Essential Artifacts for Intelligence Driven Networks

Applying AI to Network Management

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Clarifying some concepts...

- **AI ≠ ML**:
  - AI has a broader spectrum of methods, some of them are already exploited in the network for a long time.
  - **Perception**, **reasoning**, and **planning** are still not fully exploited in the network.

- **Intelligence ≠ Intelligent**:
  - Intelligence emphasizes data gathering and management:
    - Which can be processed by systematic methods or intelligent methods...
  - Intelligent emphasizes the reasoning and understanding of data to actually "posses" the intelligence.

Why AI in Network (and) Management?

- **Management** decisions are more and more **complex**:
  - From: Is there a problem in my system?
  - To: Where should I migrate this VM to accomplish my goals?

- **Operation environments** are more and more **dynamic**:
  - Softwarization and programmability elevate flexibility and allow networks to be totally adapted to their static and/or dynamic requirements.
  - Network virtualization enabling **network automation**.

- Network **devices** become **autonomic**:
  - They must take **complex decisions** without human intervention.
  - Zero-Touch networks exploiting fully programmable elements and advanced automation methods (ETSI ZSM).

- Why not?
  - **AI** methods are just **resources**, **not solutions**!

Exploiting AI in IDNET

- AI methods in IDNET will have access to a huge amount of (intelligence) data from the systems they manage.

- The <u>knowledge</u> derived from such data can be used to decide the **strategic response** to any **event** or **situation** of such networks.

- Constantly evolving model:
  - **Knowledge (and Intelligence) Driven Network**.

Intelligence Driven Network

- The **structure** of the network results from **reasoning** on intelligence data:
  - The network **adapts** to new situations without requiring human involvement.
  - Administrative **policies** are still enforced to decisions.

- Intelligence data is **managed** properly to exploit all its potential:
  - Data with high accuracy and high frequency will be processed in **real-time**.
  - **Fast** and **scalable** methods are essential to the objectives of the network.

- **AI algorithms** must be **adapted** to work on network problems:
  - Joint **physical** and **virtual** network elements form a **MAS** to achieve system goals.

- **Use cases**:
  - Predicting traffic behaviour.
  - Iterative network optimization.
  - Assessment of administrative policies.

Standardization Issues

To facilitate the coexistence of methods from different providers/vendors...

- The **methods** used to retrieve the information must be **quality assured** (assessment).

- The **types and qualities** of information that is retrieved from a system or object must be **consistent**.

- The **format** and **ontology** used to represent the information must be **compatible** (or easily translatable) across all systems.

- The **protocols** used to communicate (or disseminate, or publish) the information must respond to the **constraints** of their target usage.

Thanks for Your Attention

Questions?

– EOF –