

IETF standard chances of IDNet in NM area

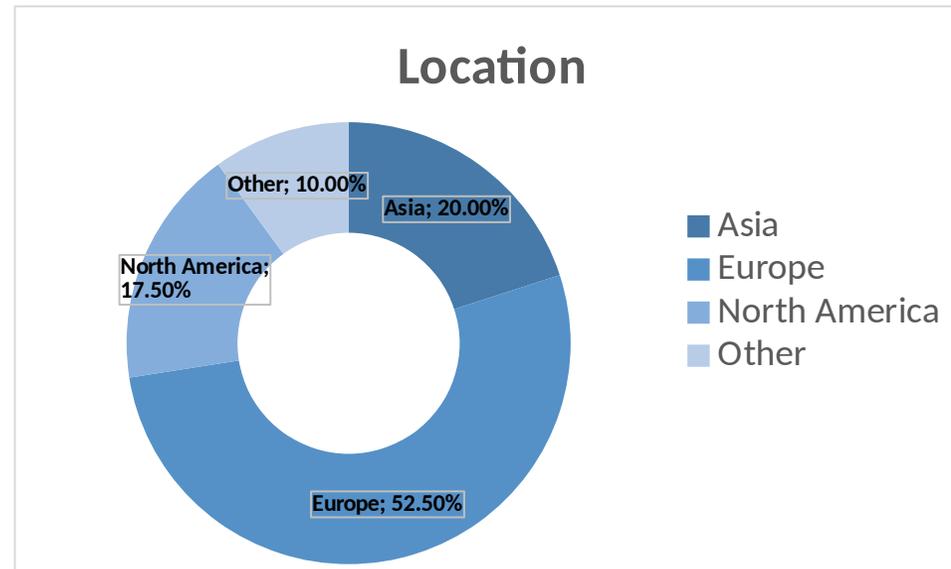
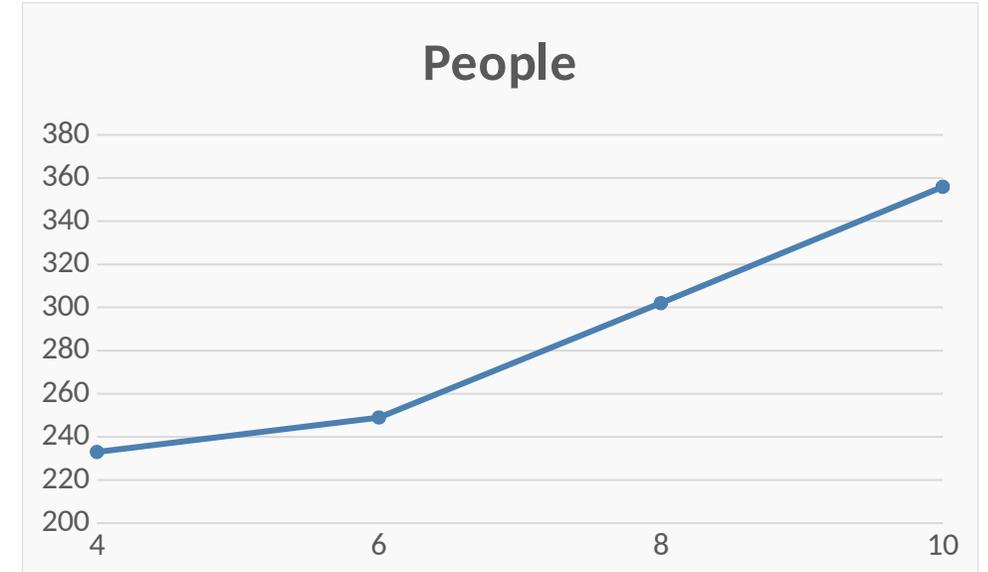
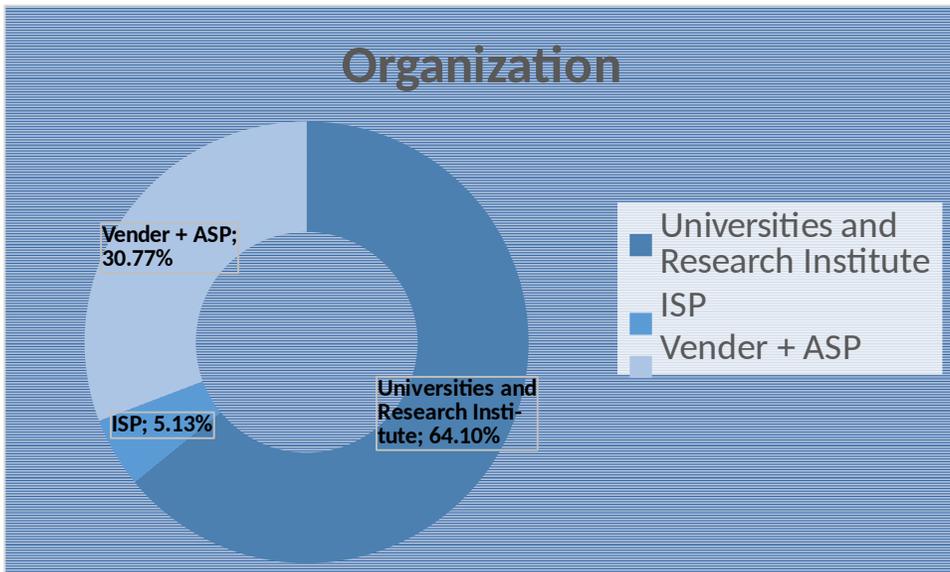
IETF-100-NMRG-IDNet-Session

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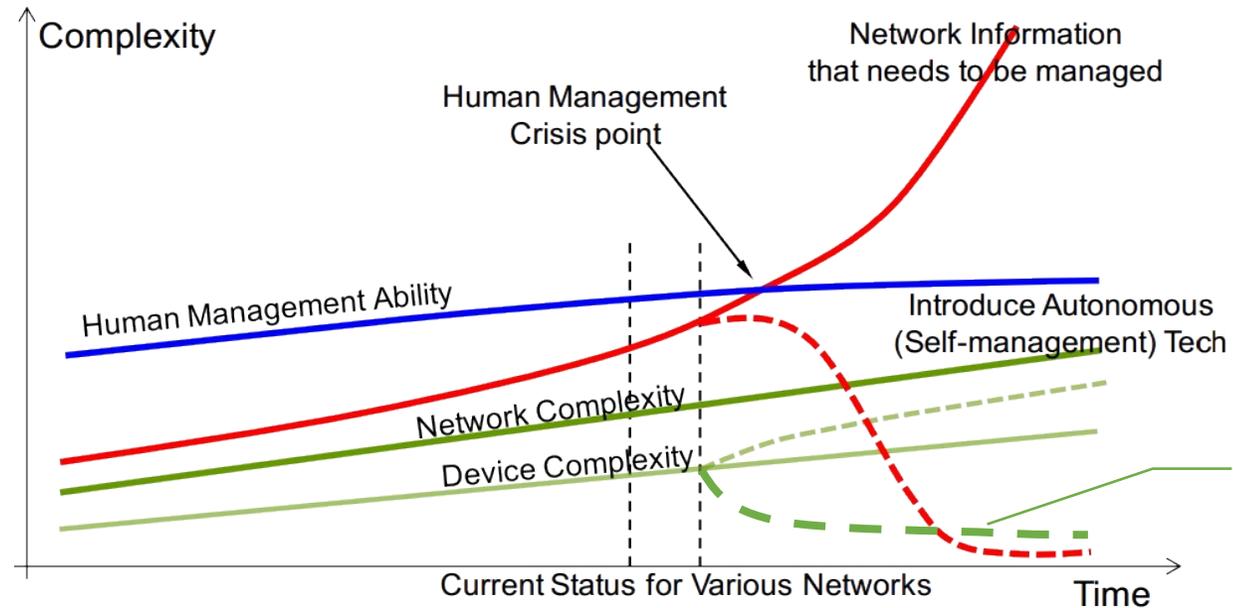
11/12/17

Summary (Mail list)

356 members total, 45+ active participants



Network Managed by Itself



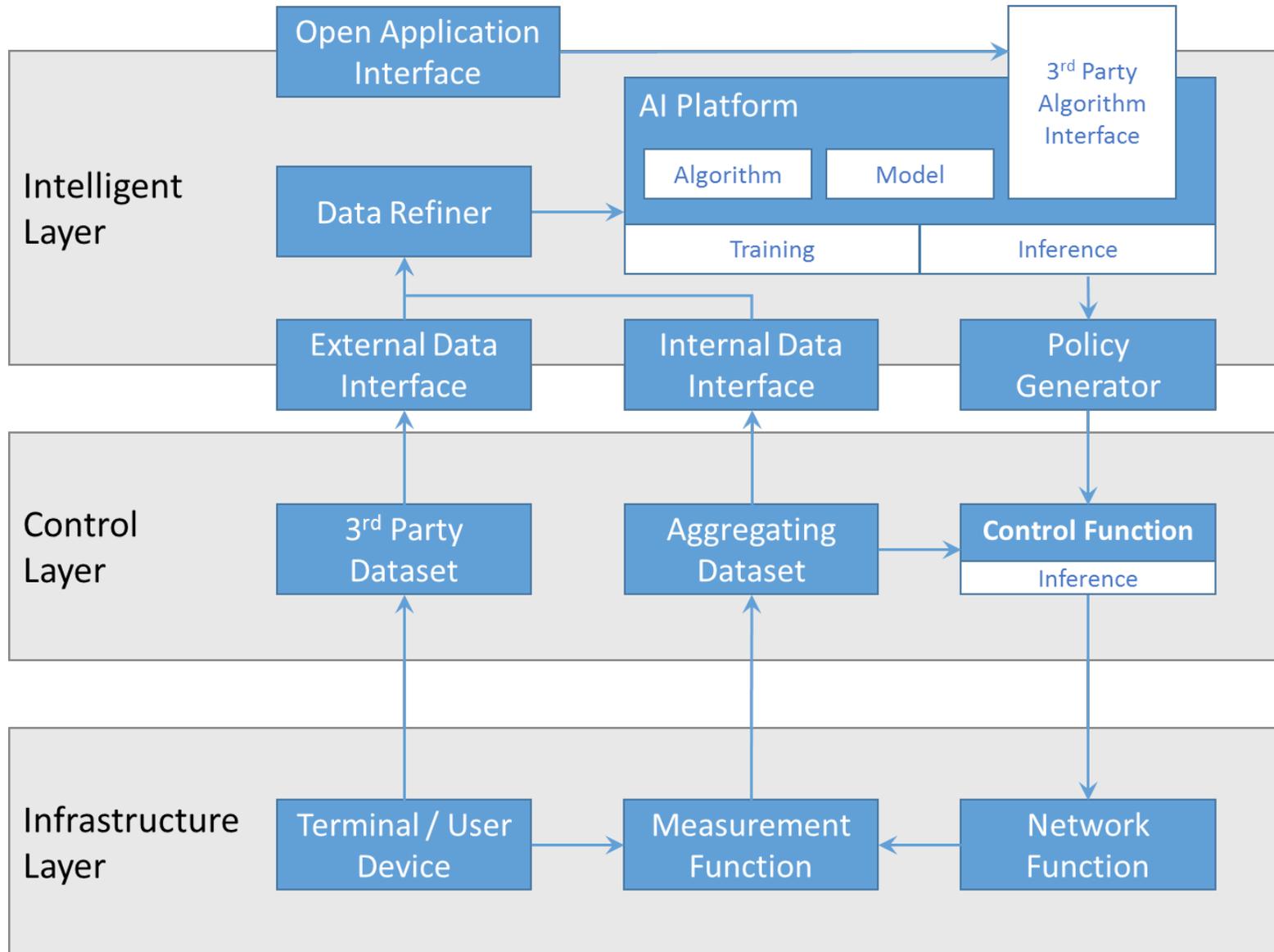
Perhaps the complexity of device might also decrease

Human-based management cannot handle the more and more complex network.

Introducing AI into network could simplify the human management, reduce the human error and the cost of network maintenance.

Autonomous also requires network devices become more intelligent and complex

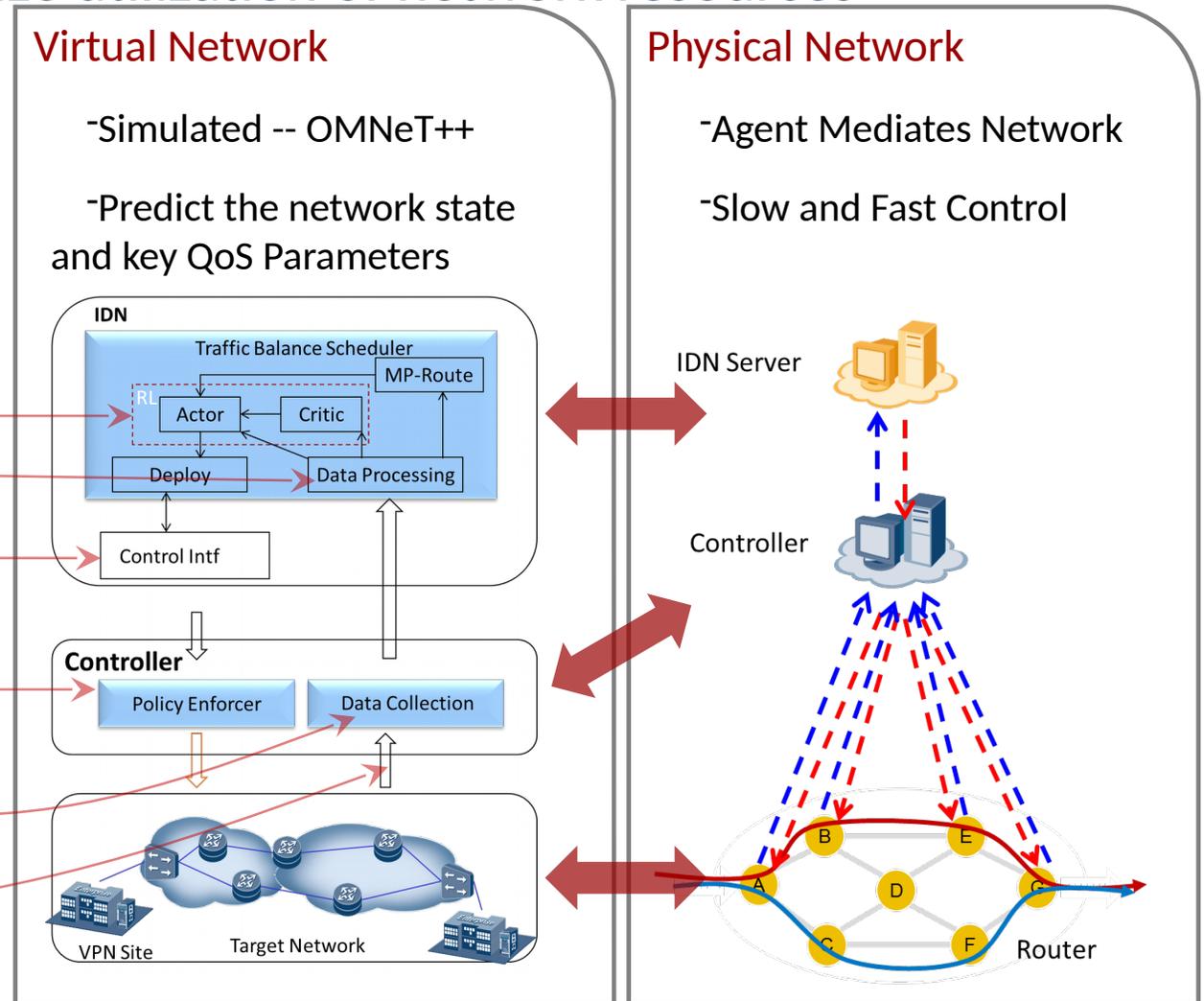
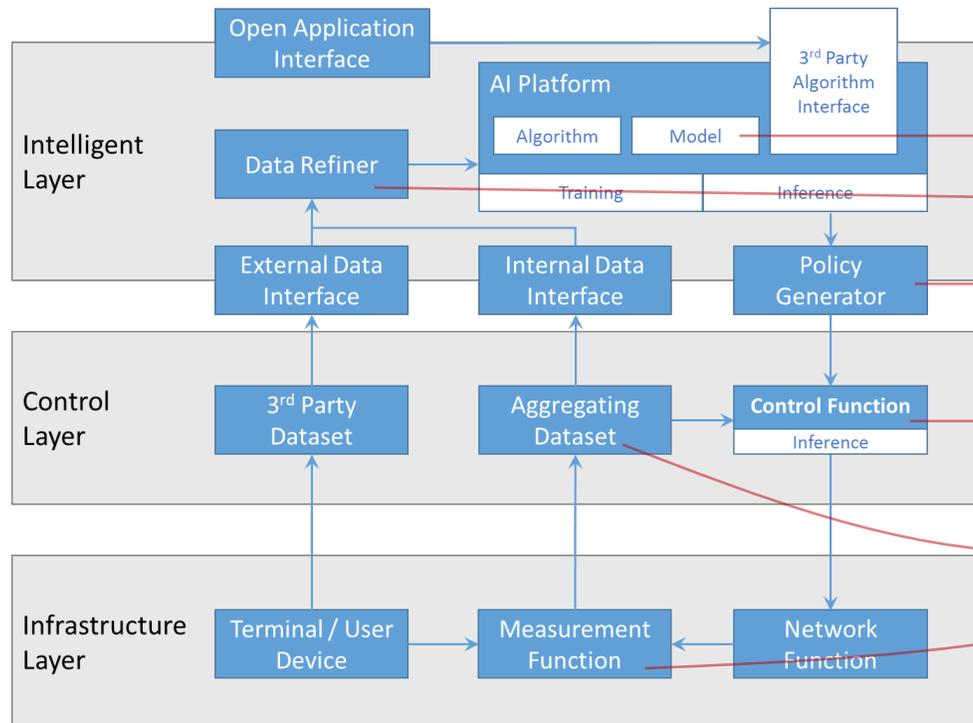
The Architecture



Use Case: Traffic Balancing

Approach: Use Reinforcement Learning to adjust the % allocation, for both fine-grained and high frequency control. Goal: Optimize utilization of network resources

- Simulate the physical network to train RL agent to optimize the traffic allocation of each link

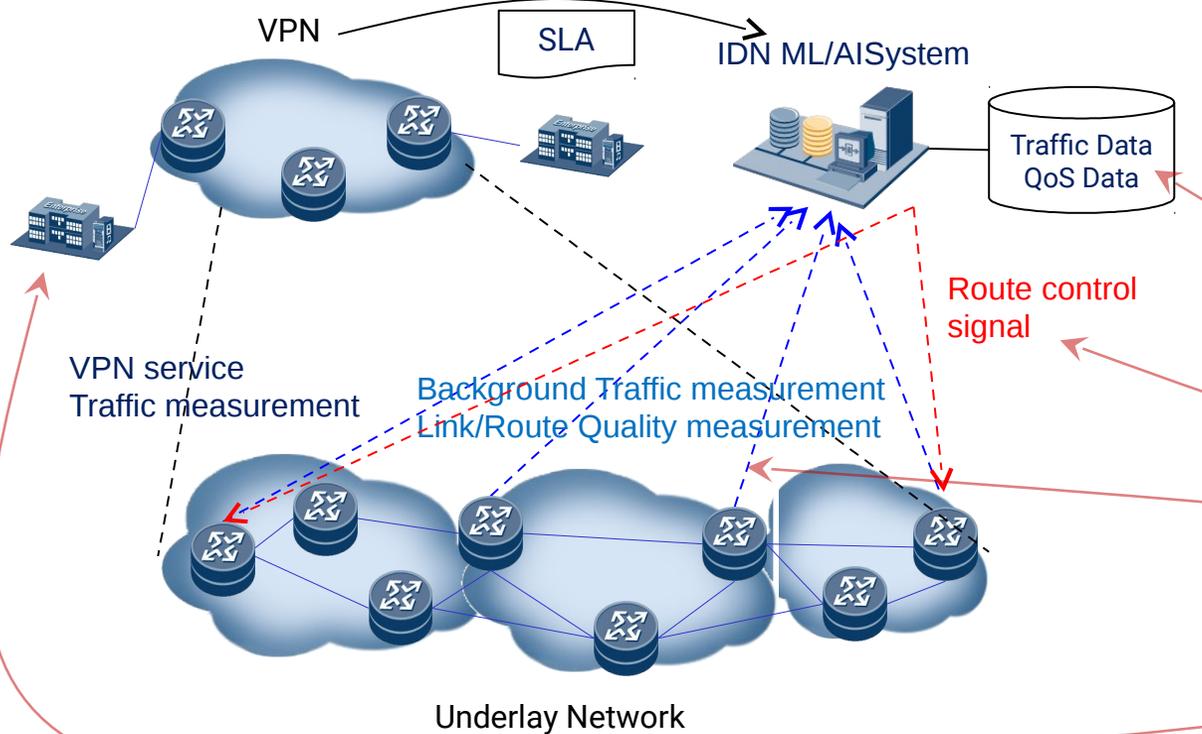


Use Case: Proactive SLA Maintenance

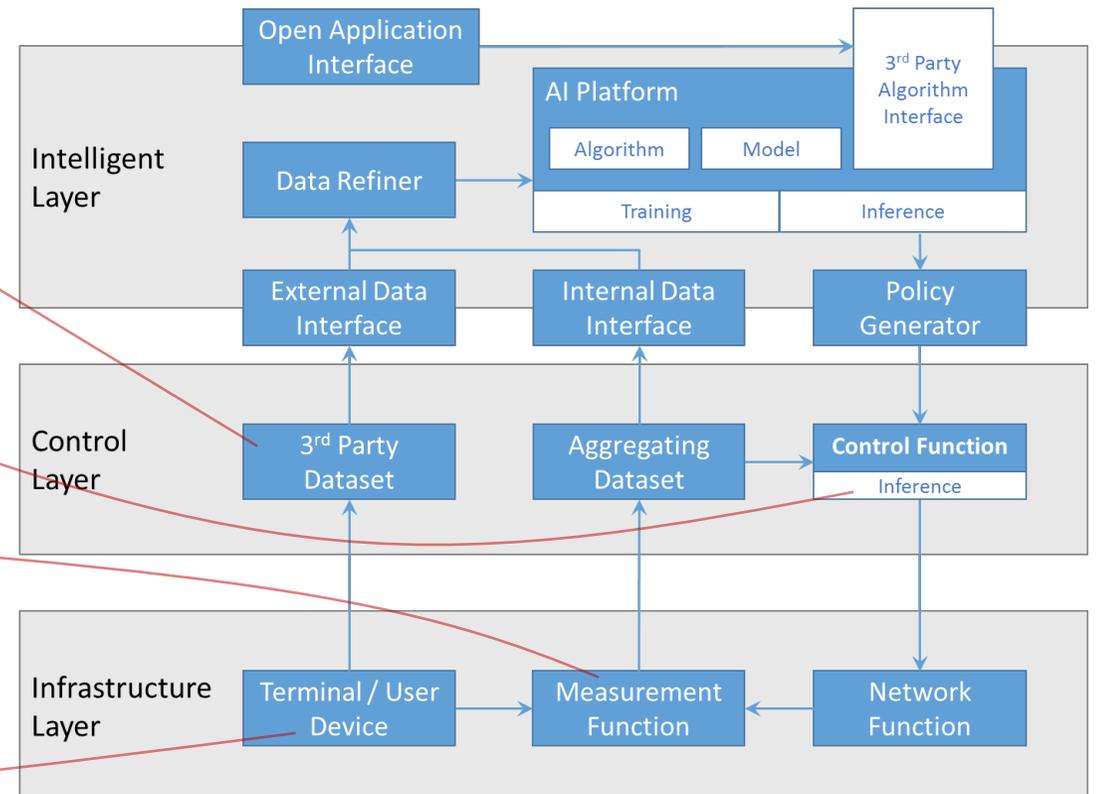
Approach: Use a Conditional Variational Auto-Encoder (CVAE) to predict the congestion and use proactive control ensure SLAs. Essentially predict congestion to avoid QoS/SLA violations before they happen.

VPN QoS Proactive Assurance

- Use proactive adjustment to provide assured QoS
- Predict the network state trend and key QoS Parameters



✓ External data can be also be used to improve prediction (the “conditional” part of CVAE)

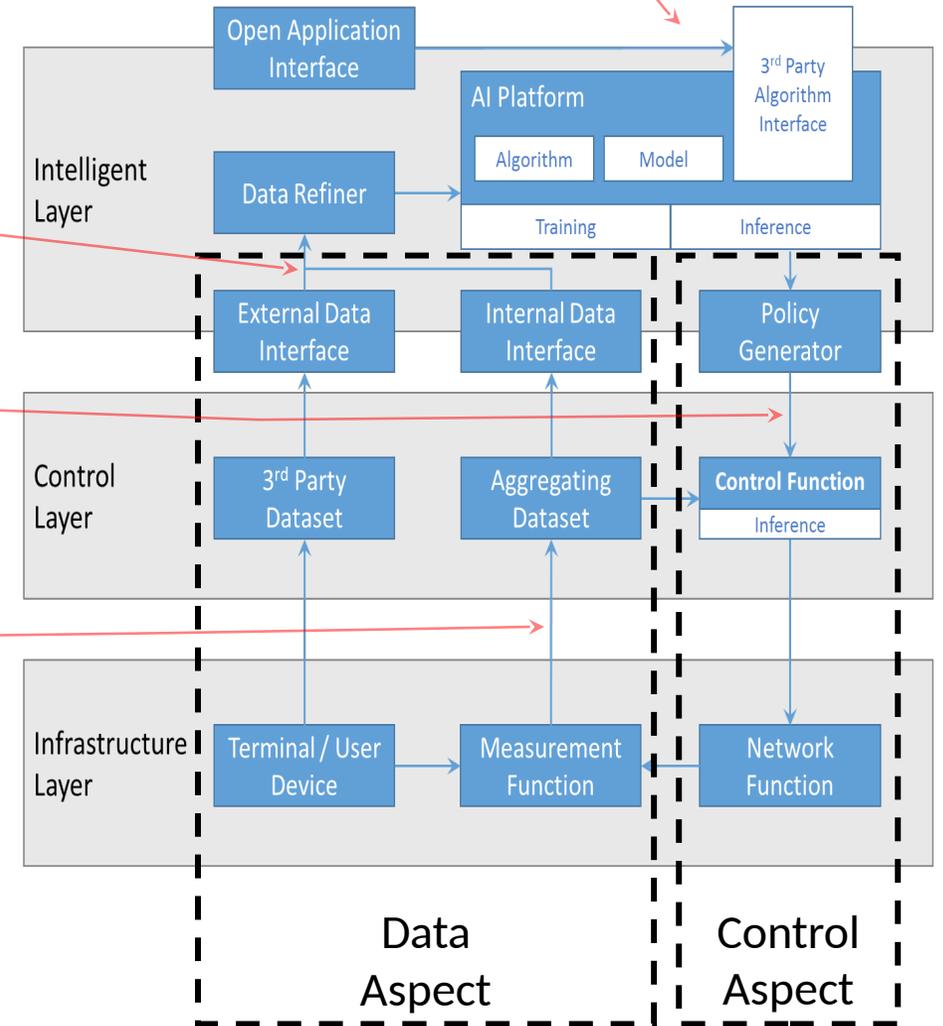
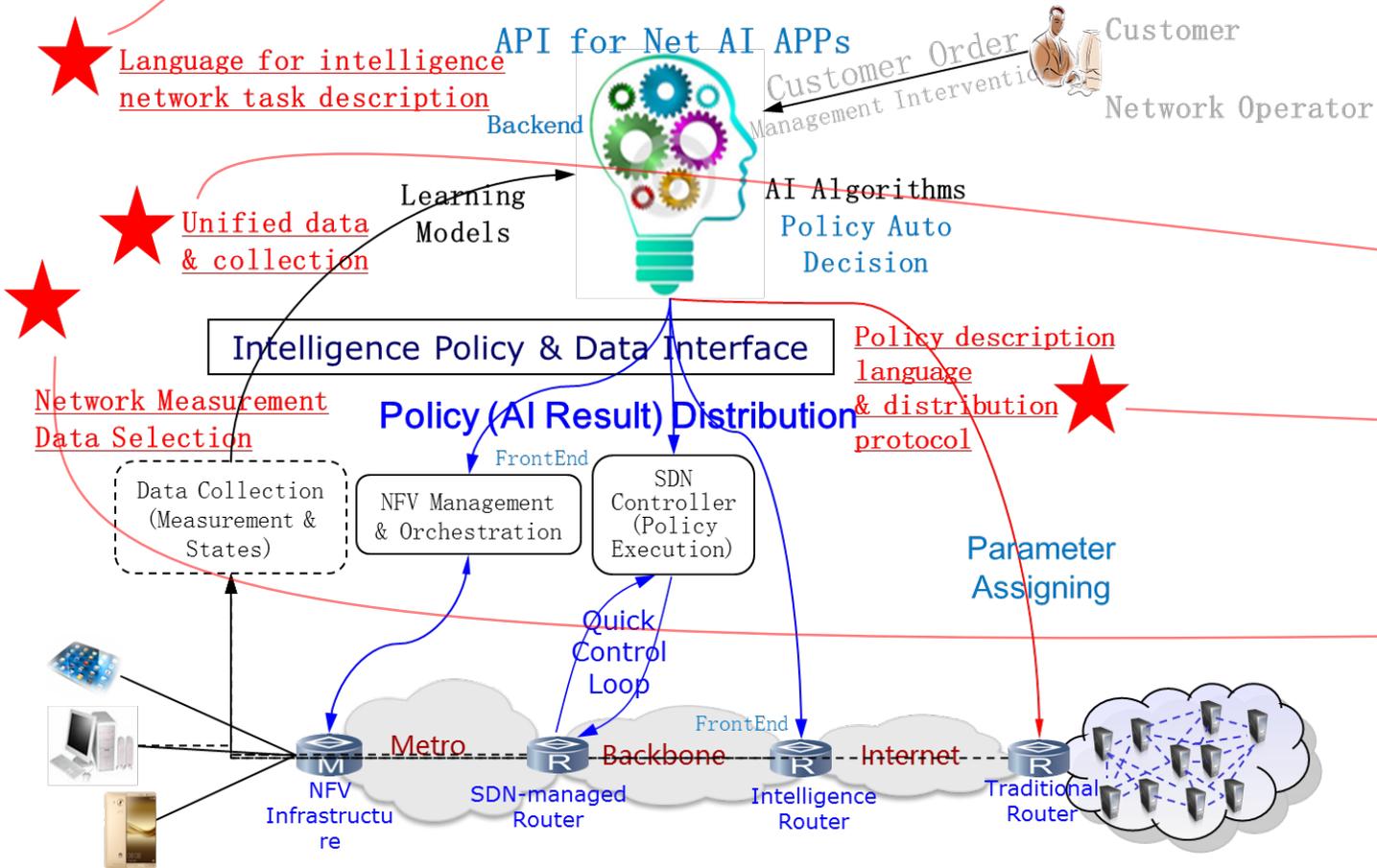


Summary (Scenarios)

Numbers of high-value scenarios have been proposed.

- Traffic Prediction, QoS Management, Application (and/or DDoS) detection, QoE Management, Traffic Classification, Anomaly Detection,
- <https://www.ietf.org/mail-archive/web/idnet/current/msg00164.html>

Standard Points in the Architecture



Standard thought

Data aspect

- Transform between network data and algorithm data

Control aspect

- Device control before and after algorithm calculation
- Measurement: new types of network KPI (not only service-oriented, but also new types of data)

	Data	Control
QoS Management	QoS Parameters (delay, loss, jitter, link utilization, etc.), time, route/topo, etc.	Route policies, e.g. BW reservation
Traffic Prediction	Real-time traffic , time , etc.	Route policies, e.g. modify the VPN config to avoid congestion
Application Detection	Packet parameters (header, content, scr/dst IP/port,	Security policies, e.g. warning notification,
QoE Management	SNR, Delay, Jitter, queue-size, etc.	Operate network to meet target QoE requirement, e.g. modify the config that relative with QoE feedback
Traffic Classification	packet size distributions, number of packets, inter-arrival time distribution, etc.	Apply application level policies, e.g. priority setting, security setting,
Anomaly Detection	packet or flow inter-arrival times, etc.	Output the scores and/or labels, then apply policies according to the result

From <https://www.ietf.org/mail-archive/web/idnet/current/msg00164.html>

IETF-draft

More details please view:

<https://tools.ietf.org/html/draft-yan-idn-consideration-00>

Thanks