- Ultra High Data Rate (AR/VR…)
- Low Latency (Connected car, Public safety …)
- Massive Connectivity (IoT)

ATSCALE

- Next-Generation OSS
- Network slicing
- Software-defined RAN
- Software-defined Core

COSMOS

- Software-defined Infrastructure
- Open Hardware and Software
- Universal Platform
A key component of ATSCALE - Software-defined RAN (SDRAN)

1. Open Front-haul and modular RAU
   - Open front-haul for flexible RAN function split
   - Standard interface for RAU

2. CP/UP separation through standard interface
   - UP in dedicated H/W and CP in virtualized function
   - Standard and open interface between UP/CP

3. Open H/W and S/W
   - White-box, Bare-metal, OCP-based H/W
   - OpenStack-based S/W

4. MEC
   - Proximity-based Mobile Edge Services
   - E2E Network Slicing incl. RAN, Transport, Core

5. Analytics-based SON
Dynamic E2E Network Slicing & its Life-Cycle Management (LCM)

End-to-end Network Orchestration

North-Bound I/F (Service Orchestration, NG-OSS, BSS) → Descriptor On-board

E2E Network Slice Life-Cycle Mgmt. → E2E Network Slice Catalog

South-Bound Interface (Local NFV Orchestrator, Transport Infra Orchestrator, PNF/VNF)

PNF/VNF Adaptor → Open API

Local (DC #i) NFV Orchestrator

Generic VNFM → Common VIM

PNF/VNF Adaptor

Transport Infra. Orchestrator

Transport-SDN

Local (DC #j) NFV Orchestrator

Generic VNFM → Common VIM

Local Network Slice (DC #i)

Local Network Slice (DC #j)

Dynamic End-to-End Network Slice

LCM: Life-Cycle Management
NS: N/W Service
VNF: Virtual N/W Function
PNF: Physical N/W Function
DC: Datacenter
MANO: Mgmt. and Orchestration
VIM: Virtualized Infra Manager
VL: Virtual Link

COSMOS: Composable, Open, Scalable, Mission-critical Optimized System

Open Software and Hardware for telco-grade Mission-critical services
COSMOS’ Open Software Architecture

SDDC (Software Defined Data Center) based on Open source

- Open Source based
- Optimized for diverse workload (5G, AI, …)
- Hybrid Resource (VM, Container, BM)
SK telecom’s open source community activities

STK is actively engaged in diverse open source community activities in pursuit of ‘open innovation’
SK telecom with leading service providers, AT&T and Verizon, is envisioning an open 5G platform.

**M-CORD**

Mobile Edge Services | Disaggregated & Virtualized RAN and CORE | Analytics Services

CORD MANAGEMENT & CONTROLLER

Leaf-Spine Fabric

OPEN COMPUTE HARDWARE

**Open Source**
-Mobile Infrastructure

-Open RAN and CORE for rapid 5G innovation

**Open Source Control and Management**

-Ultimate flexibility through end to end orchestration

**Open Compute Platform**

-High density and scale, carrier grade open platform

* Open source EPC (from Radisys), RAN L2, L3 (from Radisys), Scalable S/PGW (Intel)
M-CORD showcased innovation both for mobile network infrastructure and services at MWC `17.

**INFRASTRUCTURE**

1. MME disaggregation & IoT GW

2. Connectionless for Static IoT

3. End-to-End Network slicing

**Services**

4. Public safety w/ Network cookie

5. Active-testing & Analytics
OpenStack in SK telecom

Community version OpenStack + SONA (Virtual network) + SKT Ceph (Storage)

- Optimization for Telco-workload
- SONA+ONOS based Virtual Network + Ceph
- Kubernetes based Life-Cycle management
TIP Project Groups

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TIP – 4G Unbundled Project

Resolve the technical barriers to rollout of carrier-grade services with simpler, streamlined designs based on open API

- Construct an end-to-end unbundled and integrated 4G solution
- Migrate to 5G as solutions & technology become available
- Participating members:

Lead

SI

SW

Milestones

Aug. 2016
Nov. 2016
Apr. 2017

Kick-off F2F meeting @ Menlo Park
Open API (1st draft)
1st End-to-end call
Complete System integration
Test in TIP Community Lab (SKT)

(RF) BaiCells, AceAxis, AW2S (Lab & Infra) Facebook
Open innovation through Ecosystem collaboration is an **accelerator** in the journey to 5G