Model-driven Audit Trail Logs Infrastructure for Telco VNFs

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Network function is not alone
*NF’s non functional requirements

- Monitoring
- Logging
- Audit
- Security controls
- KPIs
- Visualization...
Observability
Monitoring

Prometheus

CNCF Graduated

dynatrace
epsagon
INSTANA
IRONdb
New Relic
NexClipper
SignalFx
StackState
STORMFORGER
Wavefront
Weave cloud
Weave scope
ZABBIX

APP DYNAMICS
Applications Manager
AppNeta
appoptics
Aternity
Azure Monitor

beats
bluematador
catchpoint
centreon
chronosphere
CloudHealth
cortex
DATADOG

Flockwave
Graphite
Jimmy bothering
M3
mackerel
Nagios
NETDATA

Logz.io
Logix
LogicMonitor

m3
mackerel
Nagios
NETDATA

NODER Escent
OPENMETRICS
OverOps
replex
ROOKOUT
Sensu
SENTRY

Thanos
sysdig
Trickster
Turbonomic
VECTOR
Victoria

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Logging, tracing, chaos engineering

Logging
- fluentd
- elastic
- Grafana Loki
- graylog
- humio
- logdna
- LOGGLY
- LOGIQ
- logstash
- Pandora
- NY Times
- SCALYR
- sematext
- splunk
- sumo logic

Tracing
- JAEGER
- OPEN TRACING
- elastic apm
- Honeycomb
- LIGHTSTEP
- Open Telemetry
- PINPOINT
- Skywalking
- SOFATracer
- Spring Cloud Sleuth
- ZIPKIN

Chaos Engineering
- Chaos Mesh
- Chaos Toolkit
- Chaos Blade
- chaoskube
- Gremlin
- LITMUS
Individual approach vs single pane of glass

- **Logging tool A**
  - IMS VNF

- **Logging tool B**
  - UPF CNF

- **Logging tool C**
  - EPC KNF

- **Monitoring tool A**
- **Monitoring tool B**
- **Monitoring tool C**

- **OSS - Umbrella level logging (tool D)**
- **OSS - Umbrella level monitoring (tool D)**

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How OSM deployment works

- UI
- MariaDB
- NBI
- LCM
- kafka
- ZooKeeper
- RO
- mongoDB
- POL
- MON
Network Function Charm

“I can use a MySQL database”

“I can send my audit logs”

“I can send my KPIs every minute”
“I can collect audit logs”

“I can send my audit logs”
NF Charm Relations

Graylog relation
Same tools across all environments

Kubernetes

OpenStack / Cloud

Bare metal
Enable NFRs across entire ecosystem

- RAN site
- Edge micro cloud
- Core network
- OSS / BSS / services
Benefits

● Easier and faster to build new network functions
● Pick and choose your LMA tools
● Faster troubleshooting
● No lock-in, free to change your setup
Demo setup

Open Source MANO

Grafana
Prometheus

Telco Network Function

Metrics

Audit Logs

elasticsearch
beats
mongoDB
Graylog
Demo setup

Diagram showing the integration of Grafana, Prometheus, Telco Network Function, Elasticsearch, and Graylog.
Demo Steps

- Deploy LMA Charms
- Deploy KNF
- Relate KNF to LMA with charms
- Scaling KNF
- Upgrade of LMA component
- Audit Logs in Graylog
Thank you Questions?