



NMC Consulting Group | Netmanias

Company Profile - Brief

Location

Headquarter

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Korea

Netmanias USA

3832 NE 88th Street
Seattle, WA 98115
USA



OUR SERVICES

Operator Challenges

To attract more subscribers and prevent existing subscriber's churn, operators 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, and Charging are accompanied. These technologies for network design and system integration mentioned above are obviously important for operators. However only their own efforts would bring so many burdens that operator itself maintains many internal experts and time to market.

Benefits

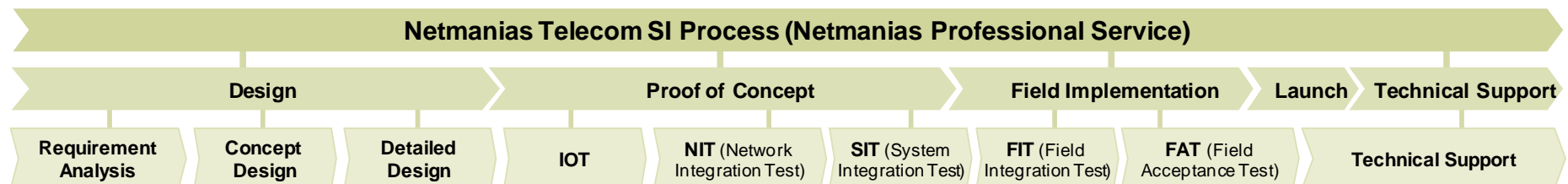
Professional services by NMC Consulting Group described above promise speedy and accurate design and implementation of network which can be satisfied operator's business vision therefore it contributes absolutely to launch a commercial service as quickly as possible and operates network in stable condition.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

Solution: Netmanias Professional Service

NMC Consulting Group/Netmanias was founded in year 2002, and is an advanced, professional network consulting company which is specialized for IP Network areas (e.g., FTTH, Metro Ethernet and IP/MPLS), service areas (e.g. eMBMS, IPTV, and IMS), and lastly, Wireless network areas (e.g. 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**



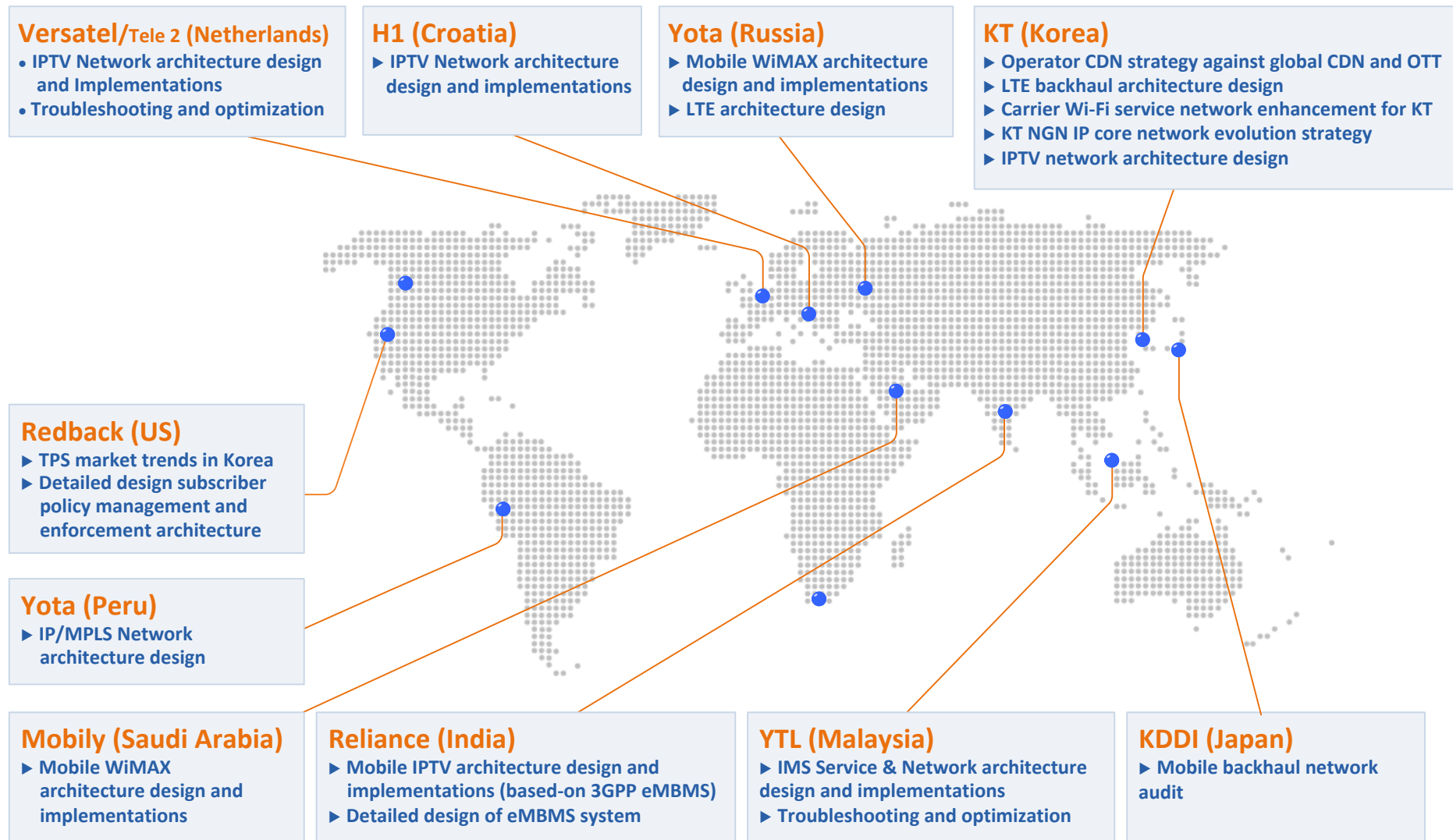
CORE EXPERTISE

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		99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
Services	eMBMS/Mobile IPTV																
	CDN/Mobile CDN																
	Transparent Caching																
	BSS/OSS																
	Cable TPS																
	Voice/Video Quality																
	IMS																
	Policy Control/PCRF																
	IPTV/TPS																
Mobile Network	LTE, 5G																
	Mobile WiMAX																
	Carrier WiFi																
	LTE Backhaul/Fronthaul																
Wireline Network	Data Center Migration																
	Carrier Ethernet																
	FTTH																
	Data Center																
	Metro Ethernet																
	MPLS																
	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.



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)

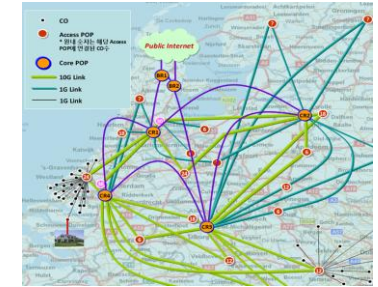


KDDI (Japan)

Vendor, Org. & Enterprise

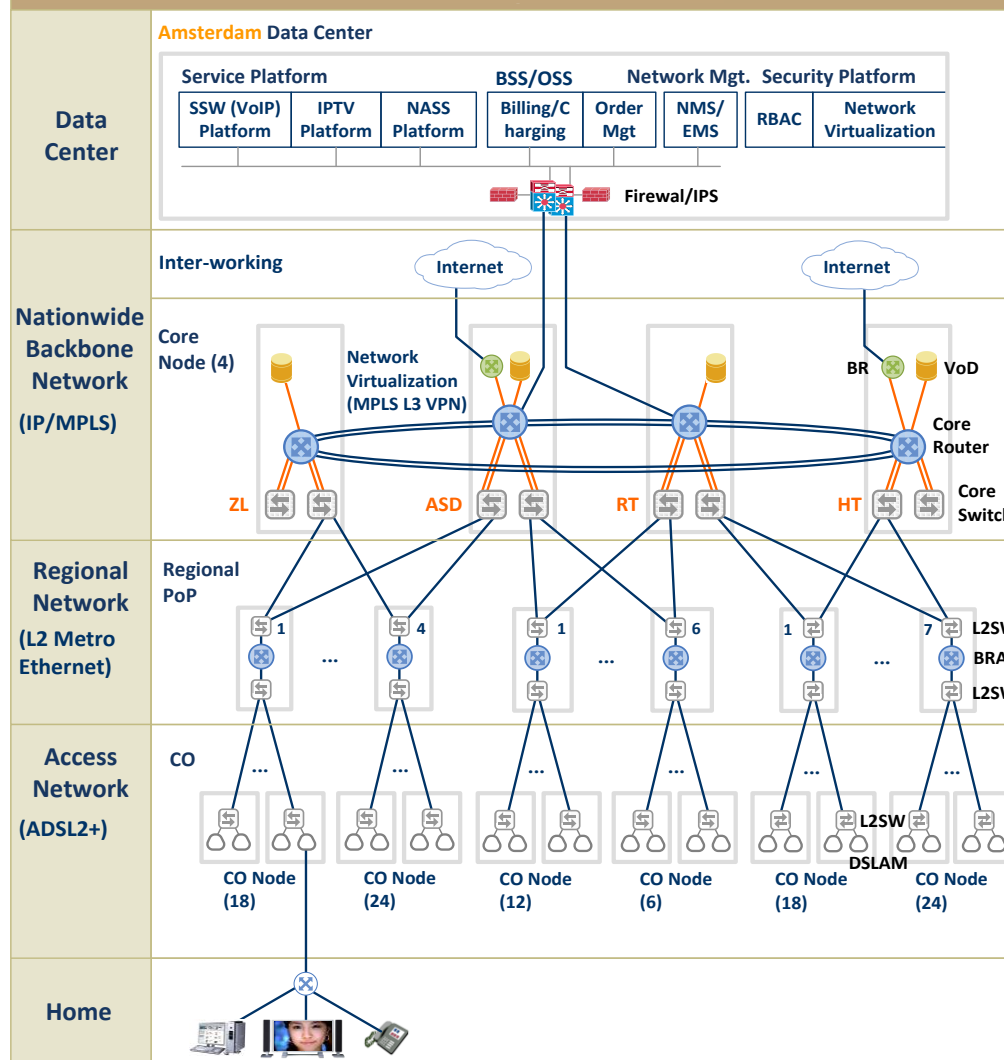


Netherlands Versatel (Current Tele 2) TELE2



TPS Service based on ADSL2+ **Design** **Integration** **Optimization**

Netherlands Versatel IPTV Network Architecture



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



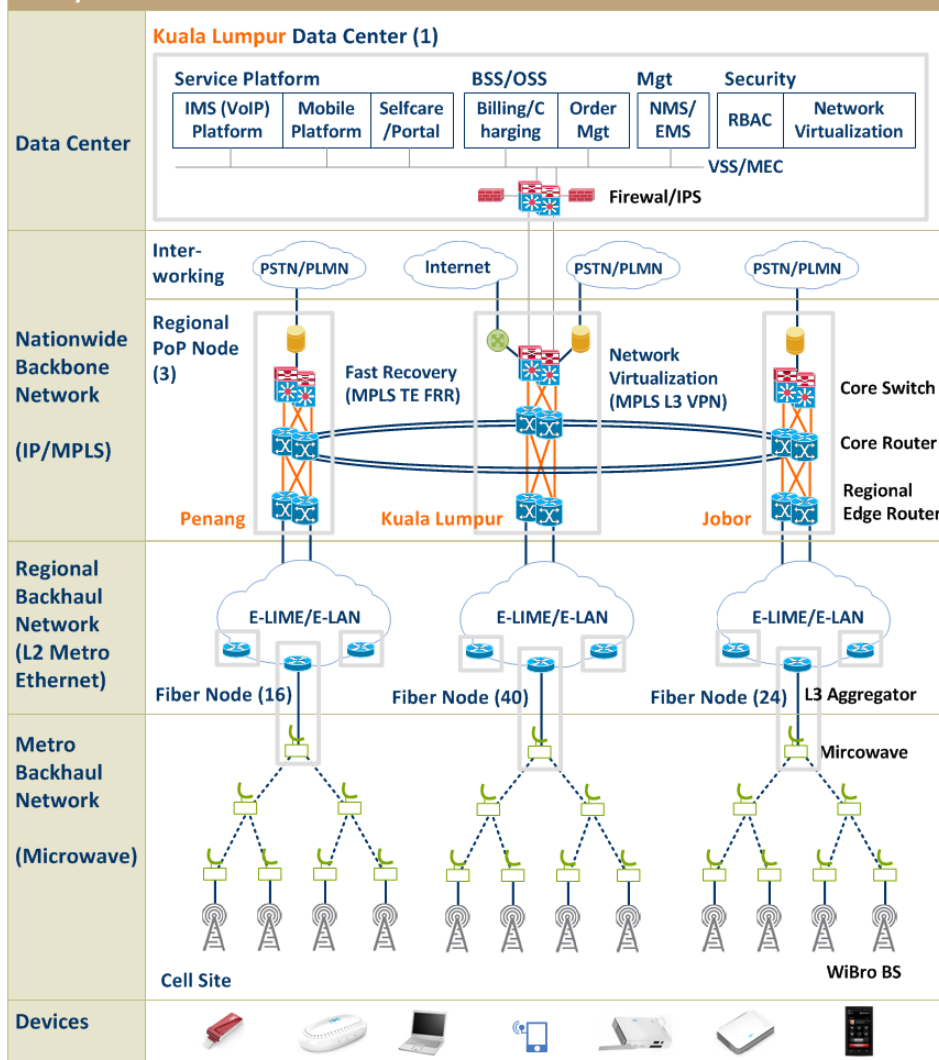
QPS Service based on Mobile WiMAX and Wi-Fi

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

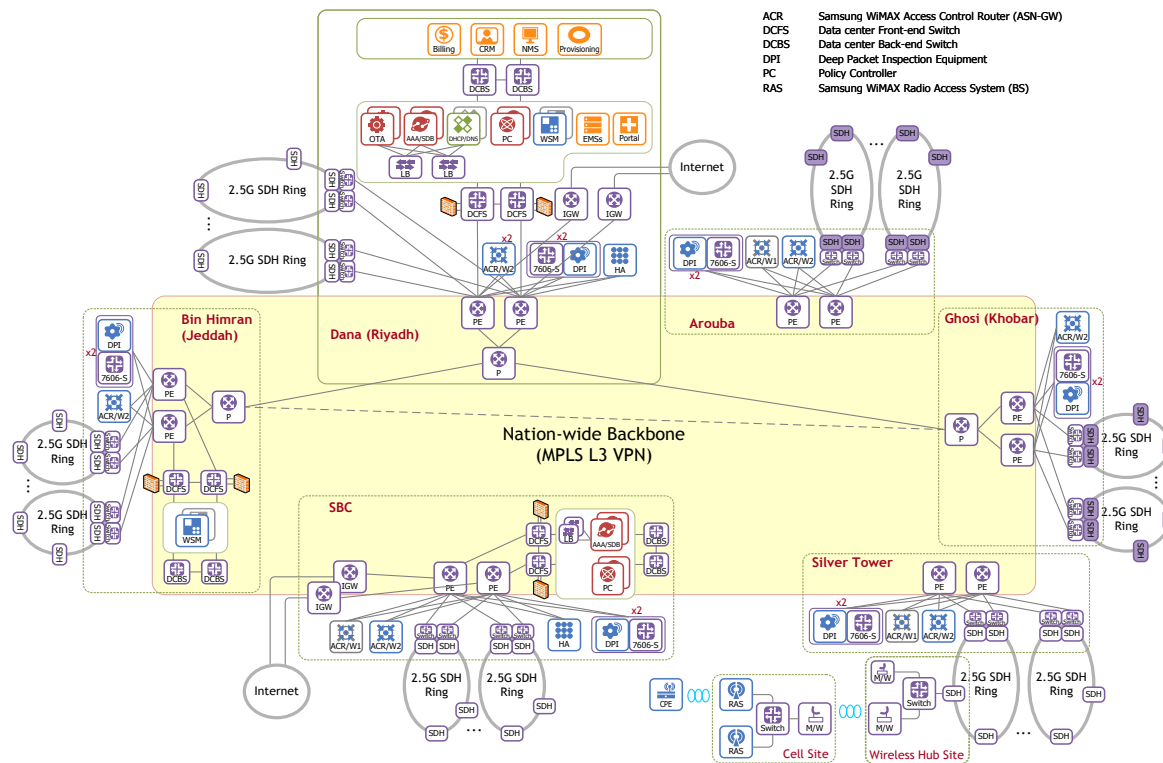
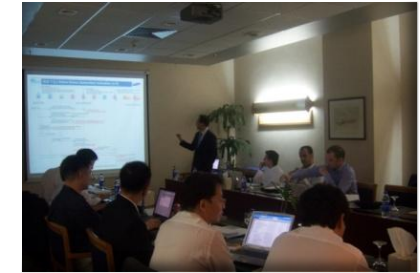
Saudi Arabia Mobily

QPS Service based on Mobile WiMAX Technology

Design

Integration

Optimization



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

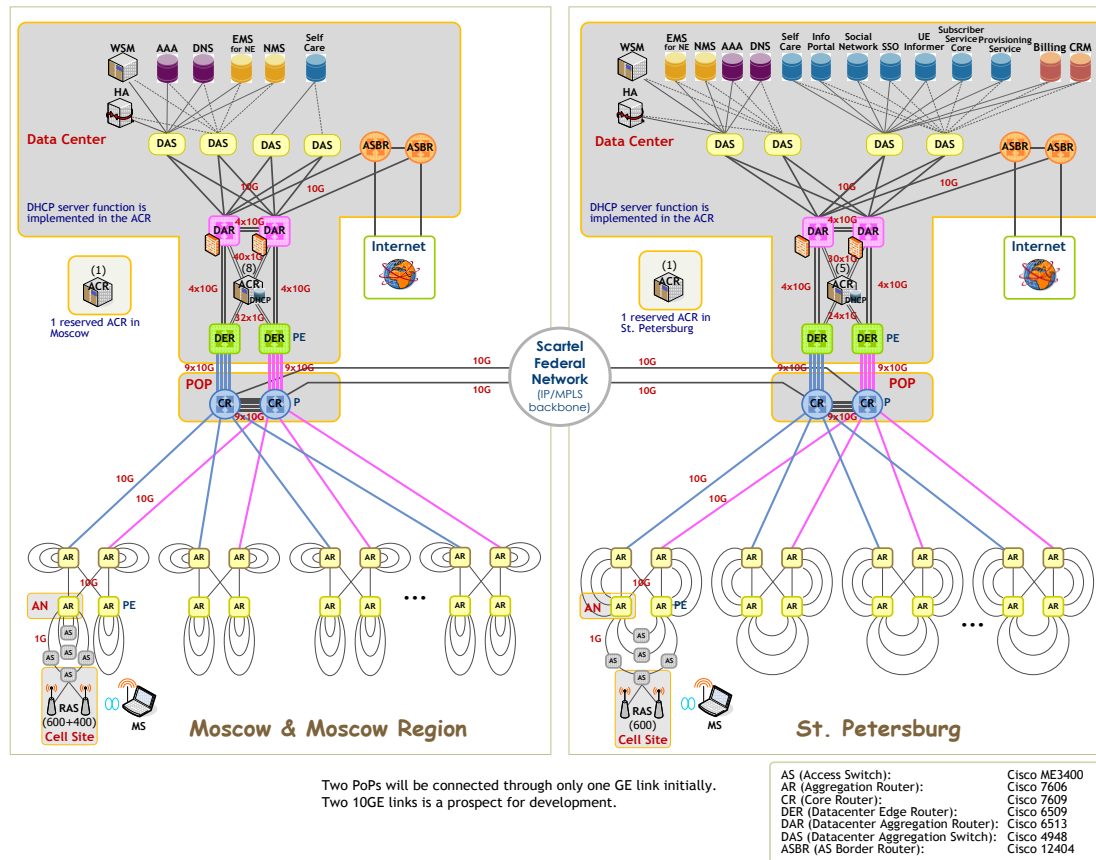


QPS Service based on Mobile WiMAX Technology

Design

Integration

Optimization



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

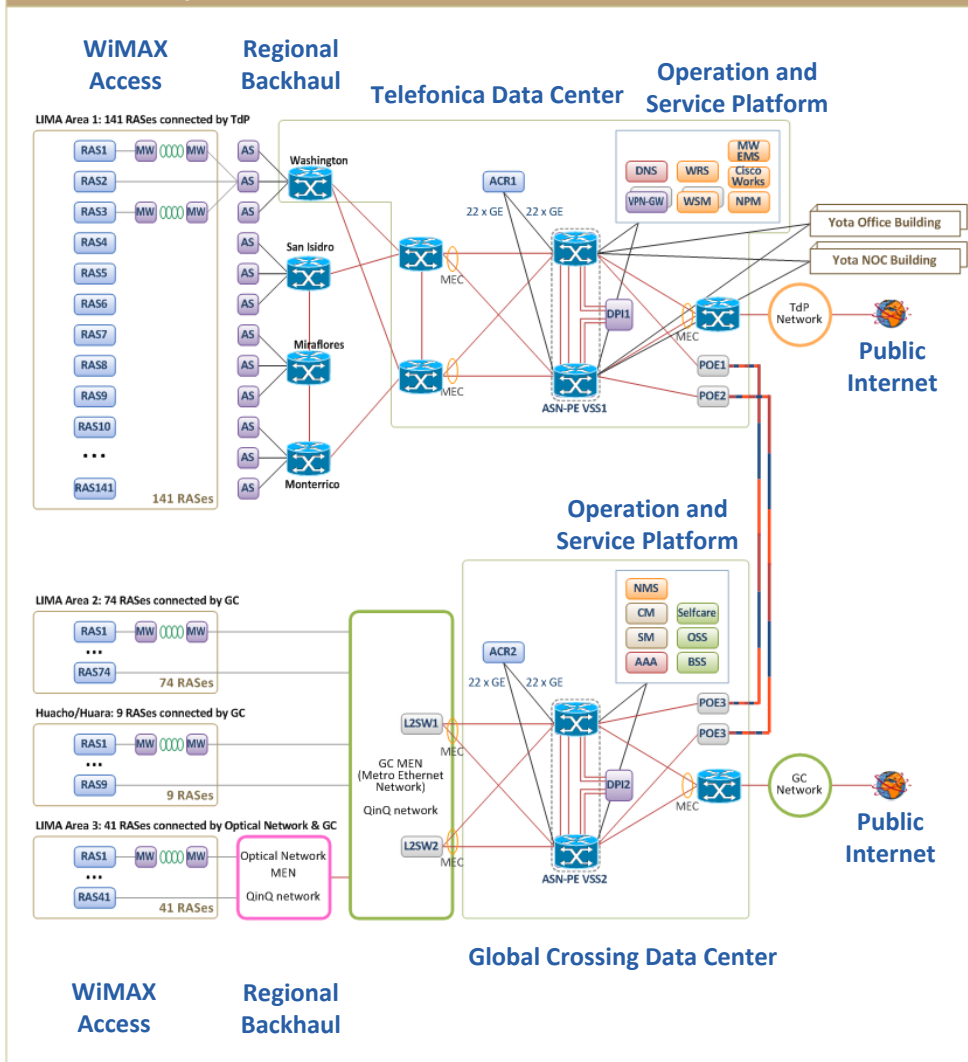


Peru Yota



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

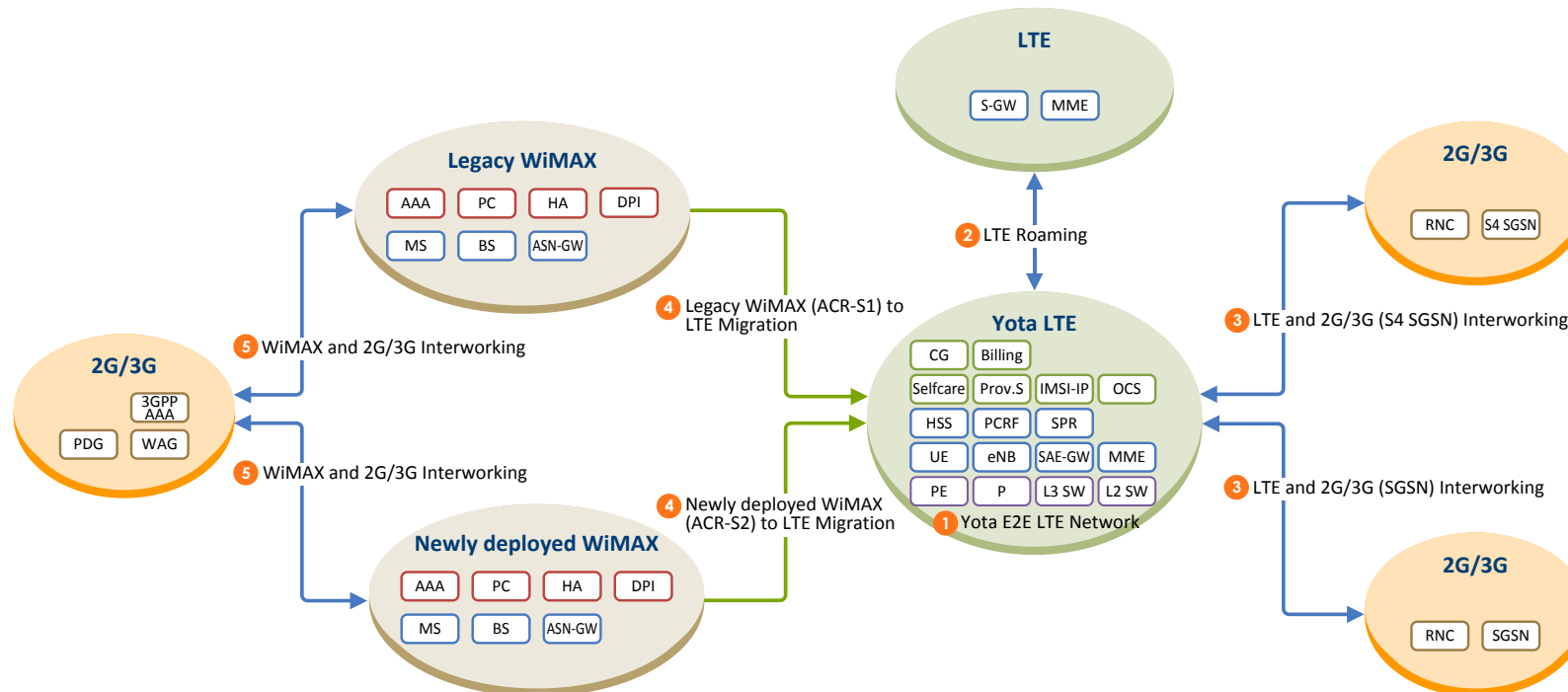
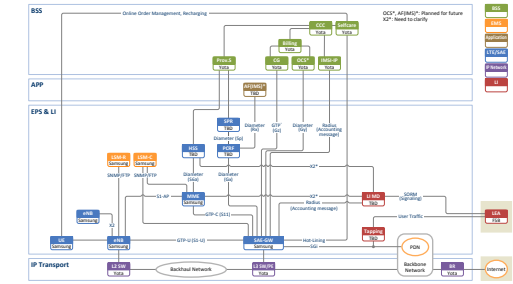
Our Work-Scope (Design)

- 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

End-to-end LTE Network Design

Design



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

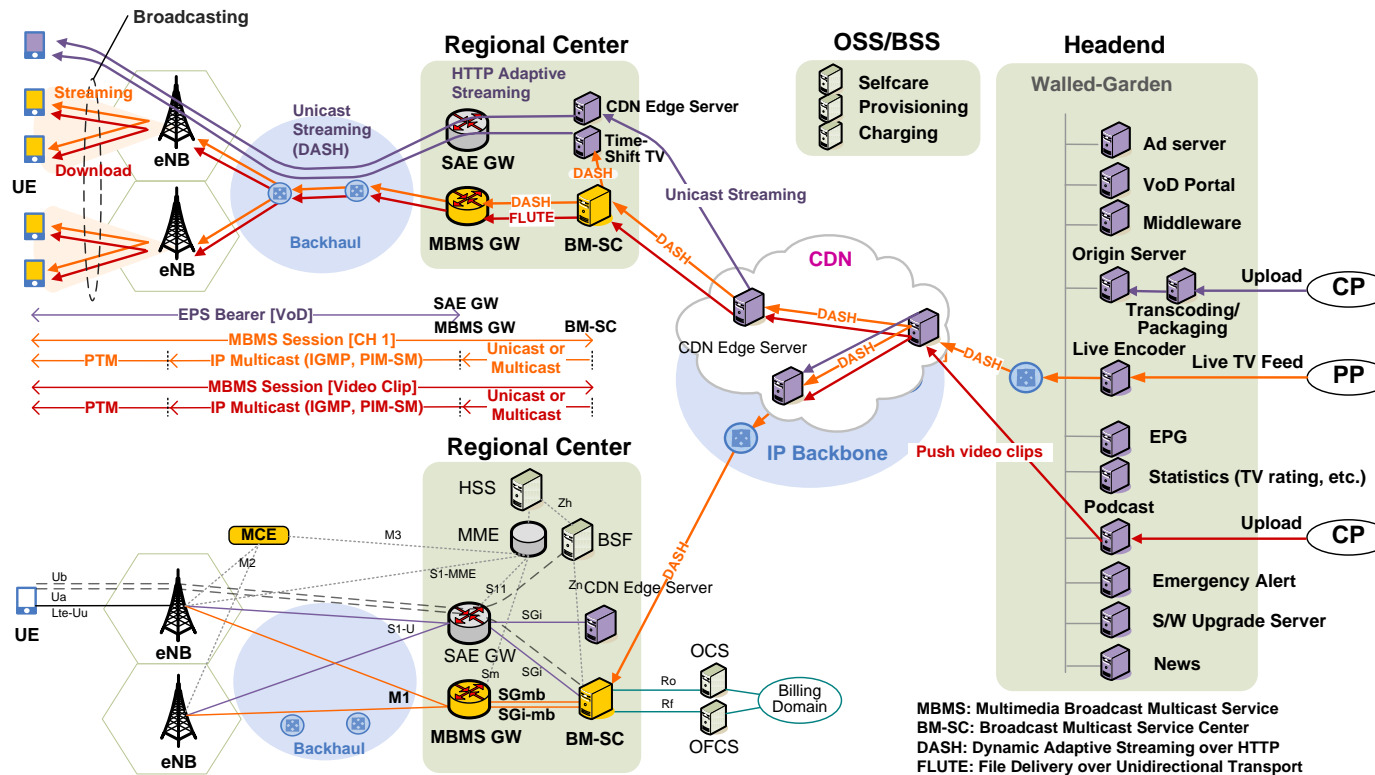
- Current WiMAX Network Architecture
- WiMAX-to-LTE Migration Scenario
- Required Features of ASN & CSN NEs

5. WiMAX and 2G/3G Interworking Design

- WiMAX-2G/3G Interworking Architecture
- Network Entry & Exit
- Inter-RAT Handover



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

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