Next Generation Automation – A Case Study
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Next Generation Automation - a case study

• Outlining the challenges for Mobile Network Operators
• Defining the key priorities with Network Automation?
• What are the main benefits of Automation?
• What does the evolutionary path from Manual to Automated Network Operations looks like?
• What is the ultimate goal of Network Automation?
NETWORK LIFE CYCLE MANAGEMENT SERVICES

Plan to Build
- Site Rollout Management
- Surveys & Field Collections
- Field Force Management
- Contract Management
- Material Management

Build to Operate
- Fault & Ticket Management
- Field Tests & Validations
- Configuration Management
- Service Assurance
- Inventory Management

Operate to Acquire
- Campaign/Loyalty Management
- Product Lifecycle Management
- Customer Care & Self-service
- Channel partner Management
- Customer Experience
## PLAN TO BUILD CHALLENGES

### Workflows
- Multiple workflows for each stage in the network planning, construction, installation, commissioning and acceptance

### Mobile Workforce Management
- Huge task of managing a large on-field workforce
- Employees, OEMs, Partners and outsourced staff need to have a single system for all transactions

### Data Quality Management
- Error prone manual data entry by field executives, with no validation at point of input
- Disparate systems used for data collection, validation, analysis and reporting

### Process Management
- Frequent handovers between multiple stakeholders with unclear accountability
- Lack of visibility into project execution status across regions

### Network Elements and Technology
- Single system for rollout of multiple technologies and Network elements (eNodeB, Small Cell, DAS, Backhaul, FTTx, Wifi)

### Reporting
- Error prone Manual Reporting as there is no database, but mostly a pdf repository of checklists
- No Transparency as cannot track SLA / OLAs
BUILD TO OPERATE CHALLENGES

Limited ability to correlate events across Network functions to build a 360° view of User Experience
OPERATE TO ACQUIRE CHALLENGES

Limited visibility to Customer experience

Customer Experience
No correlation of Customer KPIs with Service and Network KPIs

Customer Care
No view of Network health to the customer Care agents

Churn Management
Need integrated Network and Customer view for Churn Management

Network performance on the user device is the last-mile in Delivering a superlative user experience
KEY PRIORITIES FOR NETWORK AUTOMATION

“Real-time metrics & automation to maintain a high quality network for superlative customer experience”

- **One stop toolbox**: Integrated toolkit for network Management and analysis
- **Closed loop automation**: Automating E2E problem Resolution life cycle
- **Intuitive visualizations**: Advanced analytics and GIS based visualizations
- **Big Data analytics**: Correlate multiple data Streams at huge scale
- **Scalable**: Able to scale horizontally with the growth of network and customers
- **Secure Access**: Easy and secure web Access from office, home or while travelling
- **Fast Response**: Fast response times motivating people to use the platform
- **User Management**: With roles and profiles to give access to all employees and partners
BENEFITS OF AUTOMATION

Transformational activity for every one connected to **Network and Customers**

**Customer Care**
- can digitally engage with customers and resolve the complaints in first call with shorter call handling time

**Planning**
- can make the investments based on verified impacts

**Sales**
- can monitor the channel sales and correlate it to network performance of that area

**Network Operations**
- can focus on customer Impacting Issues and quickly resolve the most important incidents

**Optimization team**
- can Link Network behavior with Customer behavior via Analytics and in turn Improve customer experience

**SCM team**
- can digitize their procurement process a and manage contracts, POs, and warehouses to support network functions

**Better Network Quality**
- Due to proactive identification of network issues

**Process Driven operations**
- Network operations less dependent on the skill set of the engineers

**Lower OPEX**
- Due to reduced manpower for network operations

**Transparency**
- The complete organization sees the same data and reports
## SMARTFREN AUTOMATION JOURNEY

**Pursue Digital Transformation as Only digital will thrive**

### Siteforge  Business Process Modelling platform
- Standardized Processes
- More Accountability and SLAs
- Automated
- Simplified & Rationalized

### netvelocity  Measure customer experience
- Passive SDK for crowd sourcing
- Drive Testing
- Speed Tests

### foresight  Next Generation OSS
- Open and Intelligent
- Vendor and domain agnostic
- Automated and scalable Big data analytics platform
- Instant access to actionable insights, symptoms, root causes & recommended actions

### Tribe  Mobile companion of Smartflow and Foresight
- Robust Task Management
- AI engine integrated with Foresight
- Social collaboration
- WIKI - Knowledge sharing
- Forums and Spaces
SiteFORGE

Automation Intelligence & Workflow Orchestration
Network Roll-Out

- Site Tower Management
- Logistics and Inventory Management
- Document Management
- Project Management
- Workflow Management
- Property Management
- Rollout Management
- Analytics and Dashboards
- Knowledge Management
- Team Management
- SLA and OLA Management with Vendors
FORESIGHT INTEGRATED FEATURE SET

- Capacity Management
- Configuration Management
- Performance Management
- Fault Management
- BPM & Workflow Management
- Site Visualizations
- Customer Care
- Muting Analysis
- Trial Management
- Customer based Network Analytics
- Boundaries & Morphology Management
- Coverage Layers
- Big Data Cycle Management Components
- Network Topology
- Coverage Holes identification & Remediation
- Over shooter & Interference analysis
- Regulatory & compliance reporting
- Analytics & Reporting framework
- Data Integrity, Operations and monitoring framework
DOMAIN & VENDOR AGNOSTIC FRAMEWORK

### 360 Network visualization
- Coverage Layer
- Capacity Management
- Interference mitigation
- Change management
- Audit & Compliance
- User Management
- Small Cell Planning
- Customers QoE

#### Use case Realizations

##### Infrastructure Tools
- Telecom Library
- BI toolkit
- BPMS

##### Platform Services
- Cross Domain co-relation
- Closed loop automation
- Integrated RCA

##### Core Framework
- Centralized Data storage
- Network Orchestration

##### Parsers
- Counters And KPI
  - PM
  - CM
  - FM
- Parameter read and write
- Trap & Alarms
- Geolocated Events
- Cell Traces
- Recommendations & Algorithms
- D-SON

##### Protocol convertors
- Cross Domain
  - (RAN, IP / Transport, Core)
- Vendor Agnostic
  - (Huawei, Nokia, Ericsson, ZTE, Cisco)

##### Adaptors
- Protocol convertors
- Adaptors

##### Service & Vendor Abstraction
- Proprietary Implementation
TECHNICAL ARCHITECTURE

**Web Portal**
- **Administration Interface**: ANGULARJS
- **GIS Visualizations**: Configuration Management, Rich Interactive UI
- **Material Design**
- **Leaflet**

**RESTful Web Service & Security**
- OWASP Standards
- SDX Compliant
- SAML based SSO
- Role based Access

**NetVelocity App**
- Enterprise
- Consumer
- Speedtests
- Drives

**Tribe App**
- Collaboration
- Wiki
- Forums
- Tasks

**Micro Services**
- **Streams**: Observations, Alarms, UDRs
- **Batch Files**: Logs, Counters, Events
- **APIs**: Mobile, Push, Pull
- **Data Stores**: RDMS, Dumps, Configs

**AI/ML Toolkit**
- Build, Model & Integrate
- TensorFlow
- H2O
- MLlib
- NLP
- PMML

**Application Server**
- Business Logic & Services
- Data Access, Caching & Validations
- BPM Workflow Orchestration

**Gateway**
- Data collection & preprocessing
- API Integrations
- GIS & Data Queries

**BI Engine**
- GIS Visualization
- Configuration Management
- Rich Interactive UI

**Process Runner**
- Build, Model & Integrate
- Nifi
- PMML

**Process Management**
- Process Orchestration
- Provisioning
- Pipelining
- Provenance
- Routing

**Data Ingestion**
- Filters
- Transforms
- Protocols
- Producers

**Events Processing**
- Patterns
- Time Correlation
- Causality

**Hadoop Cluster**
- Data Storage
- Batch Analytics
- Stream Processing

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**Hadoop Cluster**
- Apache HBase
- Apache Spark

**Streams**
- Structured
- Raw
- Processed

**Batch Analytics**
- Structured
- Map Reduce
- Aggregation

**Data Ingestion**
- Unstructured
- Raw

**DevOps Framework**
- Audit
- Balance
- Control
- Data Integrity
- SLA tracking
- Monitoring
- Compliance
- Real-time Insights
- Monitoring
- Compliance
- Real-time Insights
FAULT MANAGEMENT

NOC Incident Manager

- Active Alarm window
- Incident Management
- FM Trouble Ticketing
- Work force Management
- Alarm Correlation – Self, Suppression, Count, Intermittent, Hanging cells, Sleepy cells
- Topology Correlation
- Spare Part Management

Real Time alarm visualization for RF Engineers
- Active alarm and Alarm History reports
- Alarm Dashboard
- Network availability Reports
- MTTR Reports

Active Alarm Visualization
COVERAGE LAYERS

GIS map-based visualization for Planned & On-Air Sites

Measured coverage layer based on Netvelocity Passive data

Visualization of competitor coverage based on 2nd SIM of Customers phone

Visualization of predicted layers imported from planning tools for web display

Intelligent Coverage with Planned Prediction Plots, Measured/Observed & Smoothened estimates

Classification of Passive data of Netvelocity based on algorithms
Measures network performance where it matters, on the device.
TRIBE
Enterprise Collaboration
AUTOMATION LADDER

Deploy a scalable architecture

Collect all possible data in a single platform

Insure Data Integrity – Trusted source of Data

Automate Correlation – Dash boarding & Visualization

Enable teams to build their own correlation logics

Apply Machine learning to drive new Insights

Integrity | Positive Attitude | Commitment | Continuous Improvement | Innovative | Loyal
FORESIGHT - ORCHESTRATING AI/MACHINE LEARNING WITH BIG DATA

### Ingestion & Enrichment
- Kafka
- AWS
- RDBMS
- 3rd Party sys.

### Business Analyst
- Model
- Configure
- Monitor
- Audit

#### Forecast & Orchestrator
- Retrieve Filter Criteria
- Filter Image
- Persist Data
- Retrieve Meta Info
- Image Processing
- Notification
- Content Search

#### ML Models
- Forecasting
- Scoring
- Recommend
- Clustering

### Dev Ops Engg.
- Predictive Analytics
- Intelligent Actions
- Proactive Alerts
- Visual Analytics

### AI Driven Services
- Ingestion & Enrichment
- Data Wrangling/ETL/Correlations
- Complex event processing & Rules
- Integration adaptors & BI builder

### Visual modeller & mgmt. interface
- Online Drag & Drop Interface
- Data Wrangling/ETL/Correlations
- Complex event processing & Rules
- Integration adaptors & BI builder

### Integrated AI/ML components
- Build, Model & Integrate
- OOB Algo. implementations
- Deployed to petabyte scale
- Geo Spatial Correlations

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**Orchestration ability of Machine learning Algorithms over Big data**

**Out-of-the-box Integration of industry prevalent AI & ML framework**

**Drag & drop interface to stitch flows thereby abstracting underlying complexities**

**Leverage all open source platforms & toolkits**
Coverage, HSI, & Voice

Collaboration Channel for Enhancing Workforce Productivity

Indoor/Outdoor Classification Engine

HYPER-DENSE COVERAGE PLANNING

3D Indoor Planning

Identify Social Influencers for Churn

Automated Problem Understanding and Response

Artificial Intelligence enabled problem identification
Let’s discuss!
Thank you