Security Level: Public

E.FINAD - Using Big Data to Perform Network Diagnosis and Anomaly Prediction

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Overall Objectives

High Scale Network

Proliferation of applications and services

Customer high expectation on the service quality for various applications

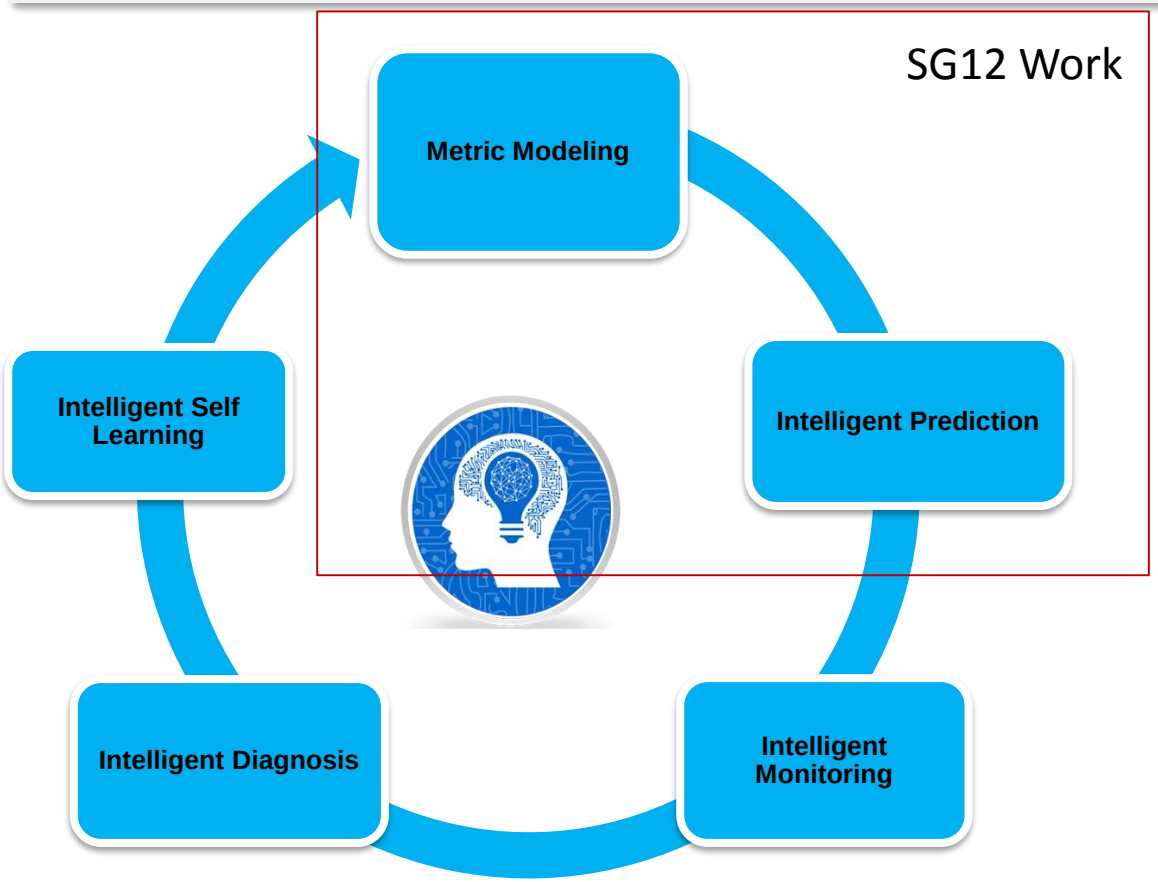
increased network incidents and unregulated network changes,unsatisfied network quality

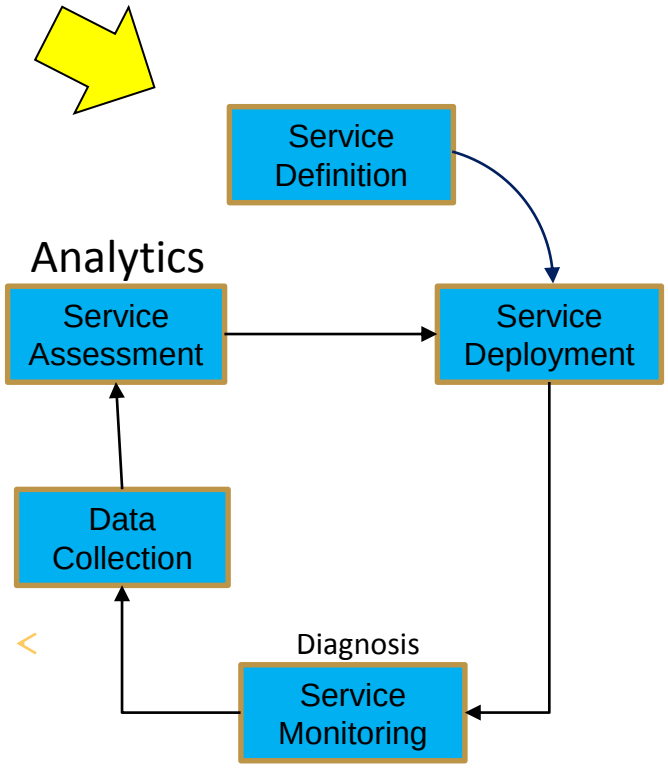
What we need:

Network Awareness
Service Assurance
Metric Calculation
Network Optimization
Performance Monitoring
Trend Analysis

Network Intelligence

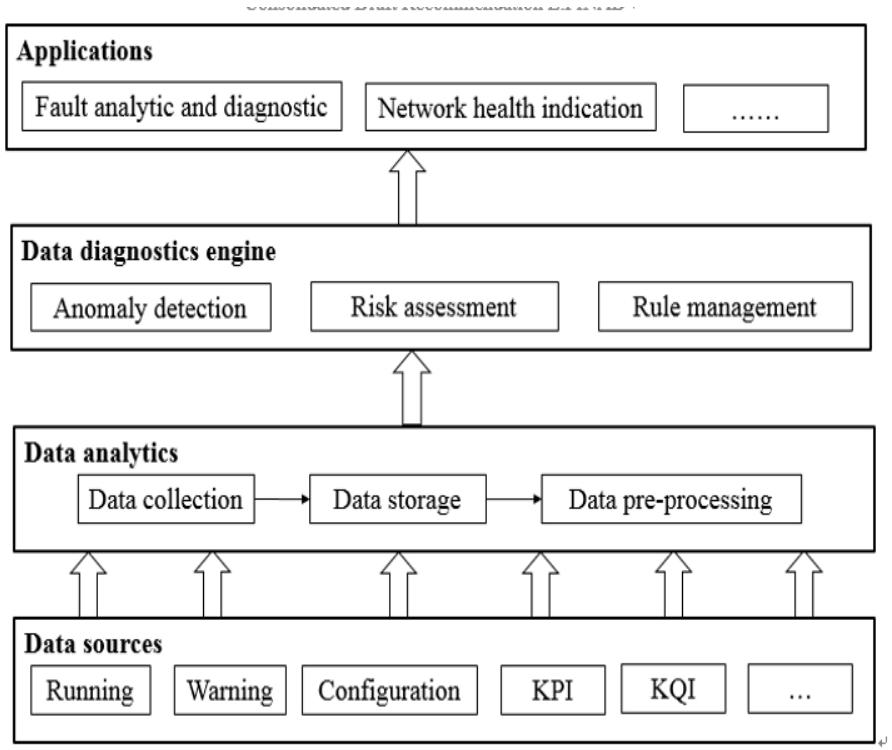
- Fill the gap for product/tool on network visualization and build the brain for network visibility。
- Build Two closed loop competitive eco-system：Diagnosis and Analytics Closed Loop:
  KPI/KQI Modeling、Intelligent Prediction, Intelligent Monitoring, Intelligent Self-healing and learning
  Service Lifecycle Loop:

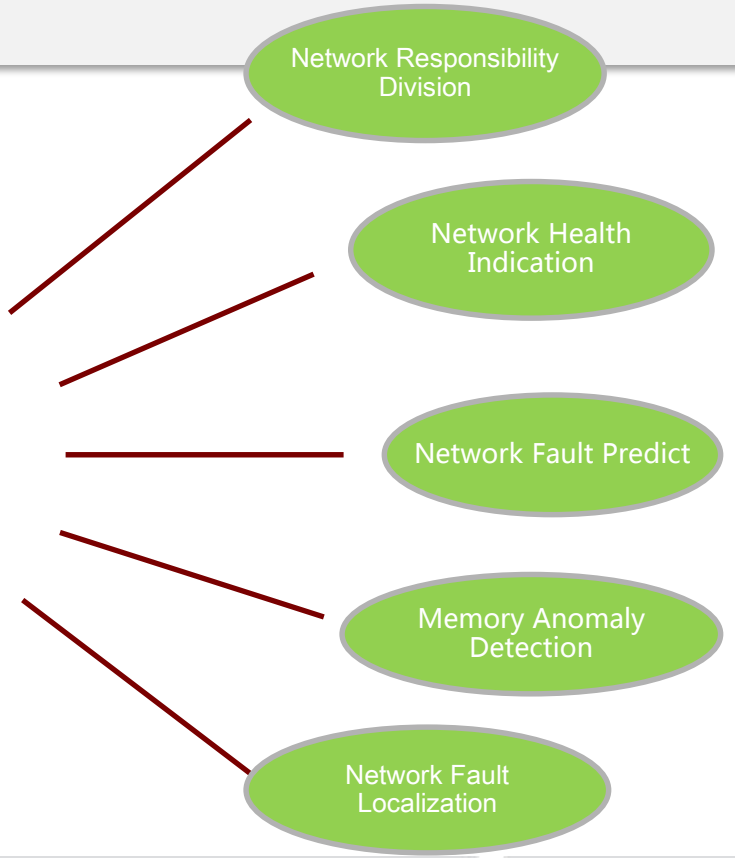




E.FINAD - Overview

- ITU-T SG12 Q16 started the work item E.FINAD in 2016: Network Health Assessment Using Big Data Fault Analytics.
- It specifies the reference architecture and the methodologies using big data to do network analytics and diagnostics.





E.FINAD - Methodology

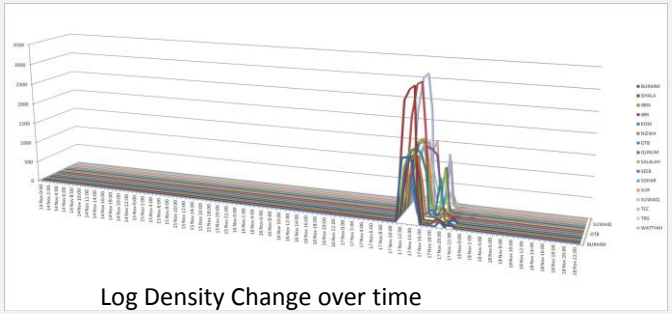
- **Spatial Dimensions Anomaly Analysis：NE configuration parameters comparison**
  - When normal NE and malfunctioned NE are running at the same time, the event type is different, the occurring frequency of the same event is also different.

Buraimi_NE80	IBRA_NE80	Ibri_NE80	KOM_NE80	Nizwa_NE80	SUR-[illegible]	[illegible]	RPR-NE80	TRG-RPR-NE80
36	36	36	0	36	[illegible]	[illegible]	36	36
37	37	37	0	37	[illegible]	[illegible]	37	37
0	0	0	0	0	[illegible]	[illegible]	122	122
0	0	0	0	0	[illegible]	[illegible]	123	123
0	0	0	0	0	[illegible]	[illegible]	124	124
0	0	0	0	0	[illegible]	[illegible]	125	125
24	24	24	24	24	[illegible]	[illegible]	24	24
47	47	47	47	47	47	47	47	47
0	0	0	0	0	0	0	126	126
0	0	0	0	0	0	0	127	127
0	0	0	0	0	0	0	128	128
25	25	25	25	25	25	25	25	25
0	0	0	0	0	0	0	129	0
51	51	51	51	51	51	51	51	51
63	63	0	0	0	63	0	63	0
30	30	30	30	30	30	30	30	30
0	0	0	76	0	0	76	76	76
29	29	29	0	29	29	29	29	29
0	0	0	0	104	0	0	0	0
34	34	34	34	34	34	34	34	34
35	35	35	35	35	35	35	35	35
0	0	0	0	0	0	0	0	132
0	0	0	0	0	0	0	0	133
0	0	0	0	0	0	0	0	134
0	0	0	0	0	0	0	0	135
60	60	60	60	60	60	60	60	60
0	0	0	71	0	0	0	0	0
0	0	0	72	0	0	0	0	0
0	0	0	73	0	0	0	0	0
0	0	0	74	0	0	0	0	0
64	64	64	64	64	64	64	0	64
65	0	0	0	0	0	65	0	65
66	0	0	0	0	0	66	0	66
67	0	0	0	0	0	67	0	67
0	0	0	0	0	0	0	0	136

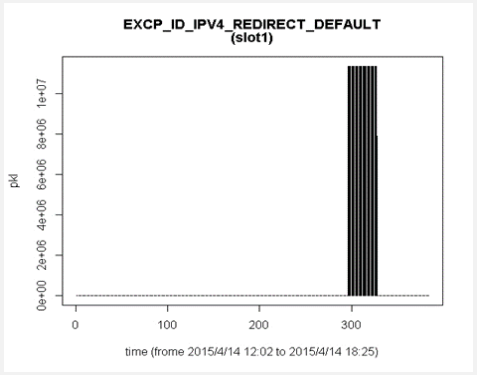
The Network Event Type of Malfunctioned NE is different from one of the Normal NE

NE Event Type Statistics

- **Time Dimension Anomaly Analysis：NE historical data comparison**
  - The change of the performance measurement results and network event occurring frequency in malfunctioned NE is different from ones in Normal NEs.



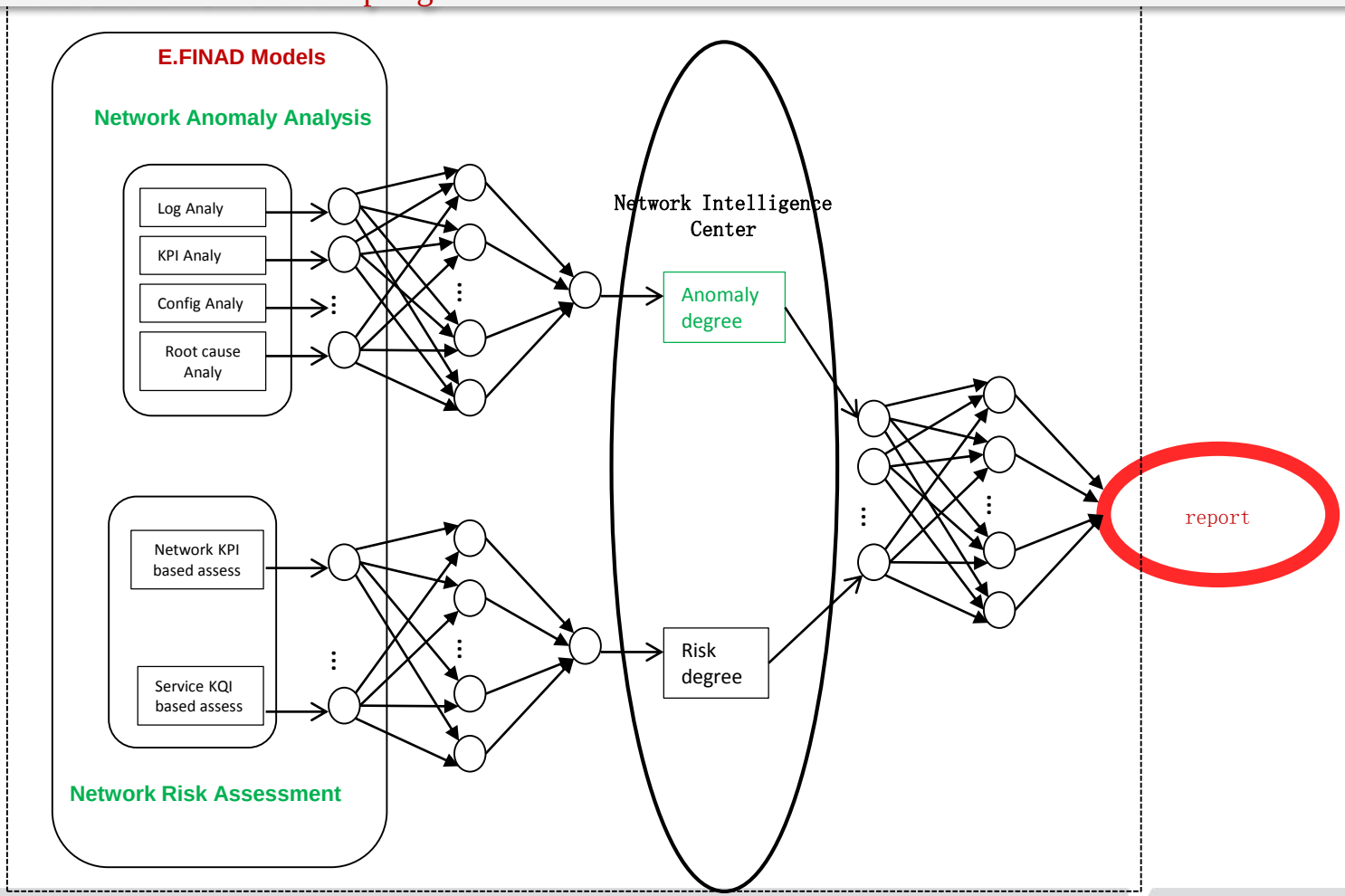
Log Density Change over time



Packet Loss KPI change over Time

E.FINAD - Models

- Adopt neuro networking method to model network health from several dimensions, including network anomaly analysis and network risk estimation , to calculate network health score through training with historical assessment data sampling



Thank you

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