draft-xibassnez-i2nsf-capabilities-01

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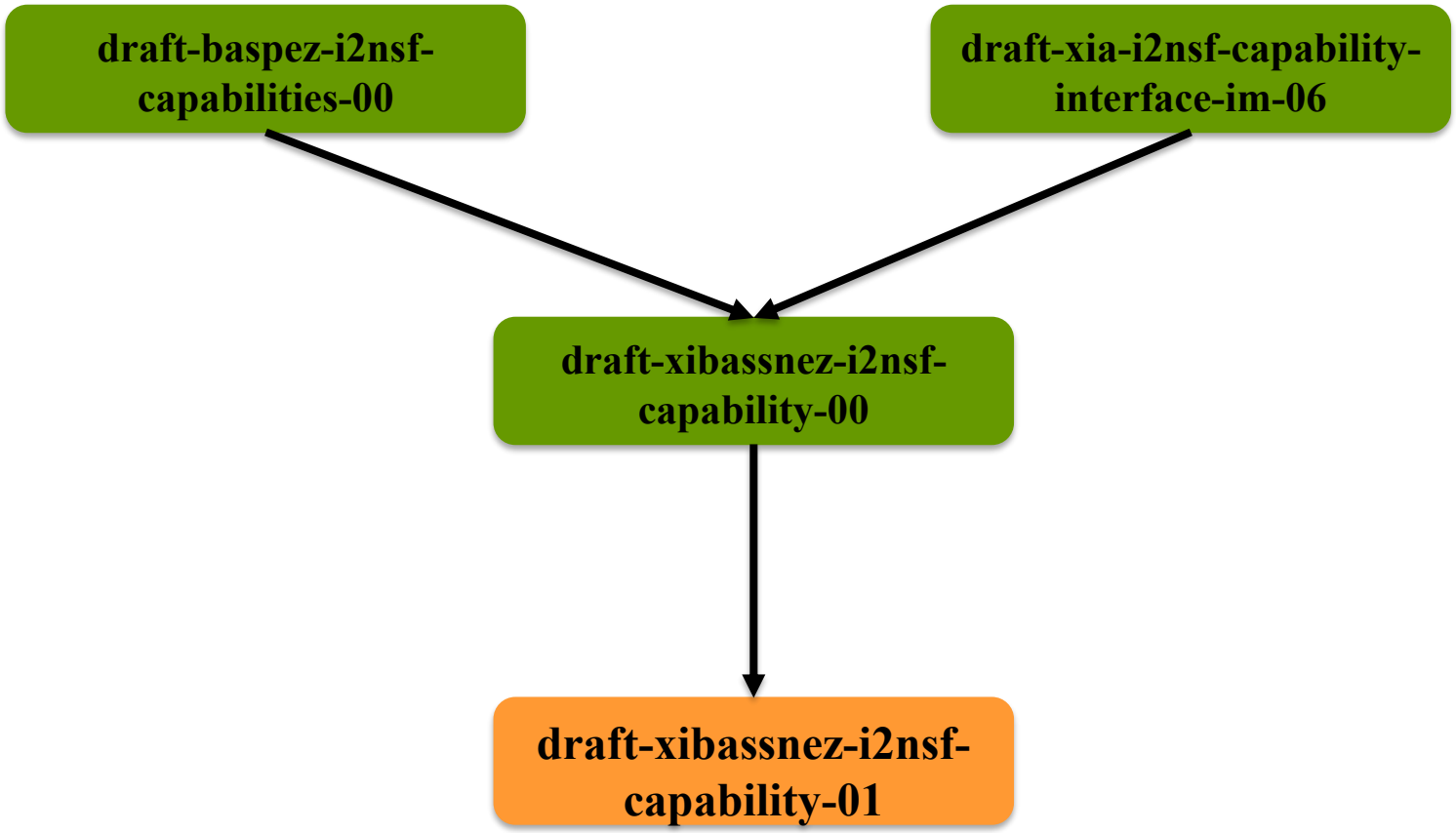
I2NSF meeting,
Chicago,
March 27th, 2017

Introduction: the Context

- **What can an NSF provide for policy enforcement?**
- **Defined by *Capabilities***
  - Capability: the functions that an NSFs provides, *independent* of the customer and provider interfaces
    - An abstraction with well-defined semantics
    - Flexibility to represent functionality that can be either vendor-dependent or -independent
- **This Draft**
  - Defines the concept of NSF Capabilities
    - Theory of operation and update to the Capability Algebra
  - Information models
    - Capability, and three categories of Security Capabilities
  - Includes several discussion points for the WG

History

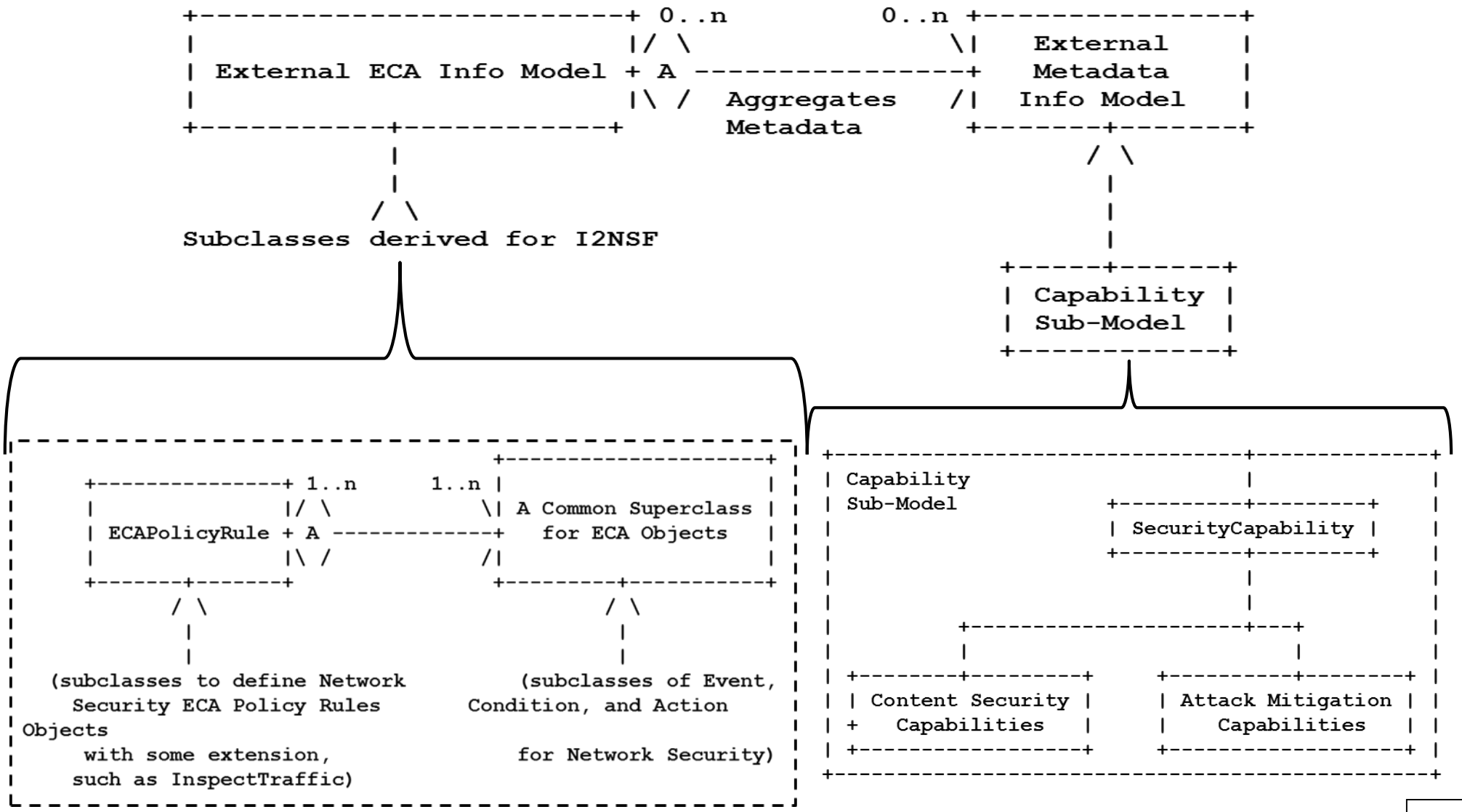


IETF96 Berlin
July 2016

IETF97 Seoul
November 2016

IETF98 Chicago
March 2017

Modeling Overview



The Proposed Capability Model

- **Support for ECA (and CA) Policies**
  - *Events*
    - significant occurrences the NSF is able to react to
  - *Conditions*
    - how the NSF determines which actions will be applied
    - fields in packets/PDU, stateful info acquired by the NSF
    - operations available to verify condition truth (matching)
  - *Actions*
    - what an NSF does on packets/traffic/PDU (e.g., deny, encrypt) and related actions (e.g., logging)
- **Other parameters to complete the policy specification**
  - *resolution strategy* + external (meta)data + *default action*
- **Templates and Capability Algebra**

Details of the Proposed Capability Model

- **Describe each NSF as follows:**
  - **Ac**: the set of Actions currently available from the NSF
  - **Cc**: the set of Conditions currently available from the NSF
  - **Ec**: the set of Events the NSF is able to respond to
  - **RSc**: the set of Resolution Strategies (how to resolve conflicts)
  - **Dc** defines the notion of a Default action
    - Can be a fixed action, a set of available actions, all the actions (F = full Ac), or no default action (Dc = empty set)
  - Capability Algebra
    - addition and subtraction of capabilities
    - ease the modelling of templates, compositions, plugins
    - asymmetric operations = union or set minus of Ac, Cc, Ec + RSc, Dc of the first operand

The model: discussion with the WG

- Possible improvements / extensions to consider for the next revision of this draft (*all questions from the I-D*)
  - Event clause / Condition clause representation
    - e.g., CNF vs. DNF for Boolean clauses
  - Event clause / Condition clause evaluation function
    - more complex expressions than simple Boolean expressions to be used
  - Action clause evaluation strategies
    - e.g., execute first action only, execute last action only, execute all actions, execute all actions until an action fails
  - More on metadata
    - authorship, time periods, (+ priorities)
  - Symmetric addition and subtraction? additional operations? Other behavior of the operations? → use cases?

Proving Its Effectiveness

- **Defined categories of NSFs that need to be modelled with the Capability Model (first instantiations)**
  - based on Policy Information Models
    - Network Security Information model
    - Content Security Information model
    - Attack Mitigation Information model
- **Categories and subcategories determined with sub-classing**
  - pros: intuitive, simple, easy to design
  - cons: not very elegant, requires non-trivial maintenance at every minor update, does not work well at run-time
- **WG: should we switch to (for example) the decorator pattern?**
  - less intuitive but much more expressive, reduce classes at runtime, provides dynamic behavior (composition) instead of fragile, inheritance-based behavior (which is static)
  - More model-driven = less maintenance

Conclusion

No need to maintain a Capability Model and a set of Policy Models for **every** NSF type
Instead, describe the Capabilities of a NSF and apply an appropriate policy model

This is a scalable, model-driven approach

Questions?

“Create like a god. Command like a king. Work like a slave”
- Constantin Brancusi