Agenda

1. Introduction to Cisco SON
2. Cisco SON Evolution
3. AI/ML based SON
4. Cisco SON – 5G automation solution
5. Q&A
Reducing Human Errors

About 30% of the activities in 60% of all occupations could be automated, and that will affect everyone from welders to landscape gardeners, mortgage brokers... and CEOs... and includes RF engineering

McKinsey & Company
Cisco SON Vision
Automate & improve your future mobile network today
The Cisco SON Product Leadership

- **Closed Loop**
  24/7 automation with minimal human touch

- **Open & Flexible**
  SONFlex, Studio, Integration with ONAP & xRAN

- **Independent**
  Pro-operator strategy, Vendor Neutral KPIs.

- **Most Mature**
  Performs on a huge scale for over 5 years

- **Most Deployed**
  World’s largest SON installed-base

- **Multi-Vendor**
  Ready for any gear & technology combination
How Does SON Work?

Fully Automatic, Closed Loop Operation

Diagnosis (Trigger)
Collect constantly 24/7 on network conditions

Action
Algorithmic apps tweak the network automatically

Feedback
Results, automatically analyzed - lead to revert or new action

10Sec - 15Min Cycle
Awards

To be continued...

AI enabled augmented engineering increases network optimisation speed by over 45,000%

Vodafone first UK operator to use Cisco SON technology to give customers ‘superior voice quality’
Trusted the Industry Leading Operators

Cisco SON Optimizes 3M Cells and over 1B subscribers Worldwide
Cisco SON milestones

- **2012**: signs up AT&T
- **2013**: Cisco Acquisition ($475M)
- **2015**: Cisco SON deployed in NA, India & Europe
- **2017**: Cisco SON leading the CSON industry
- **2018**: Flex, ONAP
- **2019**: 5G SON
SP growing demands

What SPs want to achieve

- Move faster
  - New services TTM
  - Simplify implementation
  - Enable services on-demand

- Be flexible
  - Add new business models
  - Grow capacity elastically
  - Enable network slicing

- Grow profitably
  - Add new products
  - Reduce opex
  - Reduce capex
Cisco SON Evolution

**MDSO & 5G**
- Multi-Domain E2E Service Optimization
- Video
- IoT
- Connected Cars

**FLEXIBILITY & SPEED**
- Framework for operator-led SON innovation from ONAP
- SONFlex Studio & market level automation
- SONFlex APIs
- ONAP Evolution

**ENHANCING**
- New data sources Customer Experience | Probes | Geo Location | Crowdsourcing
- User Centric Optimization
- Deep learning predictive SON

**MVMT SON**
- Closed loop
- Automation
- Multi-Vendor
- Multi-Technology
- VoLTE
- 5G NR
- cRAN/vRAN
- xRAN & Cluster SON
## Cisco SON Evolution

### MDSO & 5G
**DOMAINS EXTENSIONS**
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Proven Optimization Track Record – 4G
SON Automation Value

RF Shaping - Optimizing Cell’s footprint

Load Management - Steering traffic from loaded to non-loaded cells

Configuration Management - Freq' Relations audit and enforcement

Self Healing - Mitigating coverage outages
SON Performance Value

Closed Loop Optimization

Improving cells
Mobility
Retainability
Accessibility

-41% E-RAB Drop Rate Delta

Increasing High band Users

24% Throughput Delta

Resolving Sleeping Cell Degradation
Cisco SON Evolution

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From Network to Users
Customer Experience SON - Use-Cases

1. Enterprise

Enterprise customers QoE: take Great Care of VIP Subscribers

2. High Mobility

Highway Optimization

3. NPS Detractors

Prevent Churn and Retain Corporate Accounts with SLA
Customer Experience SON - Results

Improved high mobility users performance

-28%  -30%  +24%  -5%

High way drops  Low quality calls  User Accessibility  Muted Calls
Crowdsourcing | Geolocation

Location based optimization
## Cisco SON Evolution

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SONFlex

Next Level Automation
Automate manual tasks

Faster TTM
The SP determines the Roadmap

Reoccurring Revenue
Subscription and RTU instead of perpetual

SONFlex Studio
for light-weight automation apps by non-programmers
Taking automation to the next level

50% Cisco SON apps using SON Flex

70% SON apps tailored to AT&T specific needs

80% Market specific apps and market level automation
SONFLEX STUDIO

Enable Fast Integration with 3rd Party External Data Source
The Resulting Apps can be Shared across market at FlexStore
SON & ONAP

Cloud native
ONAP hosting platform for SON microservices

SONFlex Services
The SON applications runs as microservices

Conflict Management
With existing SON applications

3rdParty App
Provide SON services & API's
## Cisco SON Evolution

### MDSO & 5G
#### DOMAINS EXTENSIONS
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Multi Domain Service Optimization

5G Ready
Video, IoT, Connected Cars

E2E Visibility
Find a better solution

Service Domains
No more optimization of silos

Service Management
Multi-services, Multi-SLAs

Corrective Actions
Solution Domain ≠ Problem Domain
MDSO E2E Architecture – High Level

E2E Optimization and Automation

- RAN Domain
  - RAN Reports
  - RAN Actions
- Transport Domain
  - MBH Reports
  - MBH Actions
- CORE Domain
  - User and Control plane Reports
  - User plane actions
  - MME
  - PCRF
  - SGW
  - PGW
  - 5GC
- AS Domain
  - AS Reports & actions
    - IMS
    - IoT Management
    - Video Management

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AI/ML based SON

• Across technologies
• Multi Domain
• User aware
• Service aware
• Fast response, More effective
• Higher impact, Higher value
Self-aware SON

Pro-active SON
From Reactive to Proactive

Optimal actions
Predict the impact of actions and execute the beneficial

Anomaly detection
Automatically identify faults & erroneous at the network

Cell profiling for optimal SON
Tailor made SON for each cell
SON: Intelligent detection and predictive action

- Clustering ML algorithm identifies sub optimal cells (DL UE tpt) and related root cause – holistic approach
- With prediction capabilities SON picks best action to maximize performance improvement
- Zero touch optimization & performance scalable
# Cisco SON – 5G automation solution

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<th>Programable</th>
<th>Densification</th>
<th>Slice/Service</th>
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<td>SONFlex vendor agnostic solution</td>
<td>Support any RAN architecture</td>
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<td>New Site Automation</td>
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MWC19

SON Business Value Pillars

- Experience: Control service quality (SLA)
- Savings: Reduce cost per bit
- Service Enablement: Simple to deploy
  Fast time to market