mobigen

Make The Best For Smart Business

Company Introduction

2018

Inspiring Technology

for Smart & Intelligent Business

Content

Company Status

Under the three management philosophy of “infinite challenge”, “infinite innovation” and “infinite impression”, Mobigen is putting all efforts to be the best ICT solution specialist so that we help customers have more efficient and smarter ability to work. Mobigen has been performing various types of projects for mobile network quality management, and is the specialist that released the first big data platform in domestic.

mobigen
Make The Best For Smart Business

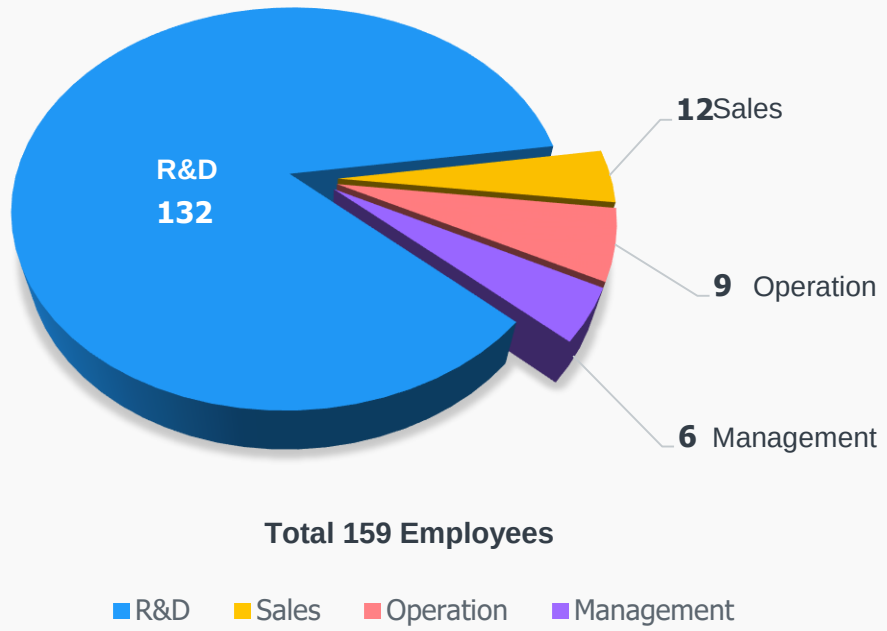
Company Name	Mobigen Co., Ltd.
Date of Establishment	March 21, 2000
Address (Headquarters)	C-16th Fl, 128, Beobwon-ro, Songpa-gu, Seoul, Korea, 05854
Contacts	+82 2 538 9360 | Fax (+82 2 538 9369)

2016 **Received SK telecom Partner Award**
2015 Selected as a managing company for Global Creative Software project (GCS) supported by the Ministry of Science, ICT and Future Planning (MSIP)
Integrated Spark, an open source framework, into Mobigen's IRIS Big Data DB
2014 **Received SK telecom Partner Award**
Renewed Quality Management ISO-9001
2012 **IRIS Enterprise V1.0 received the Grand Prize in New Software Product from Ministry of Knowledge and Economy**
[Certification] Acquired CrediMail V6 GS certificate (Good Software)
2010 Selected as exemplary taxpayer by Seoul Metropolitan Government
2009 **Certified as ‘A+ Members’ enterprise by Korea Technology Finance Corporation**
2008 Awarded as Honor Partner by SK Telecom
2007 Won Good Proposal Award at SK Telecom’s Open Idea Festival
2006 Selected as HP eKorea Partner
2005 **Selected as enterprise responsible for IT advance and innovation by SME (Small & Business Administration)**
Acquired ISO9001 Selected as honor IT firm (Korea Technology Finance Corporation)
2004 **Selected as good product by Public Procurement Service**
Certified as IT solution partner of Samsung Electronics
2003 Won “Best Partner Award” by SK Telecom
2002 Acquired IT mark awarded to SMEs with competitive IT capabilities from the former Ministry of Information & Communications
2001 Designated as excellent new technology creator in IT sector
2000 **Established Mobigen / Opened R&D Center**

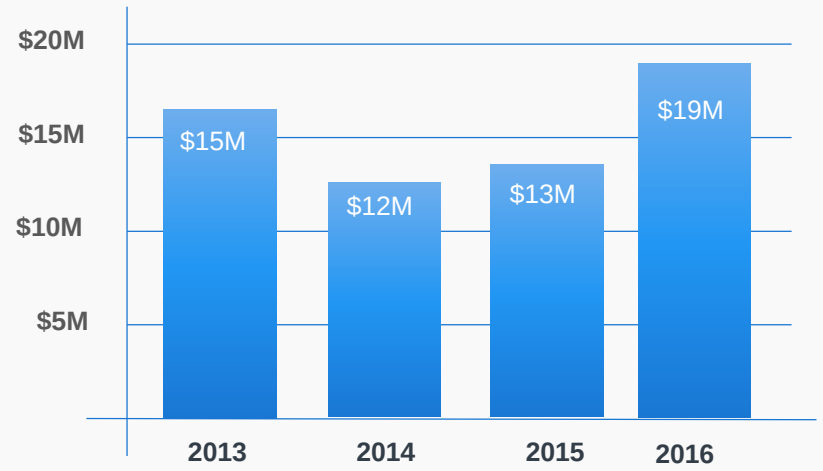
Employees and Financial Performance

MOBIGEN has experienced in the field of big data and telecom service monitoring over 10 years. Based on such experience and proven technology, MOBIGEN is able to take full responsibility to meet any customers demand. MOBIGEN is the technology-driven SW company consisting of more than 80% R&D staffs out of total employees.

Employees by Sector



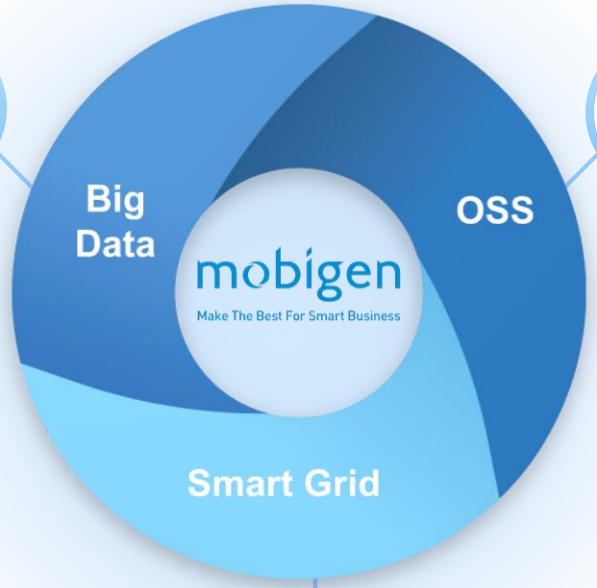
Financial Performance



Business Area

MOBIGEN's business area are of Big Data sector that processes and manages the structured/non-structured big data in real-time, the Smart solution (OSS and Smart Grid) sector that efficiently manages telecommunication and electric utility network and service environment, the Messaging sector for smart work environment. MOBIGEN has been recognized for its technological competence by providing portfolio that consists of more convenient and efficient solutions and products.

- Hybrid & Distributed Big Data Database Cluster (IRIS DB)
- Big Data Log Analyzer
- Advanced Analytics of Big Data based on ADE(Anomaly Detection Engine)
- Hadoop Package for Enterprise



- Integrated Network Management
- LTE(4G/5G) service assurance and traffic analysis based on packet capture and analysis
- Map-based service monitoring
- WiFi AP/Femtocell NMS/EMS

- Smart Grid Management
- AMR/AMI Solution
- Factory Energy Monitoring

※ Messaging sector is available in Korea market only.

References & Experiences

System / Project Offered	Remark
Packet-based LTE/WCDMA Quality Management	**Packet Probe + Big Data Solution**
Cyber Attack Analysis System	Big Data Solution
Big Log Data Analysis System	**Packet Probe + Big Data Solution**
Smart Grid Network Management System	Smart Grid
Cloud-based Security Log Analysis System	Big Data Platform(Open Source)
Packet-based LTE Traffic Analysis System	**Packet Probe + Big Data Solution**
LTE Femtocell Manager	Smart Device
LTE Network Management System	OSS
Packet-based LTE Traffic Analysis System	**Packet Probe Solution**
Mobile-based Switch Monitoring System (Smart NIMP)	OSS
Map-based Monitoring on Smartphone (Mobile i-Map)	OSS
Map-based Broadband Network Monitoring System	OSS
High-speed Railroad Network Management	OSS
Transmission Network Fault Monitoring System	OSS
WCDMA Access Audit Automation System	OSS
Factory Energy Management System (FEMS)	Smart Grid
Electricity Big Data Analytics	OSS
Packet-based LTE/WCDMA Quality Management	Big Data Solution

Why MOBIGEN?

Rich experience for years in telecom sector

Mobigen has over 15 years of rich experience and expertise in telecom sector.

Improve efficiency

Consolidated view that Mobigen solutions provide help you improve operation and work efficiency.

Optimize for real-time time-stamped log data processing

Mobigen is specialized in processing the large-scale time-stamped log data in real-time.

Guarantee the high-performance with distributed and hybrid architecture solution

Mobigen solutions work on the high-speed data processing engine that has been designed with hybrid(In-memory and On-disk) and distributed architecture. It can achieve the best performance and the best capacity at the same time.

Improve customer experience

Mobigen is specialized in service assurance field in which works for improving customer experience by managing service quality from customer perspective.

Smart storage that supports SQL

Mobigen solutions enable you to easily access the large-scale distributed database with standard SQL.

Fast time-to-market

Mobigen slashes your time to market by boosting the productivity of your operation and offering the availability of various use cases.

Reduce the total cost of ownership

Mobigen helps you reduce total cost of ownership by providing cost-effective solutions.

Big Data Business

Diverse Business Approaches based on IRIS Big Data Platform

In-house Developed Platform

IRIS Enterprise DB

- Distributed big data DB supporting SQL

IRIS Analyzer

- Distributed analysis solution of log data

IRIS Hadoop

- Packaged Hadoop Echo System

SI Projects based on IRIS

Telco

- SK Telecom, LGU+, KDDI etc.

Finance

- Samsung Fire & Marine Insurance

Public

- Government agencies

Constant Development of Big Data Applications

Customer Pattern Analysis

- Trend analysis of customer behavior

Log Analysis

- Analysis of equipment log data

Anomaly Detection

- Anomaly detection of equipment fault/traffic/security

Big Data – Success Stories

Mobigen has lots of experience in processing and analyzing various big data (more than 30 big data projects). Mobigen owns not only open-source big data platform (Hadoop) based solution but also proprietary solution of distributed DB (IRIS DB) for big data processing.

Customer	Project	Description
LGU+	LTE service quality management system	LTE service quality monitoring based on the **probe system running on top of big data platform(IRIS)**
SK Telecom	Real-time packet collection/analysis platform	Open source platform that **collects and analyzes LTE/WCDMA packet probing data in real-time**
	DW capacity expansion for billing data(CDR) processing	**Real-time indexing and archiving about 70B records per a day (Total 1.5 PB)** Adds IRIS in order to take over some tasks(e.g. storing raw data and making summary statistics) what the existing data warehouse system has been carrying on
Samsung Electronics	Big data analysis/management platform (Media Solution Center)	Integrated management/analysis of global mobile phone logs Deploys analysis platform/management system based on Hadoop
Samsung Fire	Integrated log analysis system	Company-wide traffic analysis based on packet data Security management and system level usage analysis **Processes 50B records/year, about 1PB/year**
NIA (National Information Society Agency)	Big data analysis and utilization center	**Deploys a platform for public data analysis and educates big data technology** Deploys the platform based on open source(Hadoop, Flume, R, Mahout, etc.)
KISA (Korea Internet Security Agency)	Information sharing and synthetic analysis system on cyber threat and incident information	Detects cyber threat information based on log analysis of public offices Deploys converged platform that combines open source(Hadoop, R, Mahout, Flume, e tc.) and in-house solution (IRIS DB)
Ministry of Trade, Industry and Energy	Deploys device independent cloud platform – government project	
ETRI (Electronics and Telecom Research Institute)	[Smart Internet] Deploys big data processing platform under cloud environment – government project	

Big Data – Success Stories

LTE Quality Management

SK telecom
LG U+

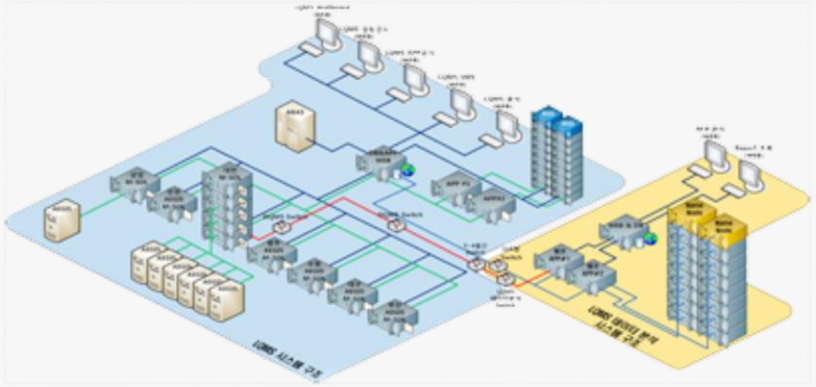
LTE

LTE Service Quality Management

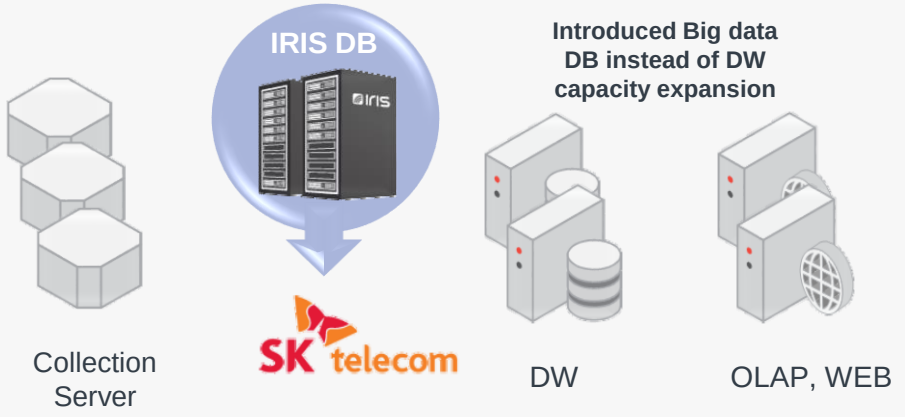
- LTE service quality monitoring/analysis,
- Provides information for engineering & marketing
- LTE packet collection, billions of records/day

Big Data Platform

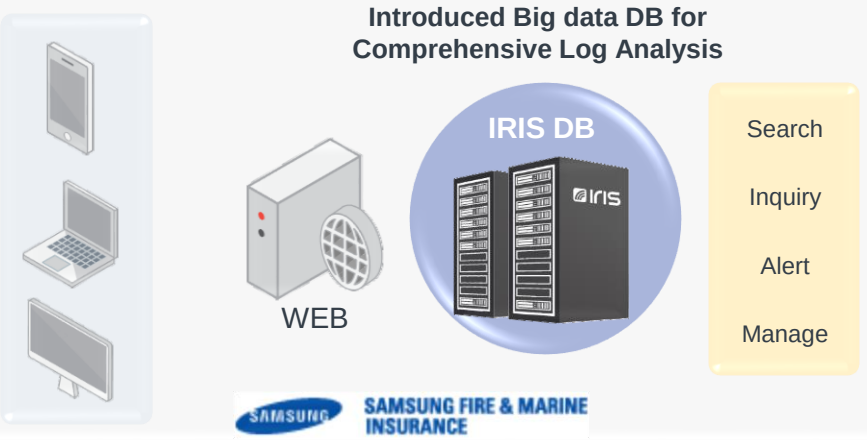
- High Availability Architecture
- Real-time monitoring system
- Detailed service monitoring
- VoLTE monitoring



DW Preprocessing



Big Data Analysis(Enterprise Data Governance)



IRIS DB – Features

IRIS Big Data DB Cluster Low-cost and high-performance DB cluster for real-time processing of petabyte-scale big data

Real-time & High Performance
- Hybrid (In-memory/On-disk) & distributed architecture
- Terabyte-scale data processing per day in real time

Scalability
- Scale-out
- Easy Node Extension

Reliability
Failover through data replication

Lower TCO
- Data Compression
- Reduces TCO

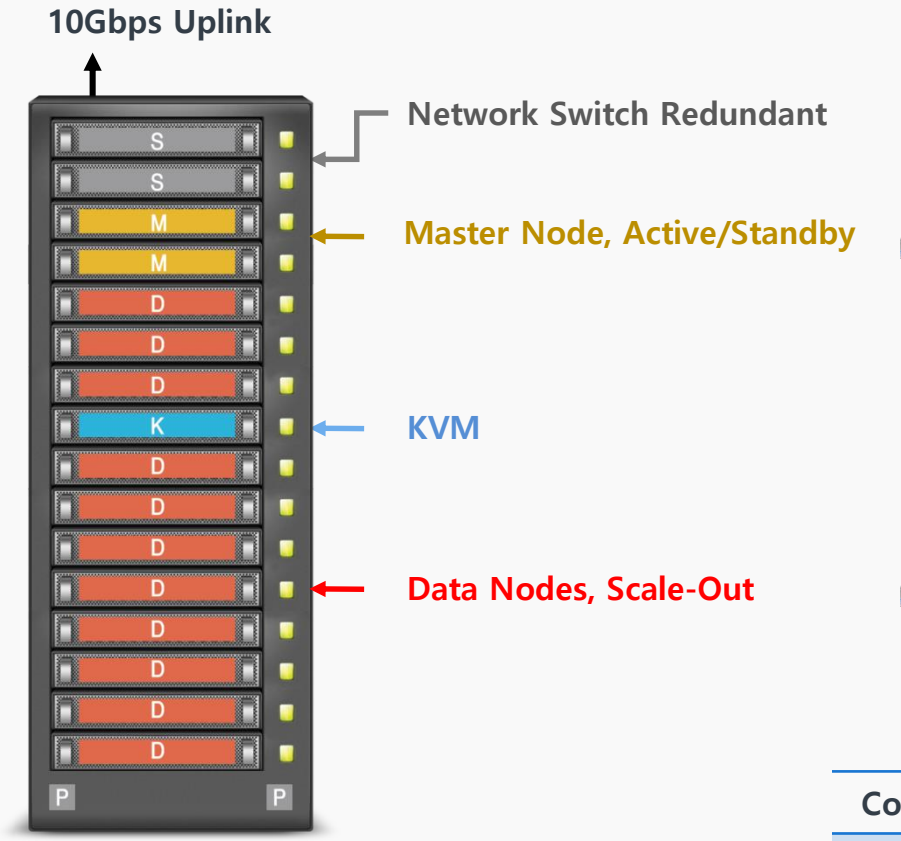
Full Text Search
Full text search engine embedded

Log Analyzer (Optional)
- Log event search
- Pivot analysis
- Report
- Open source interface (Zeppelin, Jupyter, R-studio)

Easy Data Access
- Supports SQL92
- Provides JDBC API

IRIS DB – Architecture

IRIS Big Data DB Cluster Optimized scale-out architecture



Network Switch

Master Node

Data Node

Component	Specification
Switch	48 x 1Gbps Ports
Master Node	Xeon 16-core, 128GB DRAM
Data Node	Xeon 16-core, 128GB DRAM, 12x4TB Disk (Usable 40TB) or Xeon 16-core, 128GB DRAM, 4x6TB Disk (Usable 16 TB)

IRIS Big Data Platform Configuration

- The IRIS enhances DB functionality for easier processing of big data
- User-oriented integrated ETL, Hadoop and Analyzer on IRIS

IRIS Enterprise DB

Hybrid Distributed Parallel Big Data DB Cluster

- Improved performance and speed through distributed processing of high-speed processing engine-based mass data

IRIS Analyzer

Intelligent Big Data Analyzer of analyst perspective

- Provides GUI-based integrated analysis environment that can drastically shorten big data analysis time

IRIS ETL

Event flow-based IRIS-only ETL

- Create and process various ETL jobs based on open source based ETL designer and event flow

IRIS Hadoop

Hadoop package for enterprise

- Integrated UI for administrators, developers, and analysts consider network isolation environment

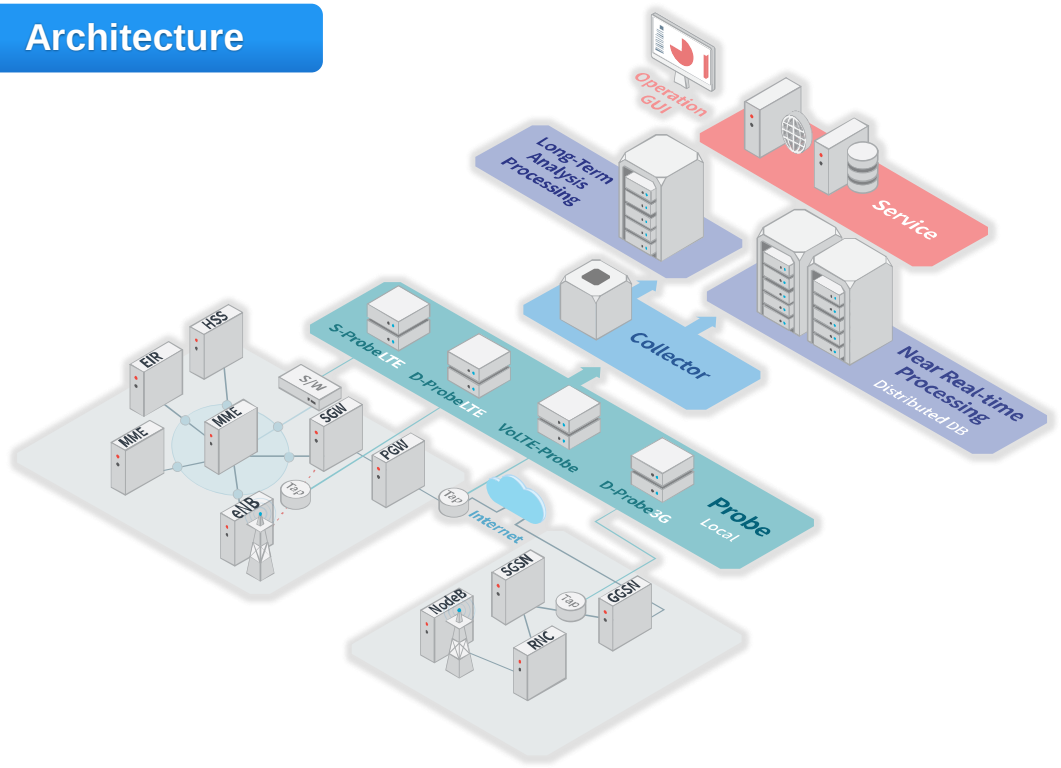
OSS(Operation Support System) – Success Stories

Using billing information (CDR) belonging to mobile operators, Mobigen applied specialized technology that manages overall service quality of mobile network and subscriber-level service quality. Mobigen has developed and deployed Packet Probe system recently to effectively monitor and analyze the LTE data service quality from customer perspective, and continued to develop and deploy systems by converging and combining diverse technologies that are based on in-house big data platform.

Project	Description	Effect and Remarks
Packet-based service quality monitoring and analysis system	• **Signaling and user data packet probing on 3G/LTE network** • Subscriber/location-based traffic monitoring and service application monitoring • Root cause analysis by real-time correlation of Signal and user data • Processes large volume Traffic(User Traffic 10Gbps, 400PPS)	• Real-time (1min.-period) monitoring and analysis • Pinpoints root cause of the problem quickly • Monitors quality of experience on subscriber-level • Utilizes traffic data per subscriber/per location/per service application in different purposes (e.g. engineering, customer care, marketing, etc.)
HD Voice(VoLTE) quality management system	• **Collects/analyzes SIP/RTP packet in LTE EPC~IMS sector** • Generates HD Voice-specified KPIs (Success/Fail, Drop call, Loss, Jitter, Silent, etc.) • Equipment-level monitoring/analysis, subscriber-level monitoring/analysis, packet viewer, etc.	• Real-time monitoring of VoLTE service quality • Great improvement by analyzing service quality per device manufacturer
Administrative District Map-based integrated monitoring system	• **Monitors/analyzes fault/performance of 2G/1X/WCDMA/LTE network per administrative district** (city, province, county, etc.) • Maximizes visualization of intuitive monitoring by expressing with different color on the map	• Integrated management with a single screen allowed effective operation
Integrated WCDMA/LTE NMS	• **Fault and performance monitoring/analysis of 2G/1X/WCDMA/LTE network** on a single screen	• Greatly reduces and improves operation efficiency by Integrating network management environment
Wi-Fi AP management system	• **Remote configuration for over 100,000 Wi-Fi APs** • Service monitoring of network devices by collecting event and performance data	• maximizes operation efficiency through remote/auto provisioning and firmware downloading and management of multiple devices from remote
Integrated big data cluster management system	• **Integrated management for big data system** • Real-time collection of Metric of Ganglia/Ambari based infra(server, network) and service(Hadoop based) • **Monitoring/analysis of anomaly of performance/state by collecting 640 Metric from 600ea big data nodes in real-time**	• Overall control on big data cluster • Integrated control on server infrastructure and network service

OSS – xInsight (4G/5G Customer Service Management based on packet probe)

Architecture



Features

- Provides the near real-time(1min.) monitoring and analysis of customer experience of service quality
- Creates xDRs to provide end-to-end visibility of each call and pinpoint root cause of the problem
- Correlates signaling and user data to provide root cause analysis based on 3GPP call procedures
- In-depth monitoring from different perspectives
  - Network Topology monitoring from network operation perspective
  - Application and VoLTE monitoring from customer perspective
- Stores network data in a big data DB for big data analytics
- Seamlessly scalable architecture

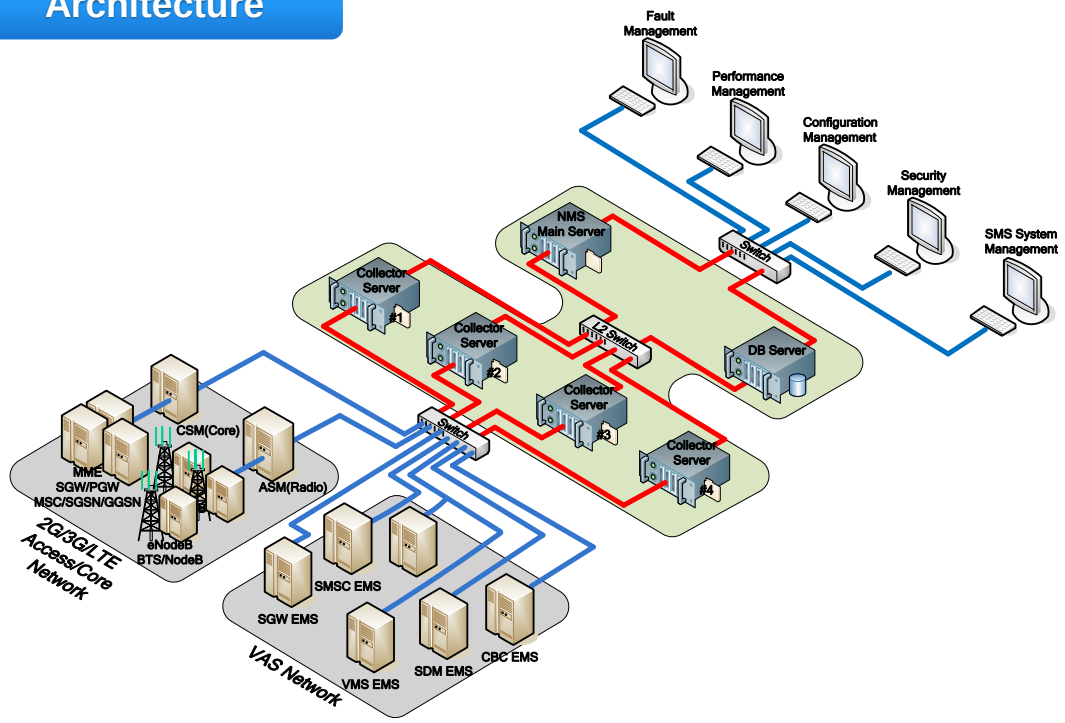
- **Real-time Monitoring**

- **Traffic Pattern Analysis**

- **VoLTE Quality Monitoring**

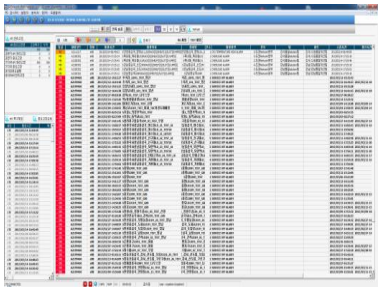
OSS – nManager (Comprehensive Network Management System)

Architecture

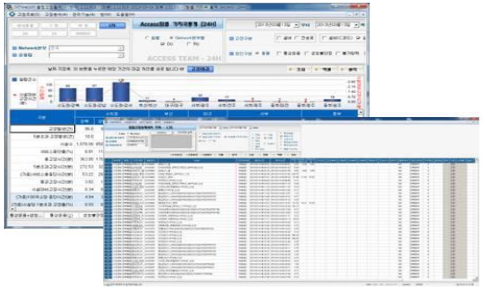


Features

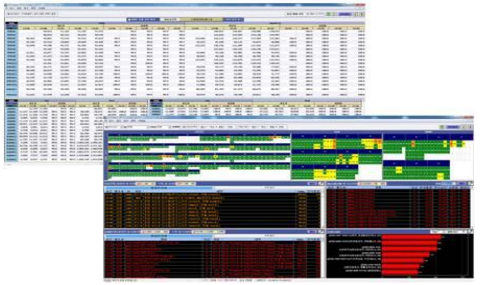
- Real-time data processing
  - Real-time alarm data collection from each EMS
  - Processing and monitoring of real-time alarms
- Large-scale data processing
  - High speed data processing for alarm and performance analysis
- Fault monitoring
  - Real-time fault monitoring and history management
  - Alarm filtering and correlation
- Performance management
  - Traffic monitoring and alarming
  - Trend analysis



- **Real-time Monitoring**



- **Statistical Analysis**



- **Performance Monitoring**

OSS - Map Based Monitoring

Map-based Network Monitoring(Web)

- **Fault and performance monitoring of nationwide network**
  - ☞ Monitors from service area and customer perspective

Map-based Network Monitoring(Mobile)

- **Monitoring/analysis operation from outside of office**
  - ☞ Offers a mobile office environment

- Comprehensive monitoring/analysis for the administrative district, subway and a crowded area
  - Monitors traffic performance for the administrative area at one-minute interval
- Drilling down to lower-level maps for detailed investigation
- Intensive monitoring for the concerning area
  - Provides monitoring and analysis functions for the concerning areas (e.g. highway, railroad, etc.)
- SMS Trouble Ticketing with Call Back URL

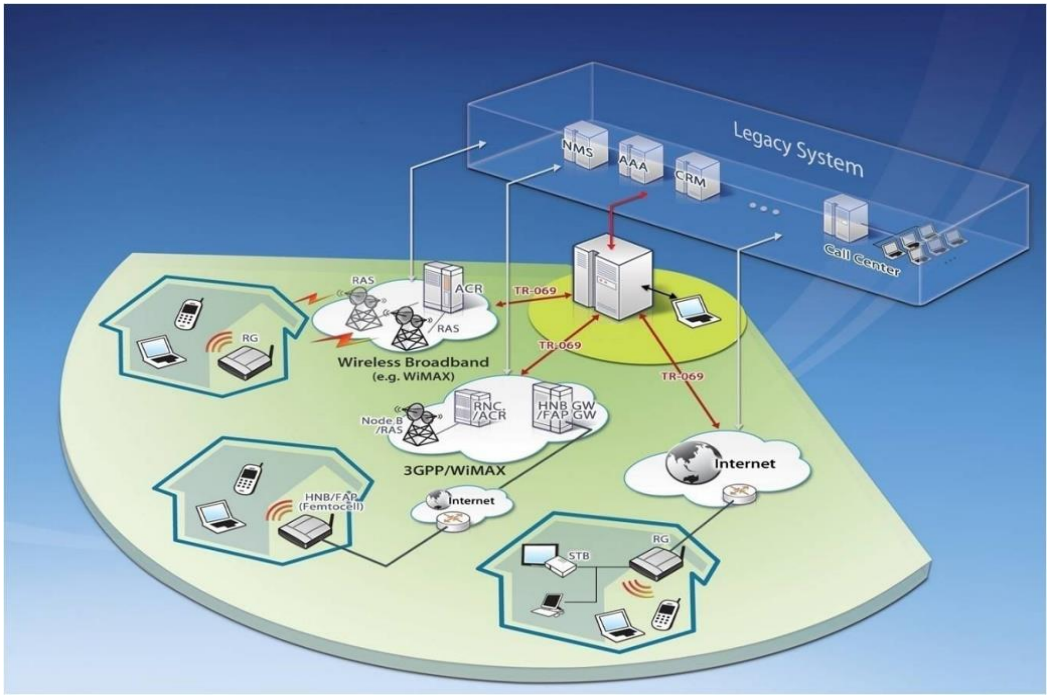
● **Regional View (Web)**

● **Highway View (Web)**

● **Highway View (Mobile)**

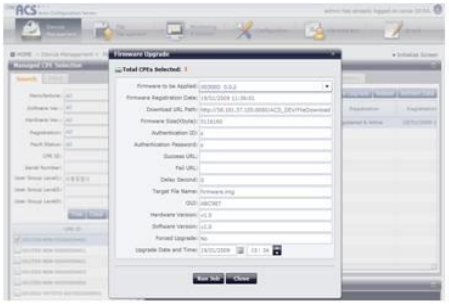
OSS – eManager (Wi-Fi AP/Femtocell Management)

Architecture



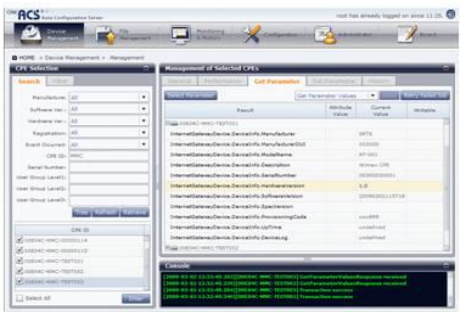
Features

- Auto Provisioning
  - Automatic or manual registration of a single or a group of APs
- Software & Firmware Upgrade
  - Upgrades software or firmware automatically based on the predefined schedule
- Status & Performance Monitoring
  - Monitors status and resource of APs
  - Real-time event monitoring
  - Periodic performance monitoring and trend analysis
- Diagnostics & Reboot
  - Reboot APs from remote



● **Firmware Upgrade**

● **AP Status Monitoring**



● **AP Parameter Settings**

Thank you.

Contact Information

Address C-16th Fl, 128, Beobwon-ro, Songpa-gu, Seoul, Korea, 05854
Telephone +82-2-538-9360 **Fax** +82-2-538-9369

www.mobigen.com

mobigen
Make The Best For Smart Business