NMC Consulting Group | Netmanias

Company Profile - Brief

Location

Headquarter
2F, Namyeong Building
730-13, Yeoksam-dong,
Gangnam-gu, Seoul 135-921,
Korea

Branch Office
3832 NE 88th Street
Seattle, WA 98115
USA

Carrier Ethernet
protocols
IP/MPLS
Wi-Fi
Transparent
Caching
LTE CDN IMS
Infrastructure Services

Networks eMBMS

Consulting

POC

Training

Analyze trends, technologies and market
Report
Technical documents
Blog
One-Shot gallery

Future

OUR SERVICES

Operator Challenges

To attract more subscribers and prevent existing subscriber's churn, operator should introduce new services differentiated from competitors and deploy state of the art technologies. For providing these services, strategy for new network construction and legacy network migration is needed along with network design and system integration to achieve realization on the strategy. Accordingly complicated technologies such as Authentication, QoS, Security and Provisioning, Charging are accompanied.

These technologies for network design and system integration mentioned above is obviously important for operator however only thier own efforts would bring so many burdens that operator itself maintains many internal experts and time to market.

Solution: Netmanias Professional Service

NMC Consulting Group was founded on year 2002 and is advanced, professional network consulting company which is specialized for IP Network area like FTTH, Metro Ethernet and IP/MPLS, Service area like eMBMS, IPTV and IMS lastly, Wireless network area like Mobile WIMAX and LTE.

NMC Consulting Group provides following services to the Operator (Green Field, Legacy),

► **Service & Network Consulting Service**
► **Design and System Integration Service**
► **Operational Support Service**
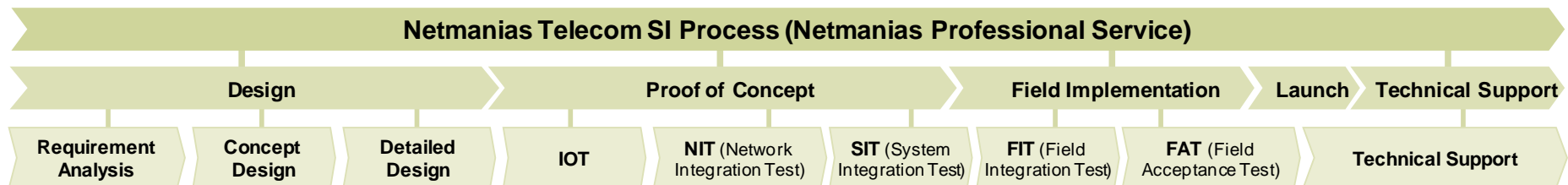► **Project Management and 3rd Party Coordination**

Benefits

Professional services by NMC Consulting Group described above promise speedy and accurate design and implementation of network which can be satisfied operator's business vision therefore it contributes absolutely to launch a commercial service as quickly as possible and operates network in stable condition. NMC Consulting Group outsourcing solution enables Operator to focus on its core business of marketing and sales.

Netmanias Telecom SI Process (Netmanias Professional Service)

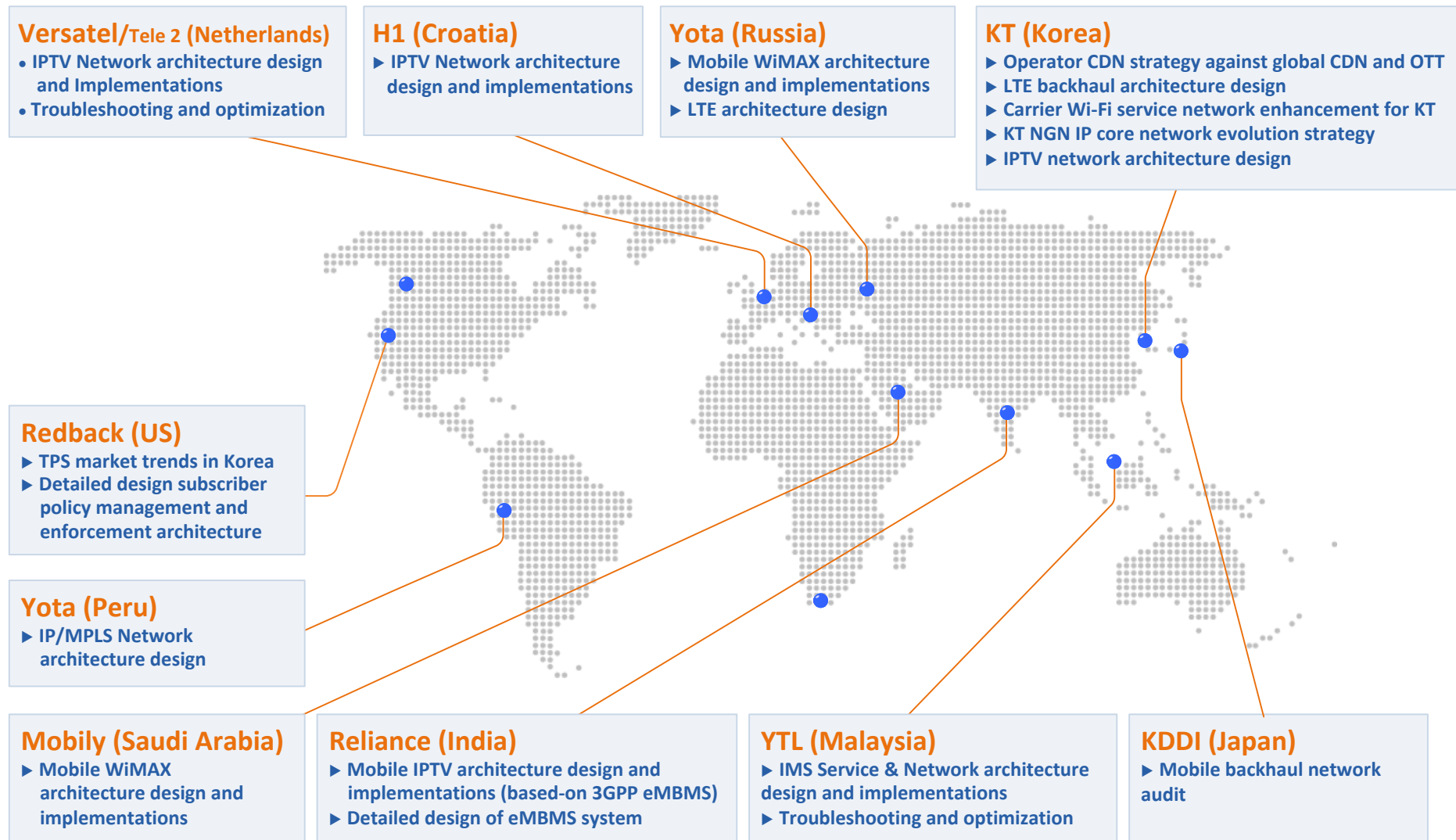| Design			Proof of Concept			Field Implementation		Launch	Technical Support
Requirement Analysis	Concept Design	Detailed Design	IOT	NIT (Network Integration Test)	SIT (System Integration Test)	FIT (Field Integration Test)	FAT (Field Acceptance Test)		Technical Support

CORE EXPERTISE

NMC Consulting Group was founded on year 2002 and is advanced, professional network consulting company which is specialized for IP Network area like FTTH, Metro Ethernet and IP/MPLS, Service area like eMBMS, IPTV and IMS lastly, Wireless network area like Mobile WIMAX and LTE.

Category	Technology	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13
Services	eMBMS/Mobile IPTV														■	■
Services	CDN/Mobile CDN													■	■	■
Services	Transparent Caching													■	■	■
Services	BSS/OSS										■	■	■	■	■	■
Services	Cable TPS									■	■	■	■	■	■	■
Services	Voice/Video Quality								■	■	■	■	■	■	■	■
Services	IMS							■	■	■	■	■	■	■	■	■
Services	Policy Control/PCRF					■	■	■	■	■	■	■	■	■	■	■
Services	IPTV/TPS				■	■	■	■	■	■	■	■	■	■	■	■
Mobile Network	LTE										■	■	■	■	■	■
Mobile Network	Mobile WiMAX									■	■	■	■	■	■	■
Mobile Network	Carrier WiFi													■	■	■
Mobile Network	LTE Backhaul/Fronthaul													■	■	■
Wireline Network	Data Center Migration												■	■	■	■
Wireline Network	Carrier Ethernet									■	■	■	■	■	■	■
Wireline Network	FTTH						■	■	■	■	■	■	■	■	■	■
Wireline Network	Data Center						■	■	■	■	■	■	■	■	■	■
Wireline Network	Metro Ethernet			■	■	■	■	■	■	■	■	■	■	■	■	■
Wireline Network	MPLS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Wireline Network	IP Routing	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

MAJOR PROJECTS

NMC Consulting Group | Netmanias has accumulated abundant field experiences and technical expertise in System Integration(SI) through 51 consulting and system integration projects conducted in various regions including Korea, Netherlands, Croatia, Russia, Saudi Arabia, Malaysia and India for the past 11 years.

Versatel/Tele 2 (Netherlands)
- IPTV Network architecture design and Implementations
- Troubleshooting and optimization

H1 (Croatia)
▶ IPTV Network architecture design and implementations

Yota (Russia)
▶ Mobile WiMAX architecture design and implementations
▶ LTE architecture design

KT (Korea)
▶ Operator CDN strategy against global CDN and OTT
▶ LTE backhaul architecture design
▶ Carrier Wi-Fi service network enhancement for KT
▶ KT NGN IP core network evolution strategy
▶ IPTV network architecture design

Redback (US)
▶ TPS market trends in Korea
▶ Detailed design subscriber policy management and enforcement architecture

Yota (Peru)
▶ IP/MPLS Network architecture design

Mobily (Saudi Arabia)
▶ Mobile WiMAX architecture design and implementations

Reliance (India)
▶ Mobile IPTV architecture design and implementations (based-on 3GPP eMBMS)
▶ Detailed design of eMBMS system

YTL (Malaysia)
▶ IMS Service & Network architecture design and implementations
▶ Troubleshooting and optimization

KDDI (Japan)
▶ Mobile backhaul network audit

OUR CUSTOMERS

NMC Consulting Group is a professional consulting firm committed to delivering time-to-market strategy & solution by providing End-to-end communication service solution & architecture, design of last-mile/backhaul/backbone network, and End-to-end System Integration Services with Multi-vendor Coordination & Project Management throughout the whole project.

| Telecom | KT (Korea) | SK Telecom (Korea) | Yota (Russia) | Versatel/Tele 2 (Netherlands) | Mobily (Saudi Arabia) |
| | YTL (Malaysia) | H1 (Croatia) | Yota (Peru) | Reliance (India) | KDDI (japan) |

Vendor, Org. & Enterprise

KISA · NIA 한국정보화진흥원 · KLabs 한국디지털케이블연구원 · KNRA 한국네트워크연구조합 · ETRI 한국전자통신연구원

SAMSUNG ADVANCED INSTITUTE OF TECHNOLOGY · SoftBank Ventures Korea · SAMSUNG · Redback NETWORKS AN ERICSSON COMPANY

NORTEL · Solbox · IBM · KOREAN AIR

Qwilt · HFR, Inc. for Mobile Internet

Netherlands Versatel (Current Tele 2) TELE2
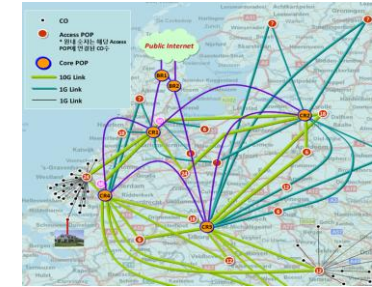
TPS Service based on ADSL2+ Design Integration Optimization

Netherlands Versatel IPTV Network Architecture

Data Center

Amsterdam Data Center

Service Platform | BSS/OSS | Network Mgt. | Security Platform
- SSW (VoIP) Platform
- IPTV Platform
- NASS Platform
- Billing/Charging
- Order Mgt
- NMS/EMS
- RBAC
- Network Virtualization

Firewall/IPS

Nationwide Backbone Network (IP/MPLS)

Inter-working — Internet — Internet

Core Node (4), Network Virtualization (MPLS L3 VPN), BR, VoD, Core Router, Core Switch
ZL ASD RT HT

Regional Network (L2 Metro Ethernet)

Regional PoP
L2SW, BRAS, L2SW
1 ... 4 ... 1 ... 6 ... 1 ... 7

Access Network (ADSL2+)

CO
L2SW, DSLAM
CO Node (18), CO Node (24), CO Node (12), CO Node (6), CO Node (18), CO Node (24)

Home

Project Overview

- **Target Service:** Triple Play Service (Internet, IPTV and VoIP) based-on ADSL2+ technology
- **Service Category:** Retail TPS
- **Integrated Network Equipments:** IP STB, RG, DSLAM, Metro L2 SW, BRAS, IP/MPLS Router, IPTV Headend (Encoder, VoD, Middleware, etc.), VoIP Farm (SSW, SGW, TGW, etc.), BSS/OSS
- **Duration:** 12 months

Our Work-Scope (Design and Integration)

- **Order Entry and Provisioning**
- **Topology Design**
- **Capacity Dimensioning**
- **IP Routing Design (IGP, BGP)**
- **MPLS Design**
- **Multicast Design (PIM, IGMP)**
- **E2E QoS Design**
- **Authentication (RG, STB, PPPoE, DHCP Options, etc.)**
- **IP Allocation**
- **Security, User Isolation**
- **Dynamic QoS (PDP, PEP)**
- **CPE/RG Provisioning**
- **Redundancy and Reliability**
- **Fault-Tolerance (IP Convergence, MPLS FRR, VRRP, RSTP, PBT, etc.)**
- **Data Center Design (IP connectivity, Redundancy, Firewall, etc.)**
- **Headend Design (Middleware, Encoder, VoD, DRM, Customer Portal)**
- **VoIP Design (RG, SSW, SGW, TGW, MS, etc.)**
- **Interworking with External Networks**
- **Interworking with BSS/OSS**

Malaysia YTL

YTL COMMUNICATIONS

QPS Service based on Mobile WiMAX and Wi-Fi
Design → Integration → Optimization

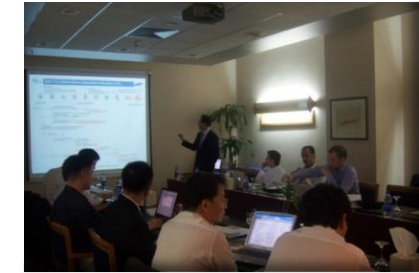### Malaysia YTL Network Architecture
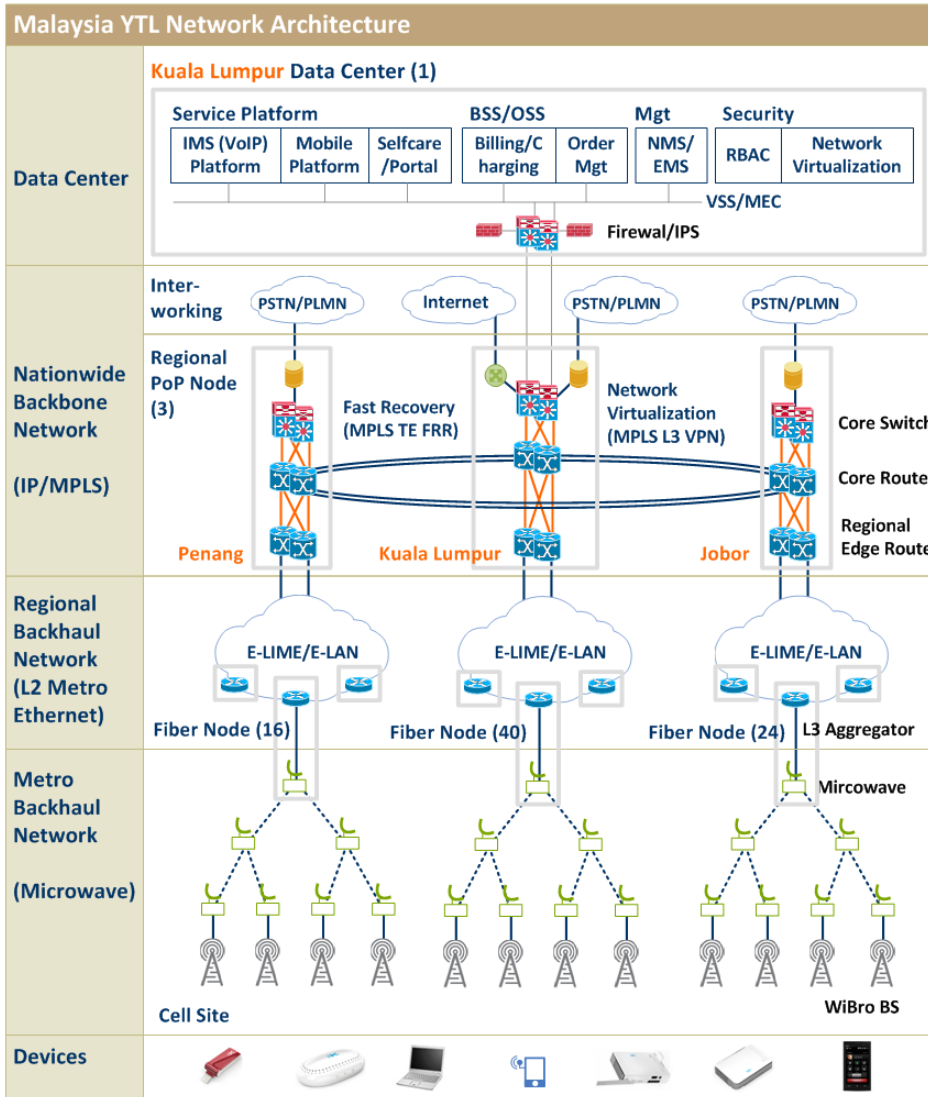
Project Overview
- **Target Service:** QPS Services (Internet, VoD and VoIP) based on WiMAX and WiFi technology
- **Service Category:** Retail QPS
- **Integrated Network Equipments:** Handset, CPE, Wi-Fi AP, Wi-Fi AC, WiMAX RAS/ACR, WiMAX CSN, SBC, CSCF, HSS, MRF, MGC, MGW, SGW, IMS AS, L2/L3 Switch, Firewall, DPI, IP/MPLS Routers, BSS/OSS
- **Duration:** 20 months

Our Work-Scope (Design and Integration)
- Wi-Fi Network Entry/Authentication
- Wi-Fi Handover/Roaming
- Mobile WiMAX Network Entry/Authentication
- Mobile WiMAX Handover
- IMS Order Entry Process Design
- IMS Network Entry and Exit
- IMS VoIP Call Flow
- IMS AS Call Flow
- IMS Security
- End-to-End IMS QoS
- IMS NE Connectivity to IP Transport
- IMS NE Redundancy/Fault-Tolerance
- Cross-Layer (IMS, WiMAX, IP Transport) QoS Troubleshooting
- Charging (Prepaid, Postpaid)
- Provisioning
- IP Connectivity, IP Routing and IP Addressing
- Redundancy
- Interworking with YTL BSS/OSS

Saudi Arabia Mobily

mobily موبايلي

QPS Service based on Mobile WiMAX Technology → **Design** → **Integration** → **Optimization**

ACR	Samsung WiMAX Access Control Router (ASN-GW)
DCFS	Data center Front-end Switch
DCBS	Data center Back-end Switch
DPI	Deep Packet Inspection Equipment
PC	Policy Controller
RAS	Samsung WiMAX Radio Access System (BS)
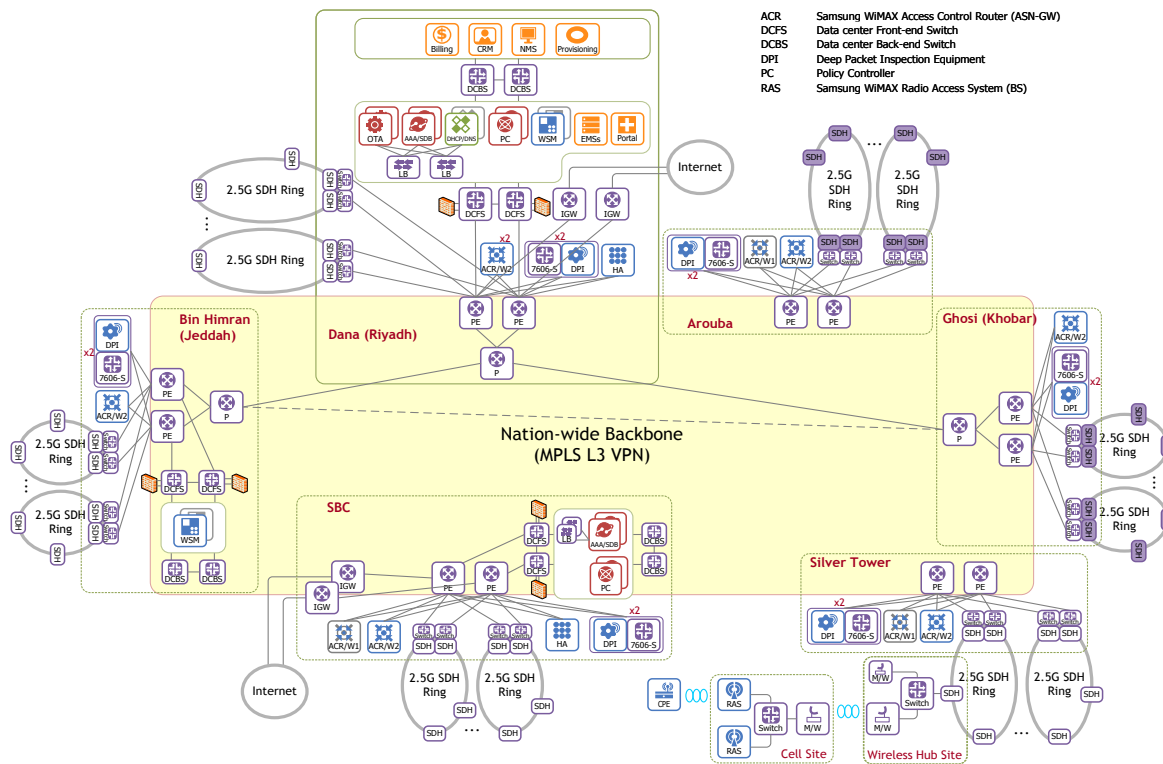
Project Overview

- **Target Service:** High speed Internet access based on WiMAX technology
- **Service Category:** Retail, Wholesale, IP-VPN
- **Integrated Network Equipments:** CPE, BS, ASN-GW, AAA, PM, OMA-DM, HA, DPI, DHCP, DNS, L2/L3 Switch, IP/MPLS Router, Microwave, BSS/OSS (Selfcare, CRM, Billing, Provisioning, Mediation)
- **Duration:** 13 months

Our Work-Scope (Design and Integration)

- Order Management (Activation, User Profile Change, Suspend, De-activation, etc.)
- Provisioning (AAA, OTA)
- Authentication (EAP TTLS/AKA)
- IP Allocation (Simple IP, Mobile IP)
- QoS, Security
- Redundancy
- Charging (Prepaid, Postpaid)
- Hot-lining
- Policy Enforcement (PDP, PEP)
- Mobility
- CPE Management (OTA: CPE Provisioning, FW Upgrade, Diagnostics)
- IP VPN
- Wholesale (Traffic Separation and Interworking with other ISPs)
- Traffic Engineering and Capacity Dimensioning
- IP Connectivity (IP Routing, VLAN, IP Addressing)
- Data Center Design (IP connectivity, Redundancy, Firewall, etc.)
- Interworking with External Networks (Public Internet, ISPs)
- Interworking with Mobily BSS/OSS

Russia Yota

QPS Service based on Mobile WiMAX Technology

Design › Integration › Optimization

Moscow & Moscow Region

St. Petersburg
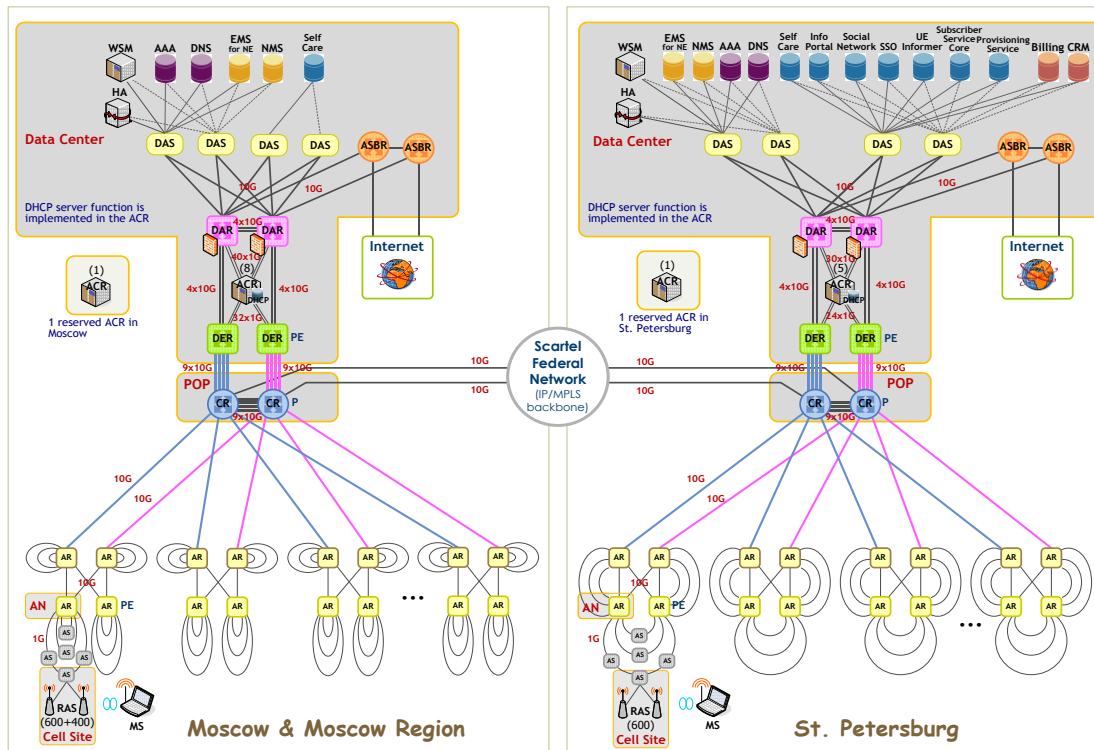
Two PoPs will be connected through only one GE link initially.
Two 10GE links is a prospect for development.

AS (Access Switch):	Cisco ME3400
AR (Aggregation Router):	Cisco 7606
CR (Core Router):	Cisco 7609
DER (Datacenter Edge Router):	Cisco 6509
DAR (Datacenter Aggregation Router):	Cisco 6513
DAS (Datacenter Aggregation Switch):	Cisco 4948
ASBR (AS Border Router):	Cisco 12404

Project Overview

- **Target Service:** QPS Service based on WiMAX technology
- **Service Category:** Retail QPS, Enterprise QPS
- **Integrated Network Equipments:** USB, CPE, Netbook, BS, ASN-GW, AAA, HA, DHCP, DNS, L2/L3 Switch, IP/MPLS Router, BSS/OSS (Selfcare, CRM, Billing, Provisioning, Mediation)
- **Duration:** 13 months

Our Work-Scope (Design and Integration)

- Order Management (Activation, User Profile Change, Suspend, De-activation, etc.)
- Provisioning (AAA)
- Authentication (EAP TTLS)
- IP Allocation (Simple IP, Mobile IP)
- QoS
- Security
- Redundancy (Link/Node/Geographical Redundancy)
- Charging (Prepaid, Postpaid)
- Hot-lining
- Policy Enforcement
- Mobility
- Traffic Engineering and Capacity Dimensioning
- IP Connectivity (VLAN, IP Addressing)
- Data Center Design (IP Routing, STP, IP connectivity, Redundancy, Firewall, etc.)
- Interworking with External Networks
- Interworking with Yota BSS/OSS

Peru Yota

Yota

QPS Service based on Mobile WiMAX Technology `Design`

Peru Yota IP/MPLS Network Architecture
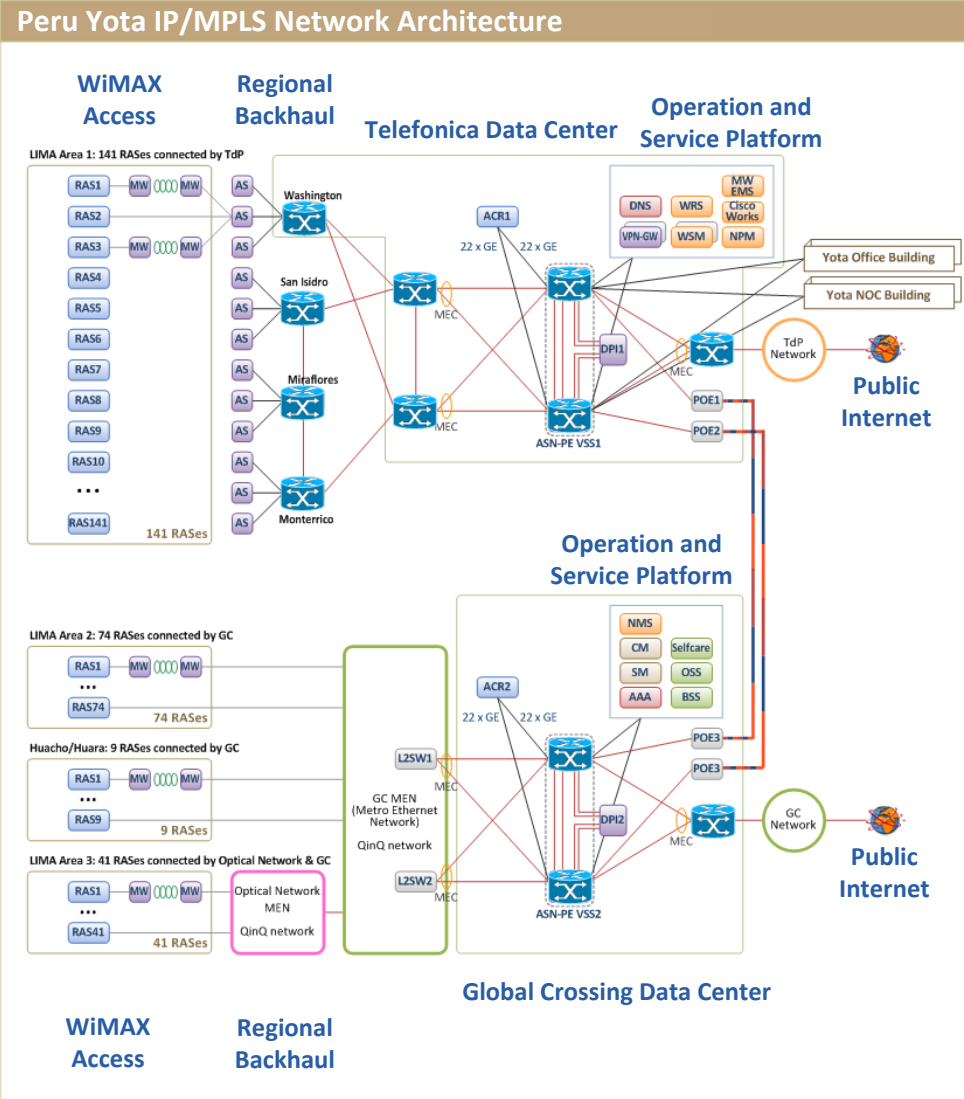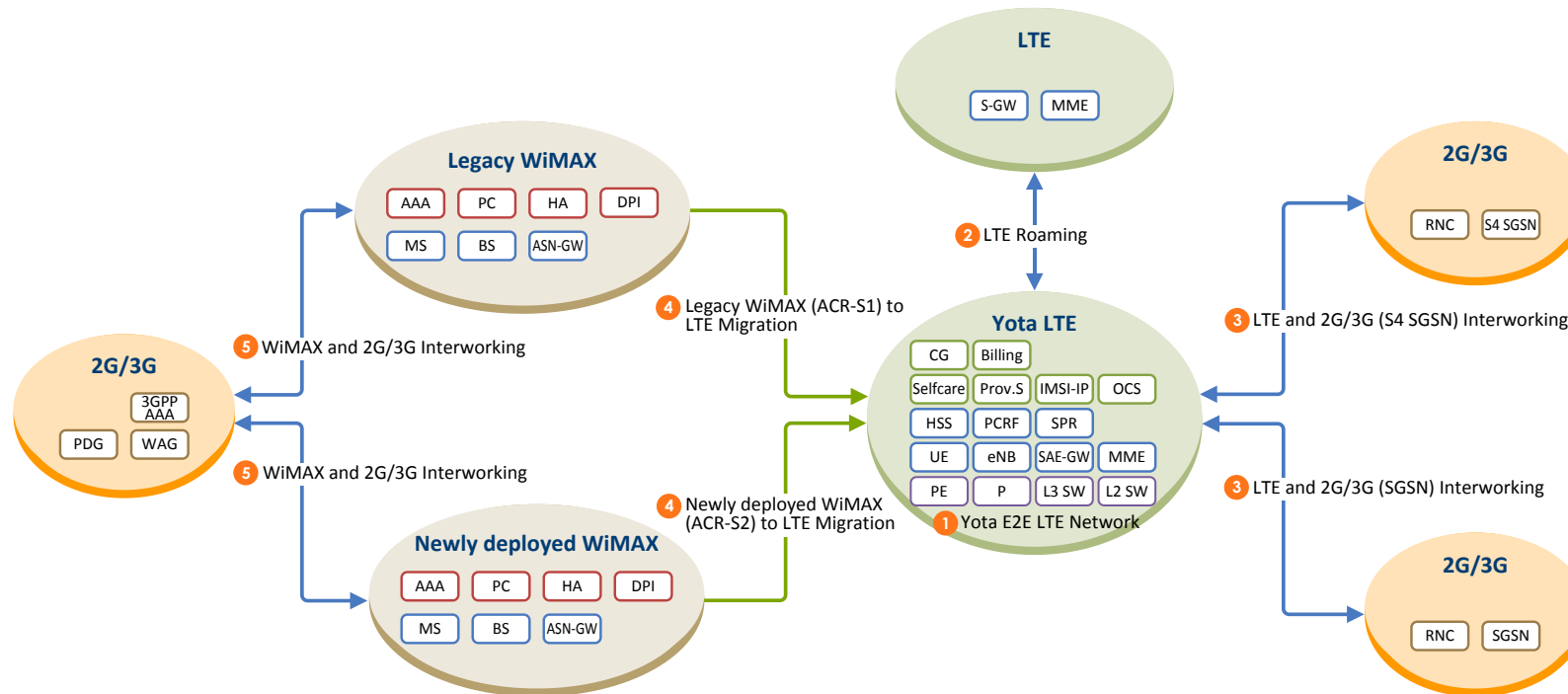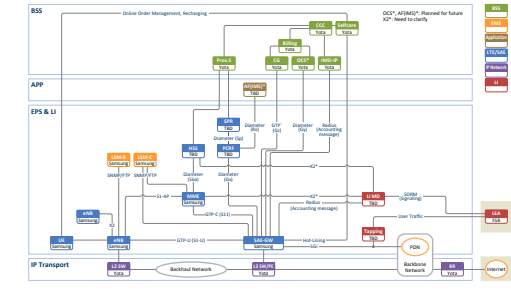

Project Overview

- **Target Service:** High speed Internet access service based on Mobile WiMAX technology
- **Service Category:** Retail
- **Integrated Network Equipments:** MS, BS, ASN-GW, AAA, DPI, DHCP, DNS, L2/L3 Switch, IP/MPLS Router, Firewall, Microwave, EMS, NMS, VPN, NPM and BSS/OSS (Selfcare, CRM, Billing, Provisioning, Mediation)
- **Duration:** 6 months

Our Work-Scope (Design)

- E2E Physical and Logical Network Architecture
- IP Routing (IS-IS, iBGP, eBGP)
- MPLS VPN
- Redundancy and Reliability
- Security
- QoS
- P2P Control
- IP Connectivity
- IP Addressing
- E2E Cross-Layer Troubleshooting on Production Networks
- Training

Samsung LTE

SAMSUNG

End-to-end LTE Network Design ➤ **Design**

LTE
- S-GW
- MME

Legacy WiMAX
- AAA
- PC
- HA
- DPI
- MS
- BS
- ASN-GW

2G/3G
- 3GPP AAA
- PDG
- WAG

Newly deployed WiMAX
- AAA
- PC
- HA
- DPI
- MS
- BS
- ASN-GW

Yota LTE
- CG
- Billing
- Selfcare
- Prov.S
- IMSI-IP
- OCS
- HSS
- PCRF
- SPR
- UE
- eNB
- SAE-GW
- MME
- PE
- P
- L3 SW
- L2 SW

① Yota E2E LTE Network

2G/3G
- RNC
- S4 SGSN

2G/3G
- RNC
- SGSN

② LTE Roaming

④ Legacy WiMAX (ACR-S1) to LTE Migration

④ Newly deployed WiMAX (ACR-S2) to LTE Migration

⑤ WiMAX and 2G/3G Interworking

⑤ WiMAX and 2G/3G Interworking

③ LTE and 2G/3G (S4 SGSN) Interworking

③ LTE and 2G/3G (SGSN) Interworking

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1. E2E LTE Network Design
- E2E Network Architecture
- Order Management
- LTE/SAE Network Procedure
- Handover
- Charging
- QoS
- Security
- LI

2. LTE Roaming Design
- LTE Roaming Architecture
- Initial Attach & Detach Procedure
- Idle Mode Procedure
- Policy Control
- Charging

3. LTE and 2G/3G Interworking Design
- LTE-2G/3G Interworking Architecture
- Initial Attach & Detach Procedure
- Idle Mode Procedure
- Inter-RAT Handover
- Policy Control, Charging
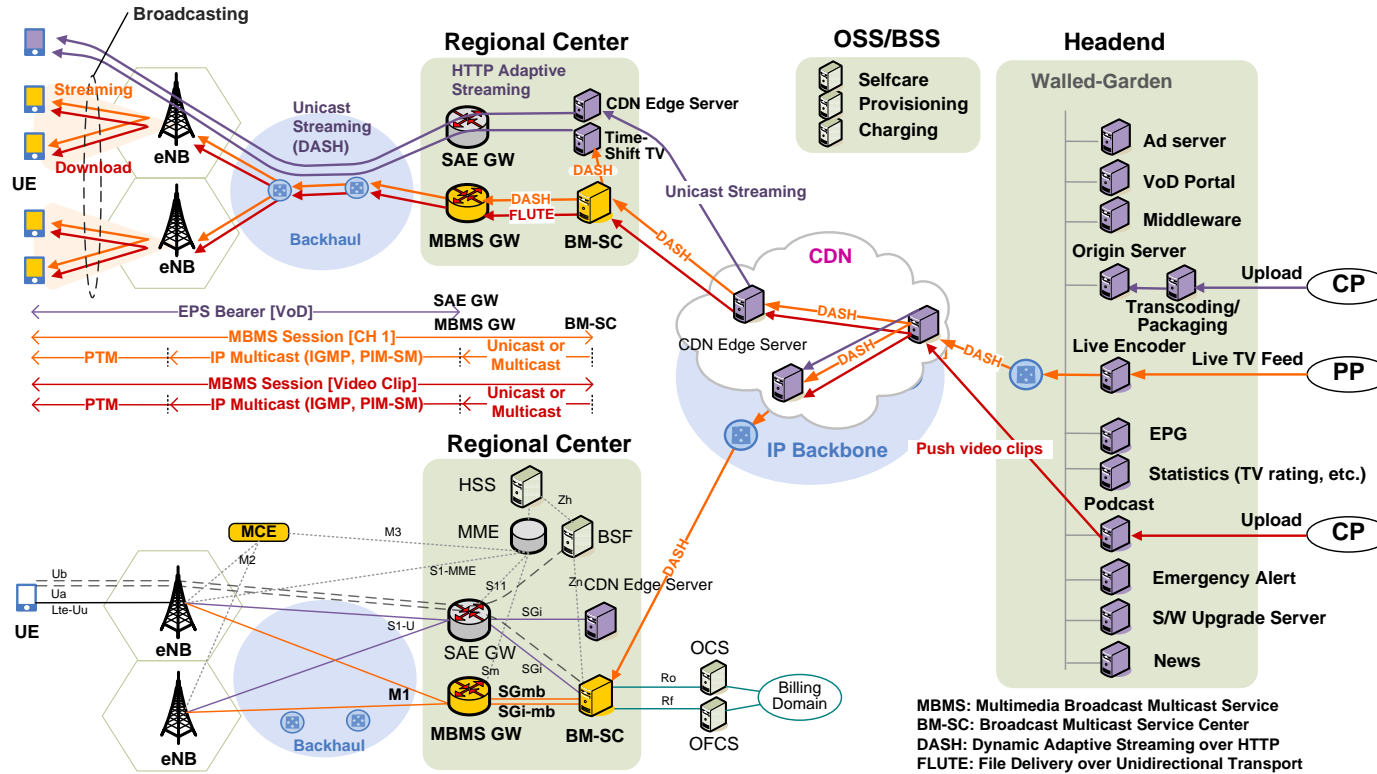
4. Legacy and Newly deployed WiMAX to LTE Migration
- Current WiMAX Network Architecture
- WiMAX-to-LTE Migration Scenario
- Required Features of ASN & CSN NEs

5. WiMAX and 2G/3G Interworking Design
- WiMAX-2G/3G Interworking Architecture
- Network Entry & Exit
- Inter-RAT Handover

India RJIL

Reliance

eMBMS Service Network   `Design` `Integration`

Our Work-Scope (Design and Integration)

- End-to-End eMBMS Service Network Architecture (Devices, eMBMS/BM-SC, CDN/Headend)
- End User Service Description (9 Use Cases)
- Subscription, Provisioning, Authentication Design
- eMBMS Broadcast Service
- Multicast Design (IP Multicast, LTE Broadcast)
- End-to-End QoS Design
- Redundancy Design
- Security Design
- Charging
- Device Requirements
- eMBMS Network Requirements

MBMS: Multimedia Broadcast Multicast Service
BM-SC: Broadcast Multicast Service Center
DASH: Dynamic Adaptive Streaming over HTTP
FLUTE: File Delivery over Unidirectional Transport

Project Overview

- **Target Service:** Mobile IPTV service based on eMBMS technology
- **Service Category:** Retail
- **Integrated Network Equipments:** Device (Middleware, Modem Chip), MBMS GW, BM-SC, CDN, Headend (Live Encoder, Application Servers)
- **Duration:** 13 months