CogNet

The CogNet Report

Addressing Data-driven Network Management

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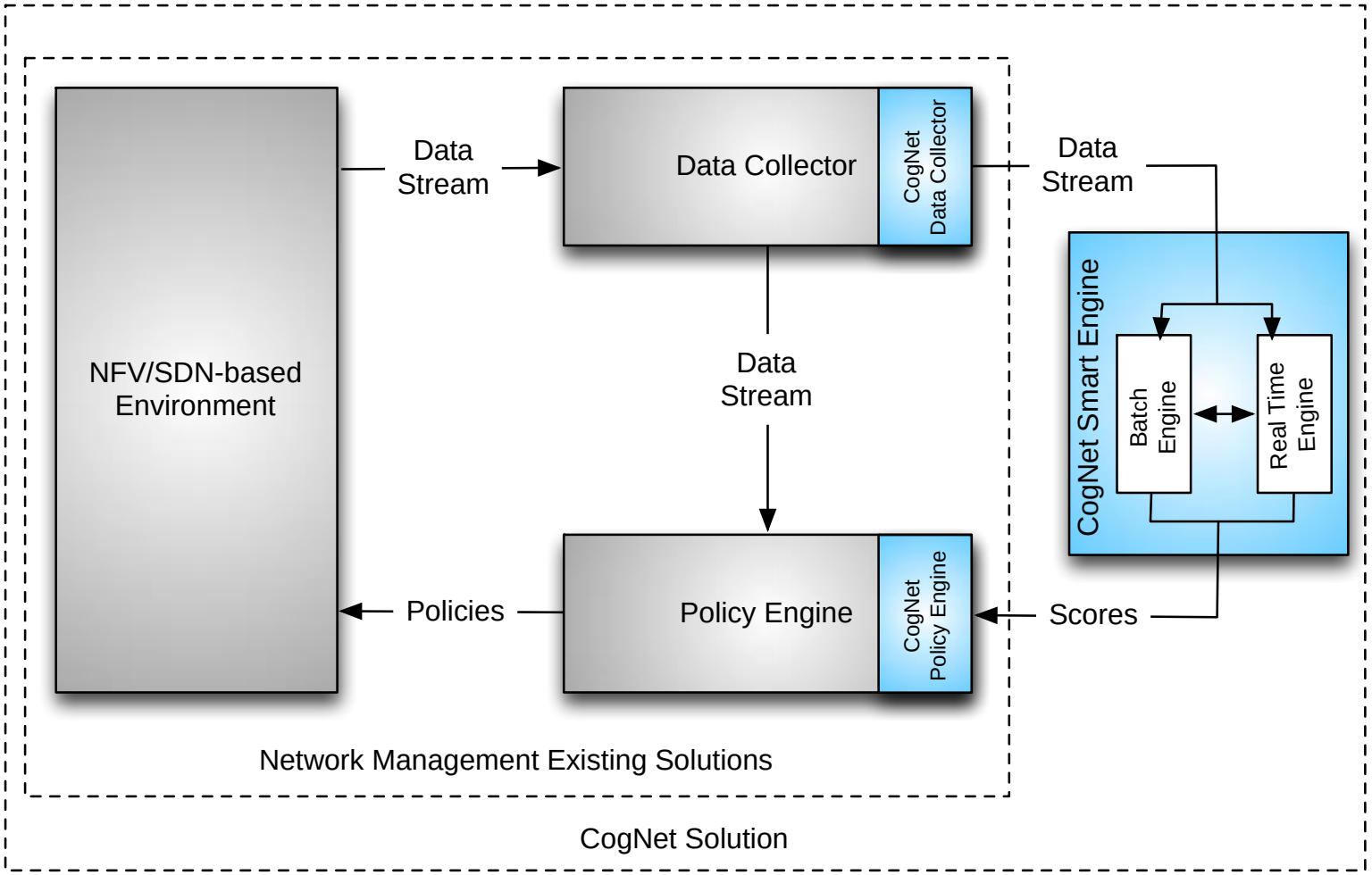
The CogNet Project

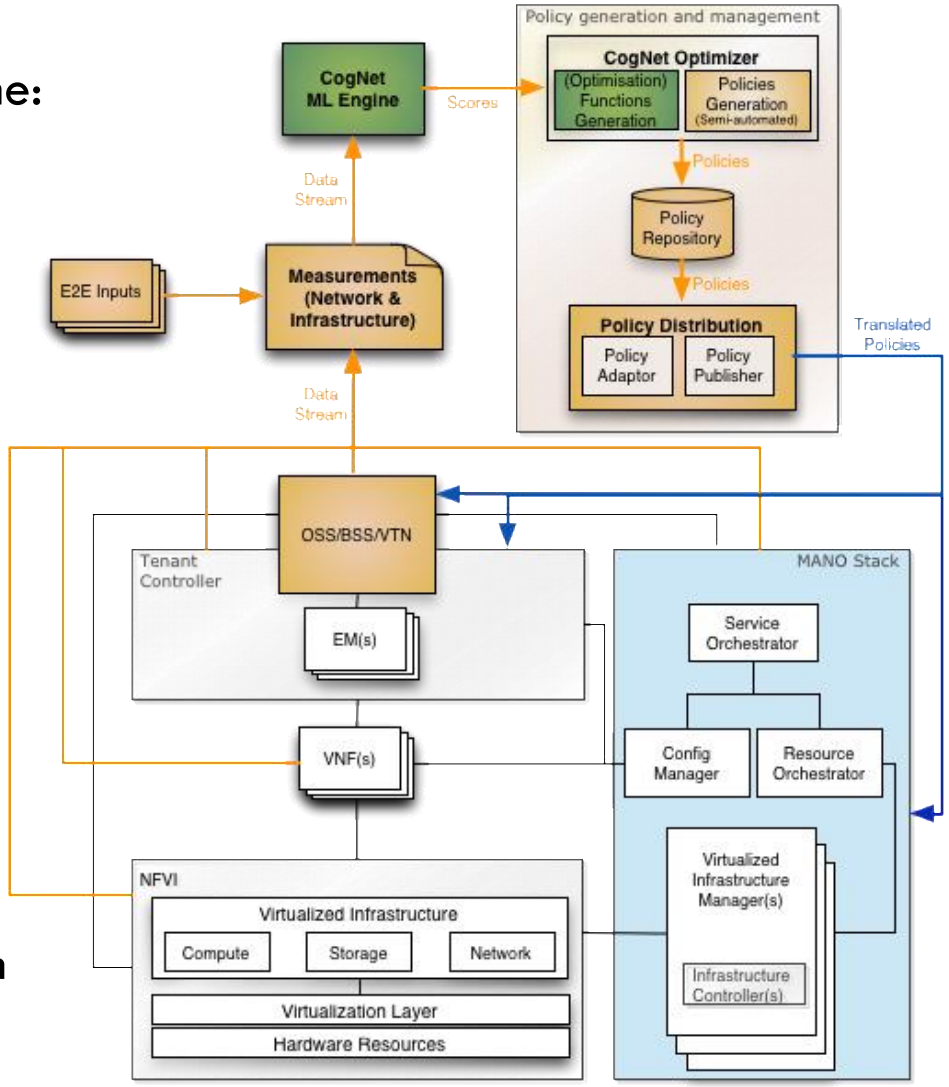
- CogNet is building a network management solution based on machine-learning
  - Relying on SDN and the NFV architecture framework
  - Focused on 5G use cases
- Committed to produce and demonstrate a general framework for smart, data-driven management
  - Able to support different application scenarios
  - Monitoring and SLA enforcement
  - Traffic identification and security
  - Resource management
  - Reliability enhancement
  - E2E service management
  - <Your favourite scenario here>
- And for sure
  - Relying on open source
  - Willing to contribute back to the community
  - Seeking for opportunities of further engagement

Data-driven Network Management

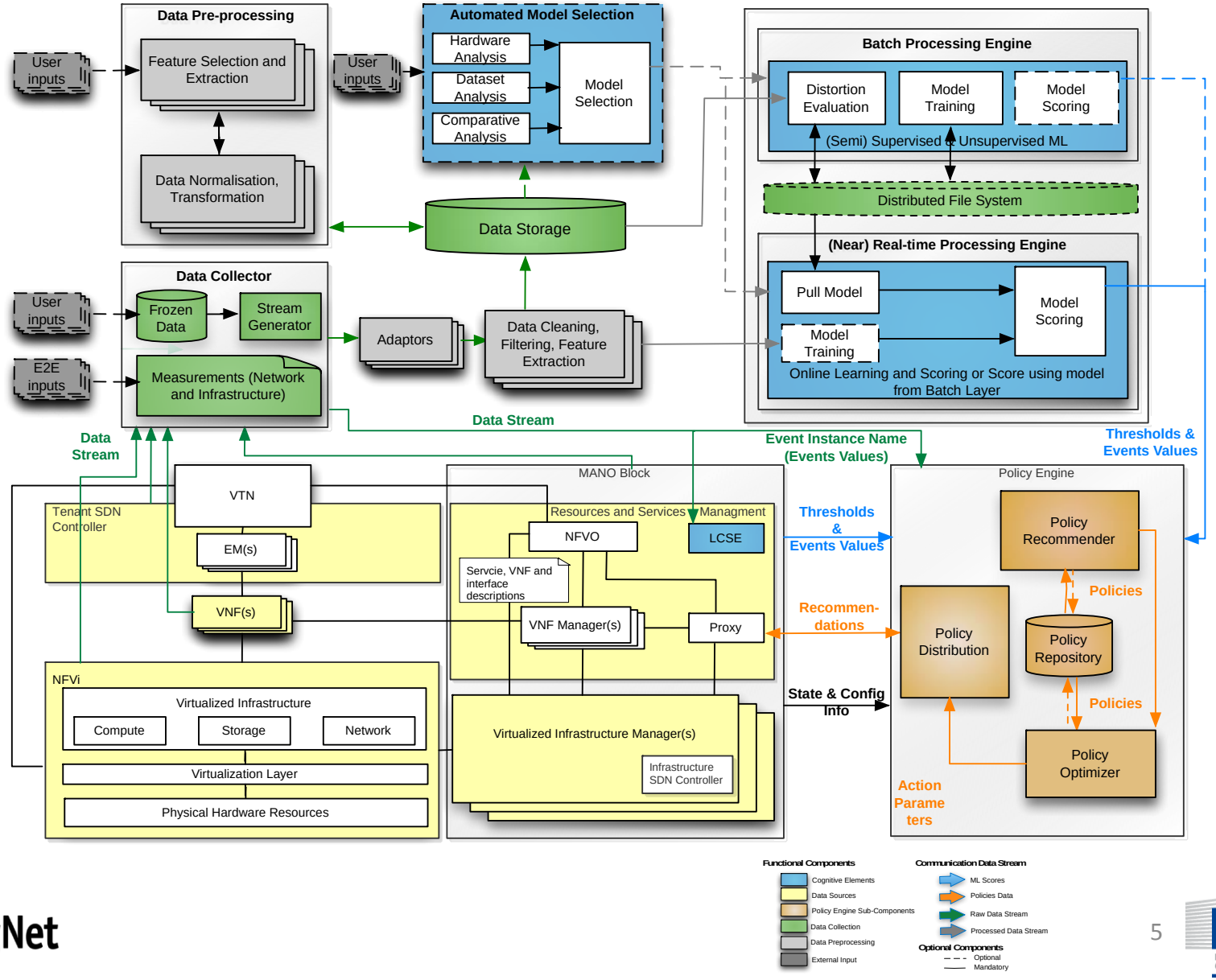


The CogNet Architecture

- A data-driven management engine: CSE
- Tuned by the application of ML models
- Two streams
  - Data, inbound
  - Policies, outbound
- Stream adaptors
  - Data preprocessing
  - Policy optimization
- A double closed-control loop
  - With the CSE at the intersection

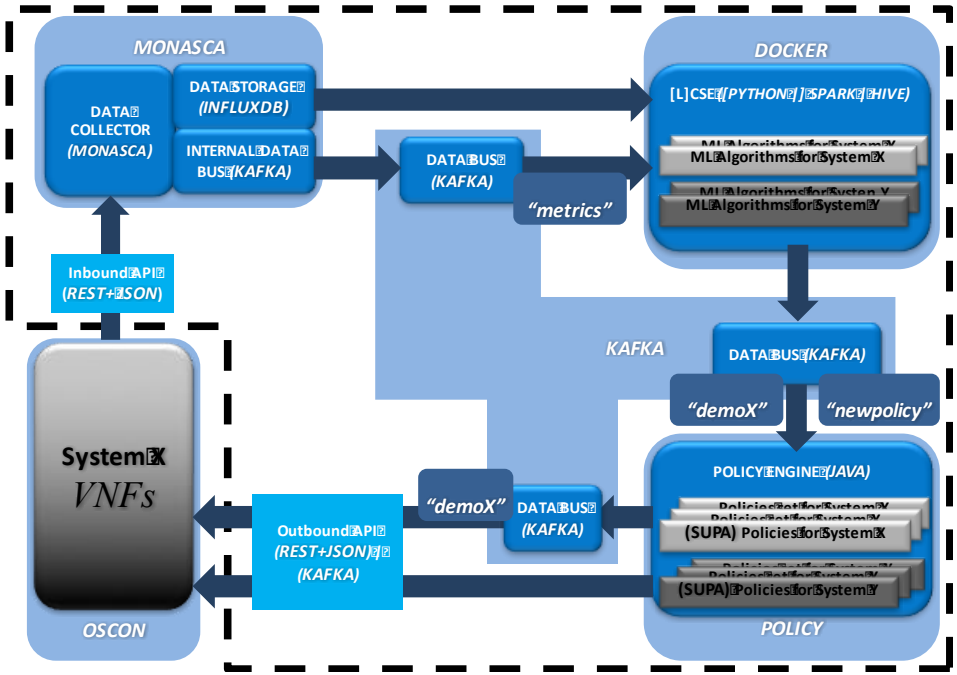


The CogNet Closed Loops in Detail



The CogNet Implementation

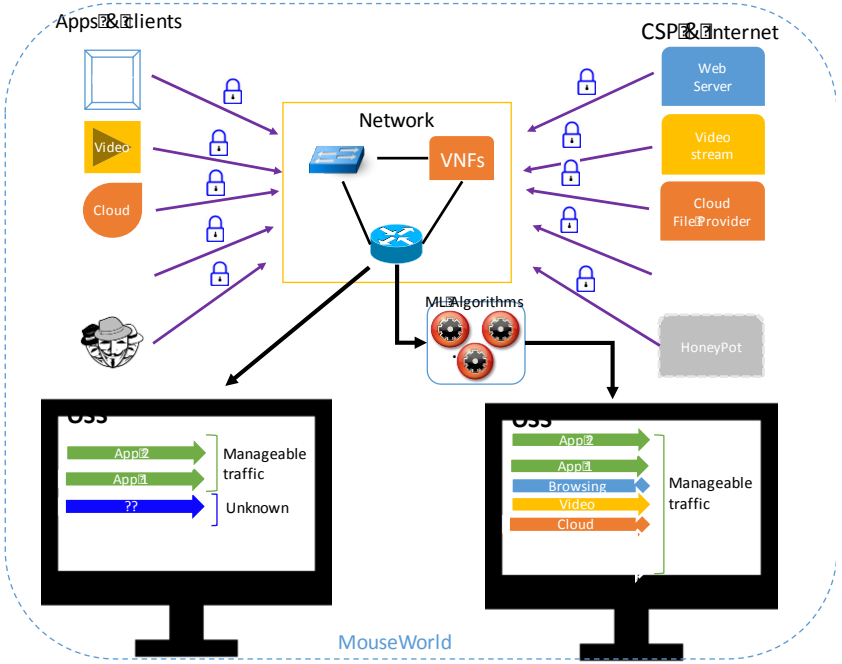
- Based on open source
  - Monasca, Kafka and InfluxDB for data collection
  - PANDAS, Spark MLlib, Hive and Hadoop for the machine learning process
  - Drools as policy engine
  - ODL as tenant controller
  - OSM for orchestration
  - OPNFV Brahmaputra as NFVI
- And open data models
  - JSON for (most) interfaces
  - SUPA for policy definitions



CogNet Common Infrastructure

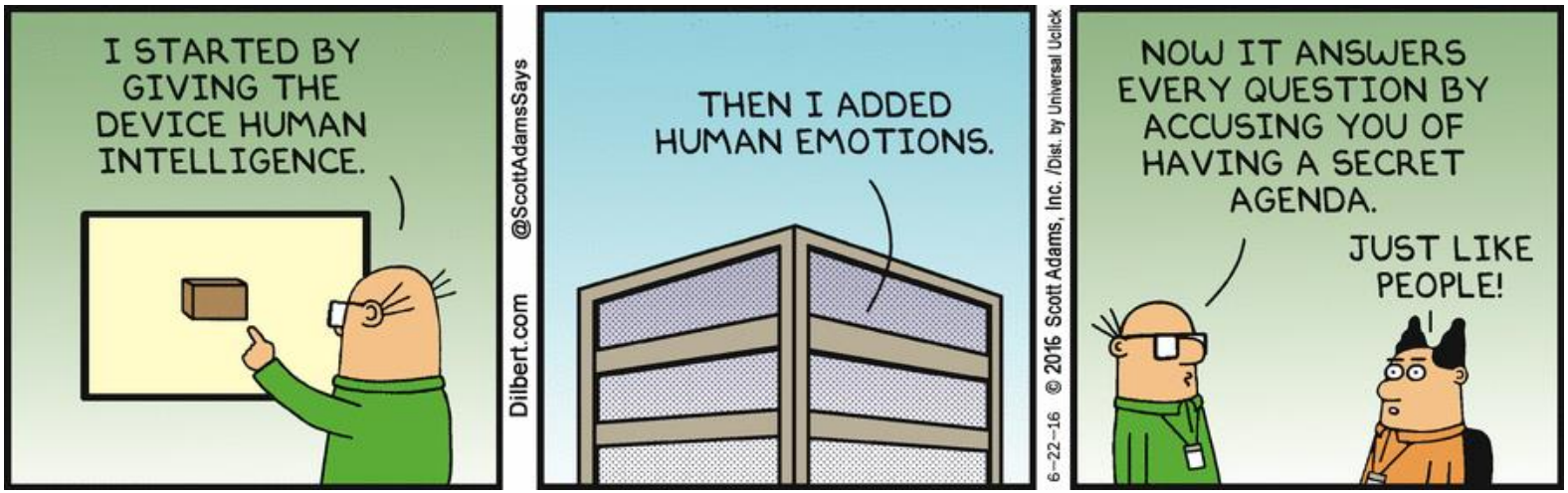
Data Thirst

- There is a serious lack of training datasets
  - Data as an asset
  - Privacy concerns
  - None or limited tagging
- Working on the production of synthetic datasets
  - Synthetic traffic laboratory
  - Generates traffic samples in a controlled way
  - Configurable mixes of synthetic and real traffic
  - Different scenarios, from high loads to security threats
- A way worth exploring in the future
  - Open synthetic datasets
  - Open synthesizing tools



CogNet "Mouseworld"

As Conclusion



- Data-driven management is the natural evolutionary step for network management
  - Is not only about ML or AI
  - The same NFV is not only about cloud
- Several challenges remain
  - The dynamic, complex nature of networks
  - The availability of useful datasets
  - The challenge of traceability in a multi-tenant, multi-user environment
- We are moving along this path
  - A pile of fun ahead