Status update
draft-clemm-nmrg-dist-intent-02

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Status update

• Draft update to rev -02, following NMRG interim meeting in San Jose.
• Updates:
  • Title changed to “Intent-Based Networking - Concepts and Overview”
  • Numerous edits throughout, including clearer delineation between Intent and other concepts (such as policy)
  • New section on first-order principles of Intent-Based Networking
  • New section on Intent Lifecycle
  • New section on Intent Research Challenges
Intent concept clarifications

• Intent is outcome-oriented
  • “What outcomes does a network provider expect”, not “how those outcomes are achieved”
  • Intent system, not user, responsible for translating desired outcomes into courses of actions, policies, algorithms.

• On the relationship to Policy
  • “Intent-based” relates to “policy-based” like “AI and machine-learning” relate to “Expert Systems”
    • Intent defined by desired outcomes, not how to achieve them (one way of which might be means of rules)
    • Policy defined by rules (e.g. Events/Conditions/Actions) and what to do under which circumstance
Principles

Starter set of principles defined, subject to further discussion:

• **Single source and single version of truth (SSoT/SVoT)**
  (Important to capture drift, ensure system convergence)

• **One touch but not one shot**
  (It may take iterations and interactions to arrive at desired intent, resolve ambiguities, avoid unintended consequences)

• **Autonomy and oversight**
  (System conducts tasks on its own; users are given the necessary tools to retain an understanding of current state and what is happening)

• **Learning**
  (System is able to assess effectiveness of its own actions and improve in order to optimize outcomes and adapt to dynamic conditions and changing context)

• **Explainability**
  (System is able explain its actions and reason about their effectiveness)

• **Abstraction**
  (Users do not need to be concerned with how intent is mapped into lower-level artefacts)
Intent lifecycle (1)

Definition Phase

- Use-related data
  - recognize
  - generate

Preparation Phase

- translate
  - validate
  - recommend
  - normalize
  - decompose
  - communicate

Operation Phase

- fulfill
  - observe
  - assure
  - report

User data

Definition Phase

- Use-related data
  - recognize
  - generate

Preparation Phase

- translate
  - validate
  - recommend
  - normalize
  - decompose
  - communicate

Operation Phase

- fulfill
  - observe
  - assure
  - report

User data
Intent lifecycle (2)

User Space
- recognize/articulate intent
- translation & refinement
- Learn
- Plan
- Render

IBS Space
- config/provision/orchestrate
- validate
- analyze & aggregate
- abstract

Network Operations Space
- monitor/observe/measure
- report & oversee

Fulfill

Assure
Intent Research Challenges (starter set)

• NMRG is a research group, after all...

• Intent interfaces
  System is to infer the intent of the user (Intent ≠ YANG, CLI, RPC, config) Human-machine interactions: facilitate interrogation/interview-style interactions, clarification, alternative selection, intent playback, iterative intent refinement

• Explanation
  Have IBN explain actions to facilitate troubleshooting, improve confidence, retain control – compare ML

• IBN Metrics
  Assess effectiveness of IBN outcomes, ability to learn, adapt, progress
Next steps

• Request adoption as NMRG work item
Thank you!