

Common NFVI Telco Taskforce

Virtual Meeting/Call

Telemetry/Observability architecture

A PATH TO FULL AUTOMATION



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 THE **LINUX** FOUNDATION



 **OLF** NETWORKING

AGENDA



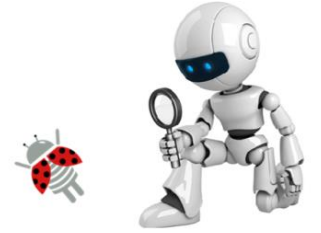
- › The Goal – Road to zero touch operations
- › Problem Statement – the current situation
- › Solution Proposal – Observability
- › Added Value – zero touch

THE GOAL



- › Telco's desire to automate their operations
 - › Zero touch provisioning and life cycle management of VNFs/CNFs and cloud infrastructure
 - › AI/ML to automate operations
 - › Visibility into operating state of the resources is the key to automation
 - › Visibility achieved through Monitoring/Telemetry

PROBLEM STATEMENT I.



Monitoring as we know it

- › Used currently in operations (Ops)
- › Provides a good approximation of the health of a system
- › Is about known-unknowns and actionable alerts
- › Concentrated on time-series data
- › Is it enough for DevOps/Cloud-based approach?
- › What about unknown-unknowns?
- › Reproduce the issue every time?
- › Restart and don't care?



PROBLEM STATEMENT II.

The approach dilemma

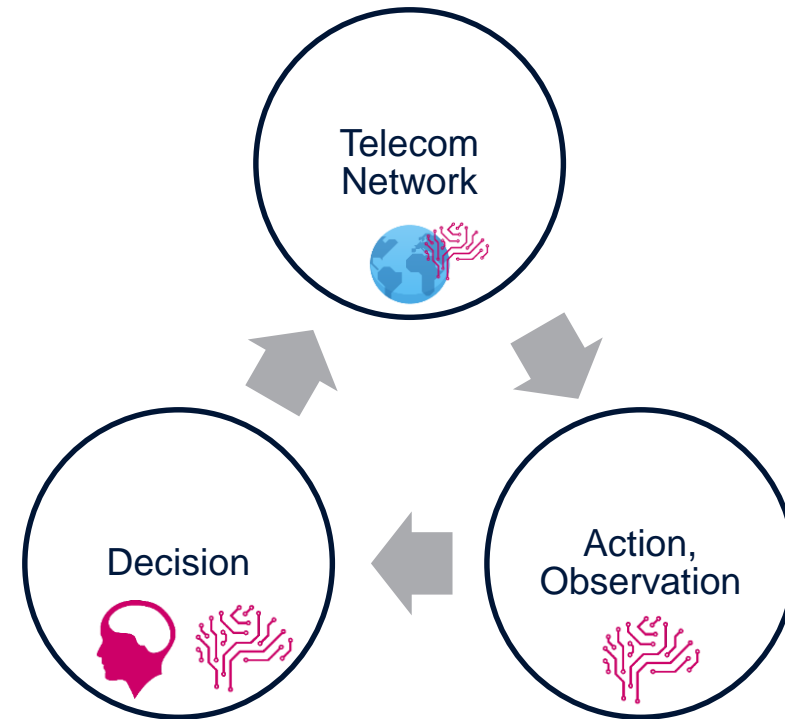
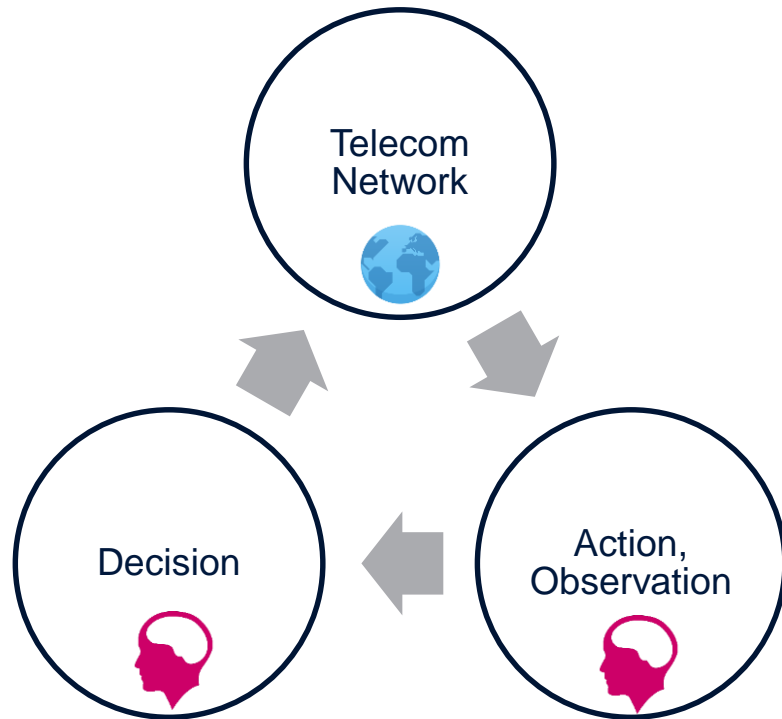
- › Disposable ephemeral instances - do we care about single tree in the forest?
 - › Discuss pros and cons
- › Resiliency
 - › Application level: application/manager/orchestrator?

Outcome of the monitoring

- › Decision about instance lifecycle
- › Root-cause-analysis
- › Application performance monitoring – optimizations
- › Upper level Analytics (i.e. Business decisions)

PROBLEM STATEMENT III.

FROM HUMAN-CENTRIC TO MACHINE-CENTRIC

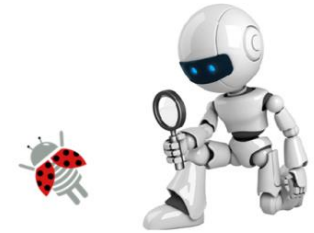
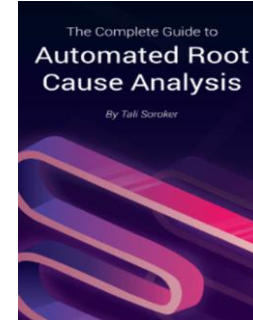


SOLUTION PROPOSAL

Observability

- › Ops → DevOps == Monitoring → Observability
- › Term emerged recently, from Control Theory
- › Providing more granular insights into the behavior of the system
- › Rich context for understanding and solving problems
- › About unknown-unknowns
- › Apply observations to:
 - › Telemetry data (application business objectives)*
 - › Metrics (service level indicators SLIs, key performance indicators KPIs)*
 - › Application/system functioning: logs, events, alarms
 - › Tracing data (requests over distributed system)
 - › Network traffic

* Book: Cloud Native Infrastructure



SOLUTION PROPOSAL – CONT'D

Importance of data collection from all levels

- › Is it enough to get NFV-only telemetry/observability data?
- › Is there added value in case NFVI telemetry/observability data is used?

- › Correlations lead to service impact information

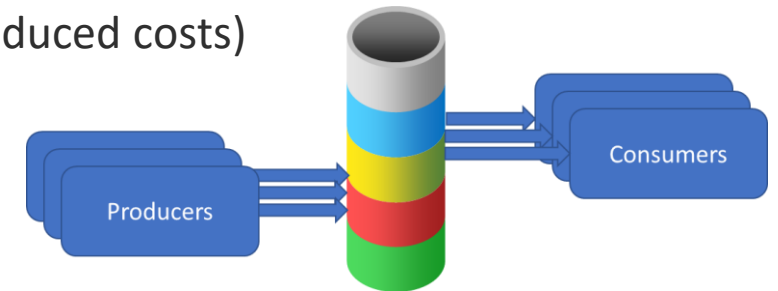
- › Push vs. Pull model
 - › Declarative definition of destination
 - › Scalability without need for discovery or explicit sync

- › Compatibility to frequently used approaches preserved by adaptation layer:
 - › Push model adapters: gRPC, SNMP traps, syslog
 - › Pull models adapters: SNMP get/walk

SOLUTION PROPOSAL – CONT'D

Message broker concept (I)

- › **Push model** – allows for declarative configuration
- › **Decouple** data sources from destinations while providing buffer for handling backpressure
 - › No impact when adding/removing consumers
 - › No need for reconfigurations on the observed system
- › **Real Time** data receipt by subscription (as fast as consumer can read)
- › Implicit DC-level **redundancy** via replication (no downtime, no data loss, reduced costs)
- › Simplicity and elegance of integration:
 - › **What** data to send?
 - › **Where** to send?
 - › **How** to send it?
- › **Unlimited scenarios** – data with context goes into pipeline in order to feed different tools (understand, debug, optimize, meet security and compliance requirements, provide critical business intelligence)



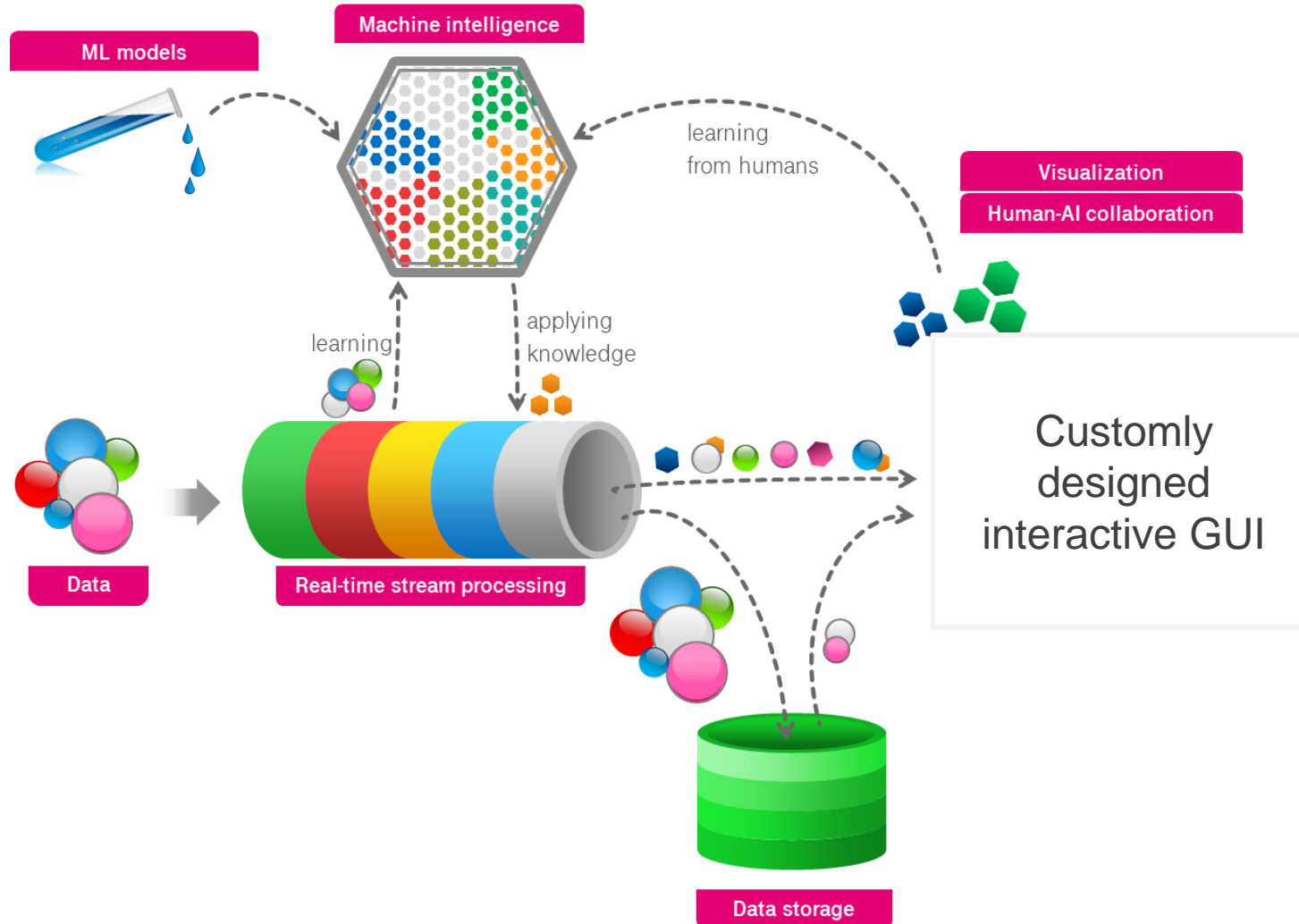
SOLUTION PROPOSAL – CONT'D

Message broker concept (II)

- › Imposes **schema registry** concept (unifying message formats, efficient data transport by fast compression)
- › Enabler for **distributed processing** due to concept of partitioning
- › **Stream** based data **processing** enabled (real-time, online)
- › No hinder for **offline data** storage and processing (just another consumer)
- › **Avoiding** vendor **lock-in** situation
- › Allows for **hybrid** architecture: on premises, public cloud, edge
- › Seamless **horizontal scalability**, allowing optimizations such as reduction of power consumption
- › **Security**: encryption and role-based-access-control
- › Examples: RabbitMQ, Apache Kafka, Apache Pulsar

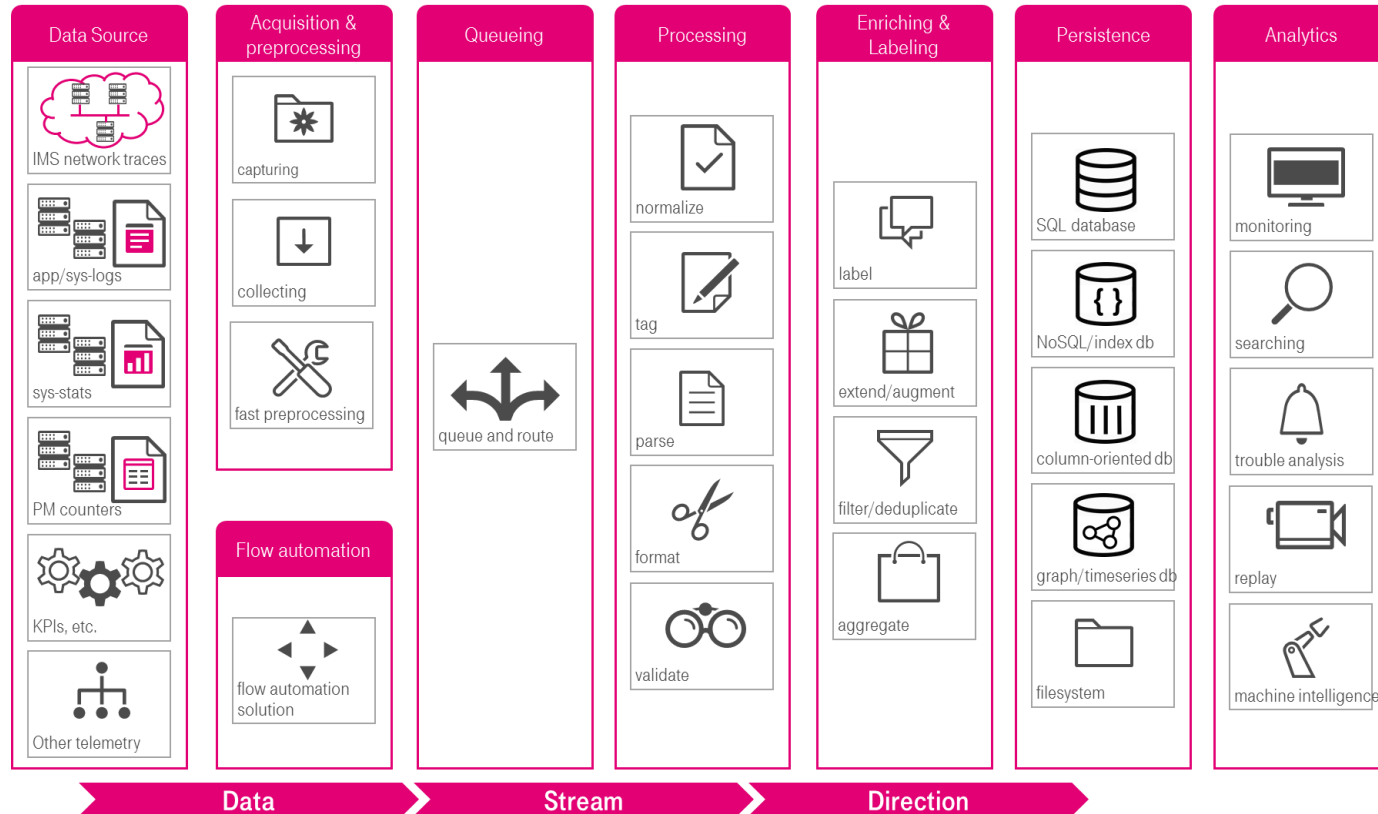


ADDED VALUE I.



Added value II.

DATA PIPELINE



Streaming architecture:

- data collection from variety of sources
- real-time on-stream processing backed up by machine intelligence
- enabler of immersive visualization and human-to-machine collaboration



ADDED VALUE III. - AUTONOMIC

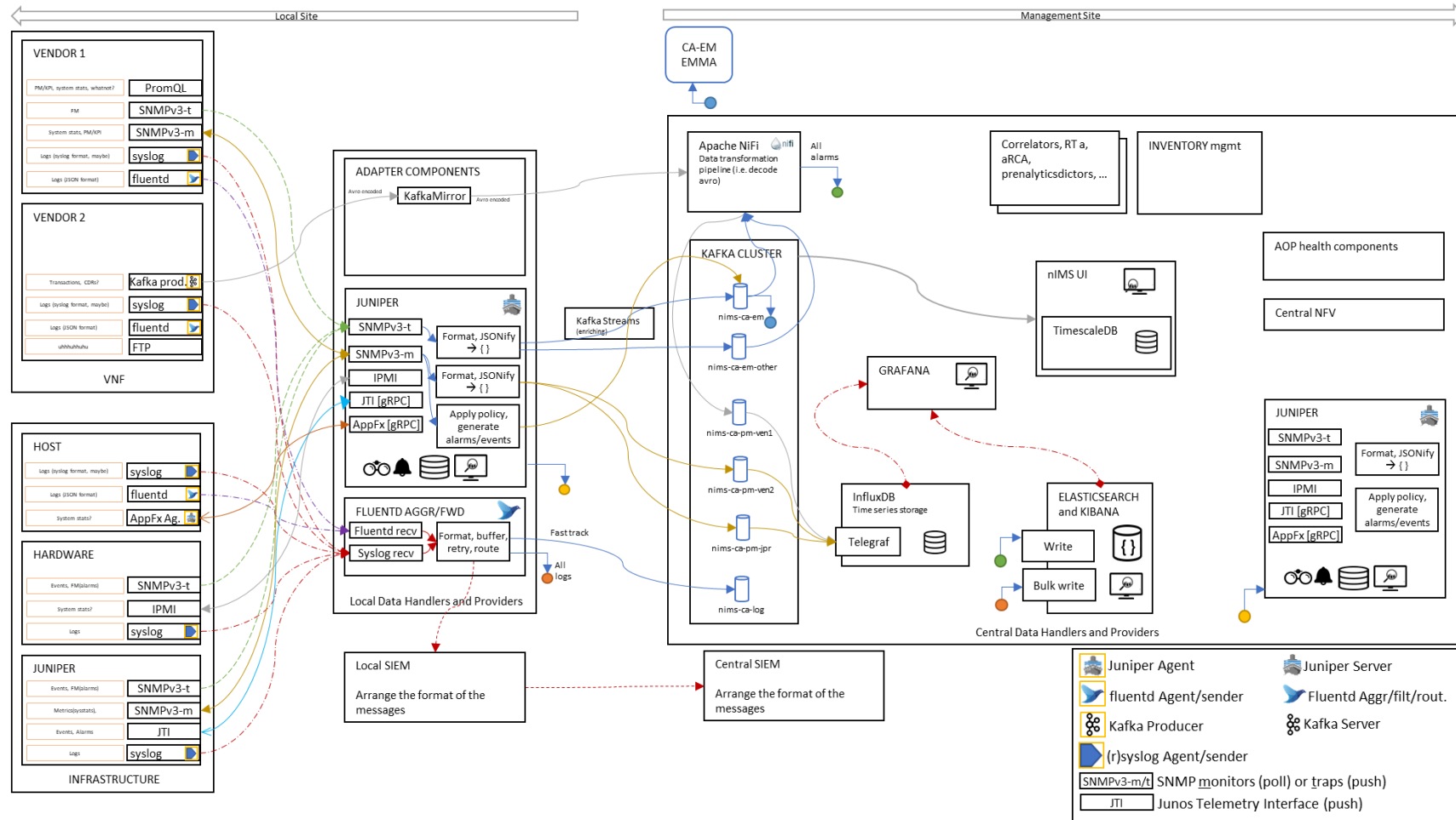
WHAT IS...

- › automation?
 - › action performed **without conscious decision**, having no other **knowledge** but **predefined** one, without possibility to extend it
 - › problem: lack of cognition/perception
- › ...autonomic?
 - › in IT sense would mostly be related to the self-managed systems where interaction between human experts and systems are only based on the high-level goals
 - › IBM defined levels of autonomic behavior in the computer systems, which ranges from Basic level (Level 1) where operator does operations manually, to Autonomic Level (Level 5) where human operators specify only policies and high-level objectives

Autonomic operations:

zero-touch eventually, reduced need for human intervention, faster, more accurate

IMPLEMENTATION AT DEUTSCHE TELEKOM



THE SUMMARY

- › Juniper and DT jointly put together this architecture
- › The joint solution is implemented and deployed in production
- › All Telcos need this in their desire to “zero touch” operations

- › CNTT RM should adopt this architecture
 - › Win for Telcos
 - › Win for Vendors
 - › VNF/CNF and NFVI vendors support this model/API
 - › True multi-vendor solution
 - › Simplifies VNF/NFVI integration
 - › No more silo'd solutions

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THANK YOU

