

Distinguishing Intent, Policy, and Service Models

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Purpose of the draft

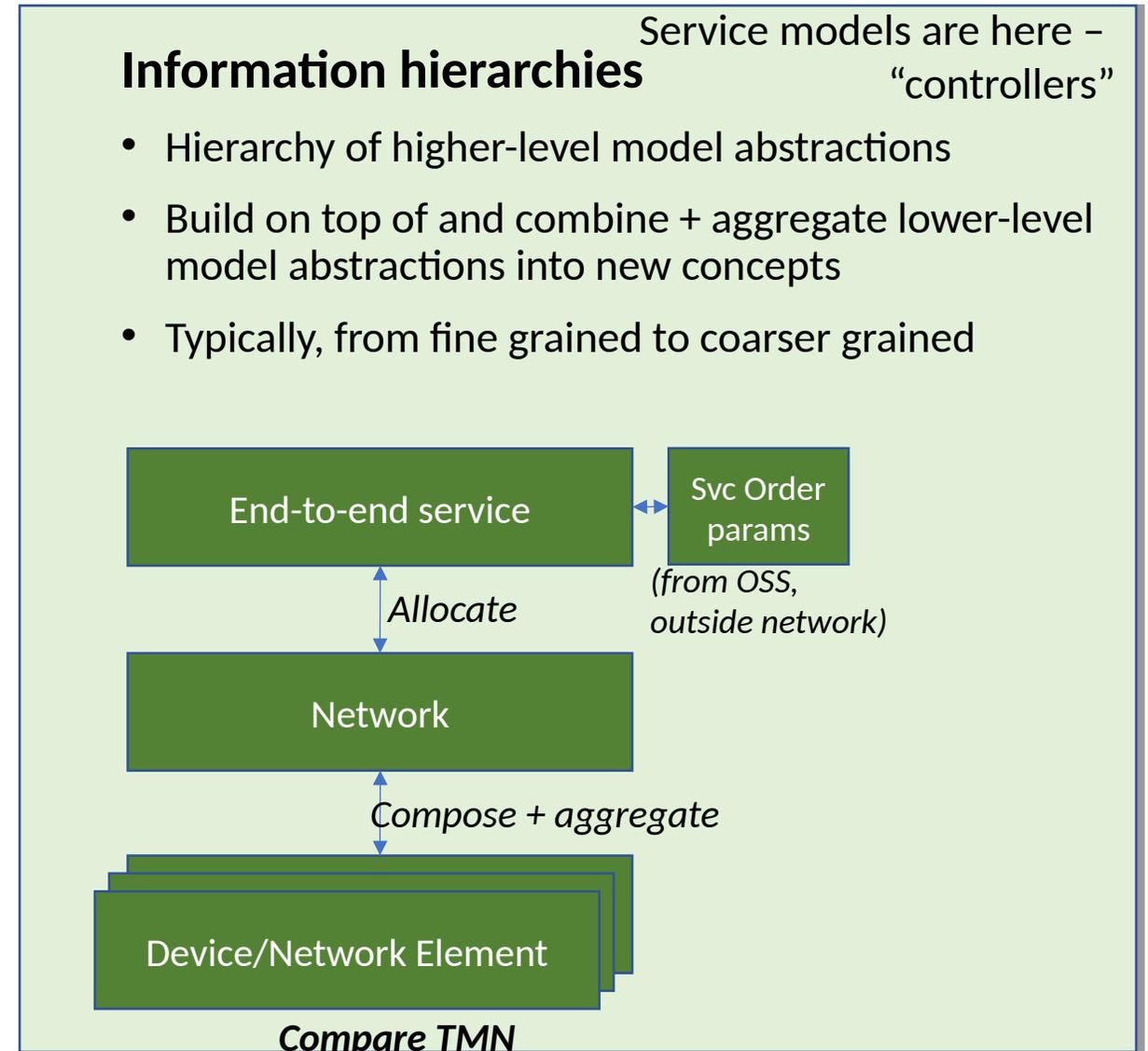
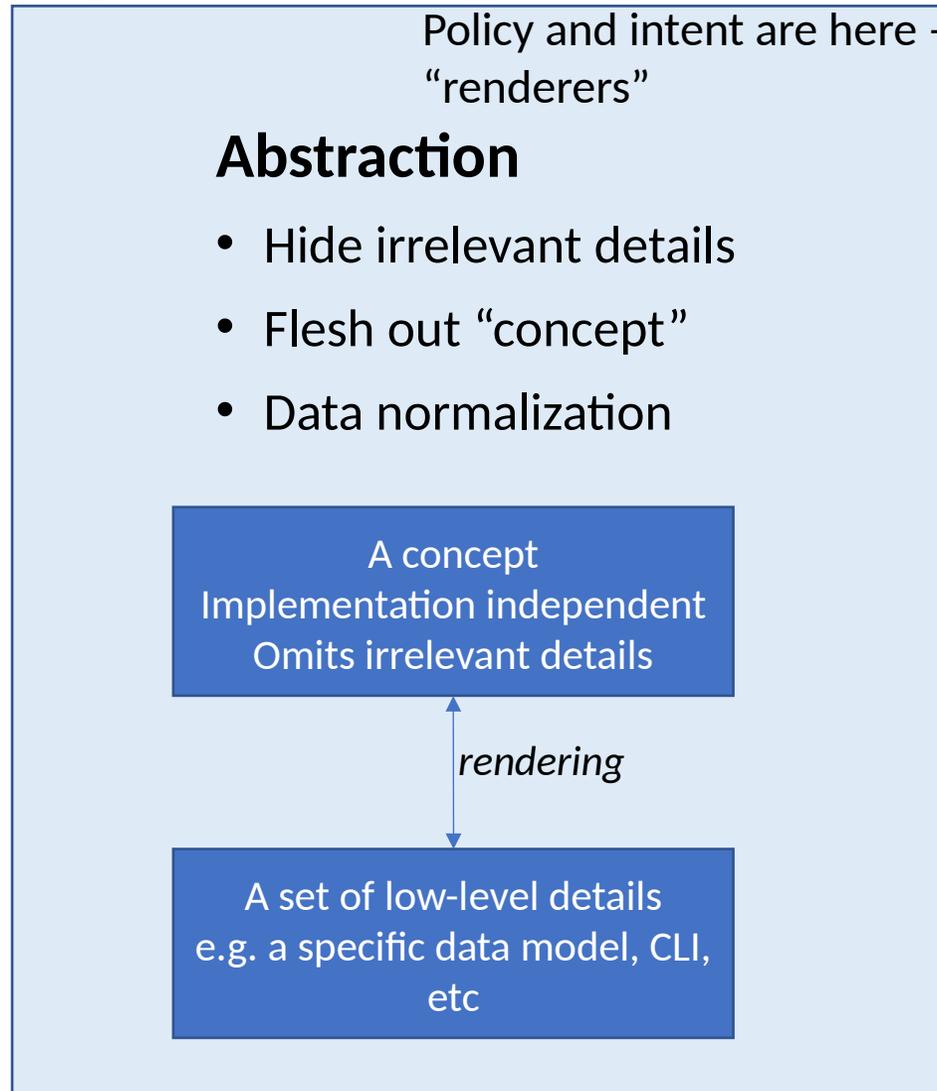
- “Intent-Defined Networking” is the latest buzzword
 - Basic idea: Define what you want, not how to get it
 - This sounds good, but is this idea really new? (rhetorical question)
- What is intent, and how does it differ from what came before?
 - Policy-based management: Define high-level policies, leave it to policy renderers to do the rest
 - Service models and service provisioning: Define services, mapping to low-level configurations and objects left to a system
- Is Intent a reincarnation of policy? Are they synonymous? Do they mean different things? Why all those terms and how do they relate?
- Compare confusion with “data models” and “information models”

▢ This Draft

Intent vs Policy vs Service Models

- Policy:
 - “Policies are rules governing the choices in behavior of a system” (Morris Sloman 1994)
 - “Policy is a set of rules that are used to manage and control the changing and/or maintaining of the state of one or more managed objects” (John Strassner 2003)
 - “A definite goal, course or method of action to guide and determine present and future decisions”.
“A set of of rules to administer, manage, and control access to network resources”. (RFC 3198)
- Intent: RFC 7575: “An abstract, high-level policy used to operate the network”
- Service Models: A model that represents a service that is provided by a network to a user. (And: which service to provide to a user is a form of intent)
- From these definitions, “intent” and “policy” are practically synonymous (and a “service” may just be another type of intent, and hence policy)

Key concepts in modeling that may be useful to explain this



Other aspects worth mentioning

- Declarative vs Procedural
 - Declarative: Desired outcome, goals, post-conditions
 - Procedural: (programmed) workflow
 - Some middle ground (e.g. rule-based)
- Rendering:
 - Predetermined: well-defined rendering rules, deterministic, “programmed”
 - Dynamic: obtained e.g. via control loops, negotiation and planning, trial-and-error, ...
 - Centralized vs Distributed (control hierarchy) vs. Decentralized (e.g. peer-to-peer, autonomic)
- What about intent-based management and policy-based management and the resulting frameworks
 - Mouli + Kaarthik draft alludes to this
 - Intent = SDN Controller API? Policy = Device Automation? Service model = non-SDN services?
 - Combine this into one big “treatise” on the subject, or have narrower drafts?

A second attempt at terminology

- Why not try to distinguish related but different concepts when we have different terms? Define things a little more narrowly for a clearer distinction:
- **Intent:** A high-level operational goal for a network or a service, whose precise mapping into lower-level parameters may be non-deterministic and unknown
(Abstraction of operational goals for network operators, focusing on network layer concepts)
Note: this makes IDS a candidate for cognitive management and distributed algorithms
- **Policy:** An abstracted rule of what to do (obligation policy) or what to permit (permission policy), given a set of well-defined events, conditions, and actions
(Focus on common abstractions and declarative rules, can apply at each layer of hierarchy)
Note: this makes PBM essentially rule-based systems
- **Service model:** A higher-level model abstraction, representing services provided to an end user, with a set of component resources and well-defined dependencies on network and device model abstractions.
(and **Network model:** A model abstraction, representing a network as a whole and holistic cross-device concepts (such as paths or connections), with well-defined dependencies on device model abstractions)
Note: This includes service function chains. It is what many controllers fundamentally provide

Structure of the draft

- Introduction
- Explanations of concepts on their own (building on existing definitions)
- Distinction between them (with examples) with refinements of terms as needed for an IRTF/NMRG definition of terms

- Is this useful – to what extent do those distinctions matter?
- If so, how do we gain broad consensus?

Backup

Examples

- Intent:

- “Optimize my network for energy efficiency”
 - “Prioritize higher levels of service over resource consumption”
 - “Ensure that gold level users receive the highest quality-of-experience of all users”
- Q: Does intent involve quantities? If there are quantities, where do they come from?

- Policy:

- “When resource utilization falls below 20%, migrate workload and shut down server”

- Service Model:

- “John gets residential internet access with 100 Mbps down 10 Mbps up”