Clarifying the Concept of Intent draft-clemm-nmrg-dist-intent-01

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Status update

- Initial discussions on this at IETF 100/101 + NMRG interim at IFIP/IEEE NOMS 2018
- Per discussions, the first in a suite of eventually three drafts:

(1) Terminology – Definitions and Concepts: Intent vs policy vs service models, etc This draft

(2) Intent definition – Expressing Intent (*draft TBD*)

- Human Machine interface aspects
- Relationship to data models can you use YANG?
- Layer interdependencies

(3) Basic intent architecture and framework/reference architecture *draft-moulchan-nmrg-network-intent-concepts*

- How to render intent
- How to validate network behaves "as intended"
- Various updates from -00: editorial updates and tightening, added references

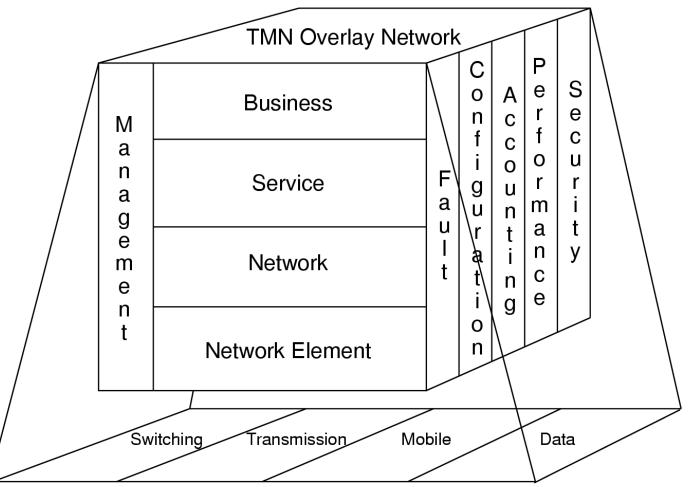
What is this about?

- "Intent-Defined Networking" is one of the recent industry buzzwords
 - Basic idea: Define what you want, not how to do it
 - This sounds good, but is this idea really new? (rhetorical question)
 - Policy-based management: Define high-level policies, leave it to policy renderers to do the rest
 - Service models and service provisioning: Define services & leave mapping of the service to low-level configurations, resource allocations, and objects to a flow-through provisioning system
 - Information hierarchies and abstractions are known concepts and common practice for service providers today (e.g. TMForum eTOM / Business Process Model, ITU-T TMN reference model (management layers + FCAPS)

• So, what is intent, really?

- How does it differ from what came before?
- Is Intent a reincarnation of policy? Of service models? Is intent synonymous, or different?
 Why all those terms and how do they relate?
- If it is different: how so? What are the implications?

Existing Frameworks (that also make extensive use of management abstractions and hierarchies)



Basic Networks

Source: ITU-T

Existing Frameworks (that also make extensive use of management abstractions and biorarchies Manage overall business aspects supported by the provided services: revenue forecast, supply TMN Overlay Network chains, corporate compliance Ρ А 0 Business Business Manage services provided by the n Μ network: service level management, Management а service order provisioning n Service Service a Management Manage network connectivity g aspects: topology, links, end-to-Network Management е end paths Network m е **Element Management** Manage aspects of individual n devices: monitor ports, download **Network Ele** a patch, set a configuration **Network Element** parameter Switching Mobile Fransmissior Data aka "TMN Pyramid" Management agent, embedded management intelligence

Source: ITU-T

Basic Networks

Existing Frameworks (that also make extensive use of management abstractions and hierarchies)

Customer								
Strategy, Infras	tructure & Prod	Opera	Operations					
Commit I	nfrastructure Lifecycle Management		Opera Suppo Readi	rt &	Fulfillment	Assur ance	Billing	
Marketing & Offer Management			Customer Relationship Management					
Service Development & Management			Service Management & Operations					
Resource Developm (Application, Co	Resource Management & Operations (Application, Computing and Network)							
Supply Chain Deve	lent	Supplier/Partner Relationship Management						
Enterprise Management	Strategic & Enterprise PlanningBrand Mar Market Re AdvertisingFinancial & Asset ManagementHuman Re Management		search & g sources	Relations Management		Security & Manage me Enterprise Manage me	Disaster Recovery, Security & Fraud Management Enterprise Quality Management, Process & IT Planning & Architecture	

eTOM – enhanced Telecoms Operations Map (TM Forum GB 921: Business Process Framework)

Differences between concepts and terms

- Service Models:
 - Describe instances of services that are provided to customers (see e.g. RFC 8309)
 - Service instantiation involves **orchestration** and **mapping** to underlying resources (user does not specify how to add, modify, remove a service the system does it)
 - Machine-to-machine interactions; flow-through provisioning
 - Typically centralized
- Policy:
 - Set of rules (event/condition/action or variations)
 - Imperative: specify **how to act** / what to do under what given circumstances
 - (largely) machine-to-machine (but also devops-to-machine) interactions
 - Policy rendering: abstraction (and homogenization) of low-level knobs and data
- Intent:
 - Declarative: Define desired **outcomes** and high-level operational goals
 - Interactions between humans and machines
 - Network (or Intent-Based Management System) renders intent two aspects: information abstraction and determination of logic
 - Centralized and decentralized flavors

Discussion items

- Define intent narrowly (only "new" concepts) or broadly
 - Putting things into a common context vs. guilty of "intent-washing"
 - Operational intent service intent flow intent
 - Intent at different hierarchy layers (at device/network/service level), distinguished by actor (NOC operator, user, administrator)
- Intent functional areas:
 - e.g. intent fulfilment vs intent validation (or assurance?)
 - Intent compliance assessment and monitoring
 - Service assurance and service level management ("intent washing")
- Intent levels
 - Intent at multiple levels in a hierarchy: e.g. service vs network infra
 - Intent of multiple roles: e.g. NOC operator, admin, end user
 - Intent at multiple levels of granularity: e.g. flow intent
 - Intent reconciliation, intent conflict detection
- Possible expansion of scope to intent reference architecture?

Discussion items (contd)

- Intent articulation and human-machine aspects
 - Type of actor impacts the type of interaction and interface
 - Natural language processing infer meaning
 - Dialogue vs command
 - Dealing with under-specification (and over-specification)
 - Conflict avoidance
 - Resolution of ambiguities
 - Technical solutions are beyond scope of this particular draft, but important for distinction of what makes intent "unique"
 - "Can intent be expressed as YANG data model?"
- Beyond scope but relevant for IRTF: possible research topics
 - Human-machine interaction
 - Intent compliance assessment
 - Intent conflict detection, reconciliation, negotiation
- This is ongoing work & the discussion is just getting started
- Next step: RG adoption?

Thank you!