Next Generation Service Engineering

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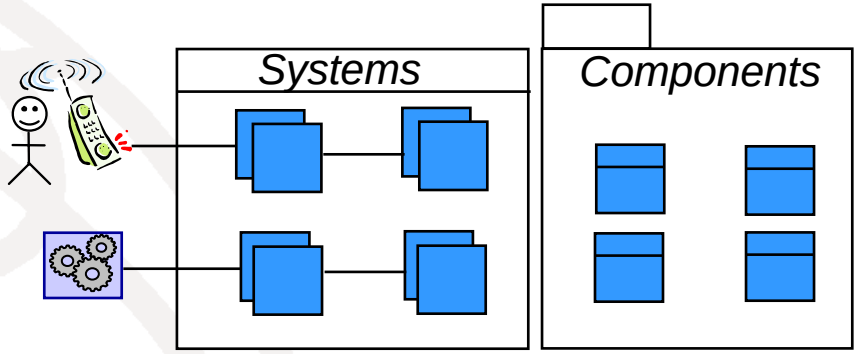
Outline

- Current best practice MDE
- Trends and challenges
- Services and service models
- Next Generation Service Engineering
- Multimedia over IP (MMoIP) example
- Conclusions

Current Best Practice: Model Driven, Agent Oriented

Functionality models

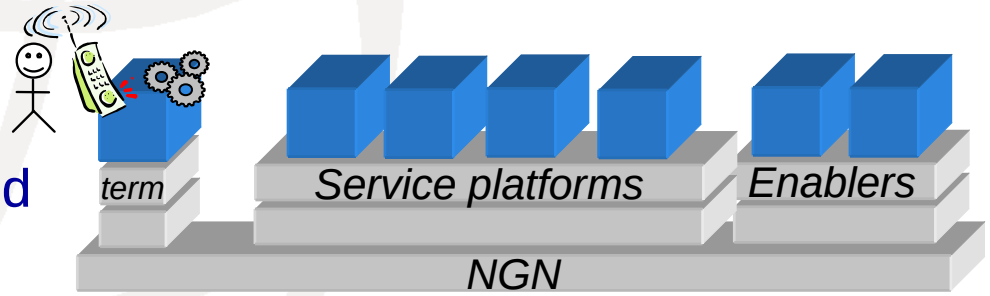
- Active objects: UML, SDL
- State machines
- Asynchronous communication
- Agents reflecting the domain and the environment
- Focus on individuals



Application generation by model transformations

Realization

- Runtime support for the Design Architecture
- Distribution transparency and scalability
- Platform layering with edges



Trends

- *Unification* of underlying network technologies and computing platforms enabling network and service convergence.
- *Diversification* of services as well as equipments at the network edges.
- Shifting the business focus from connectivity and traffic to *services and content*
- Shifting the development focus from system design to *service engineering* and end user value

Service engineering challenges

- From *object orientation* to *service orientation*:
  precise service modeling, analysis and composition
- From network and platform focus to end-user focus
- From design time to run time composition and adaptation
- Supporting situation, personalization and policy

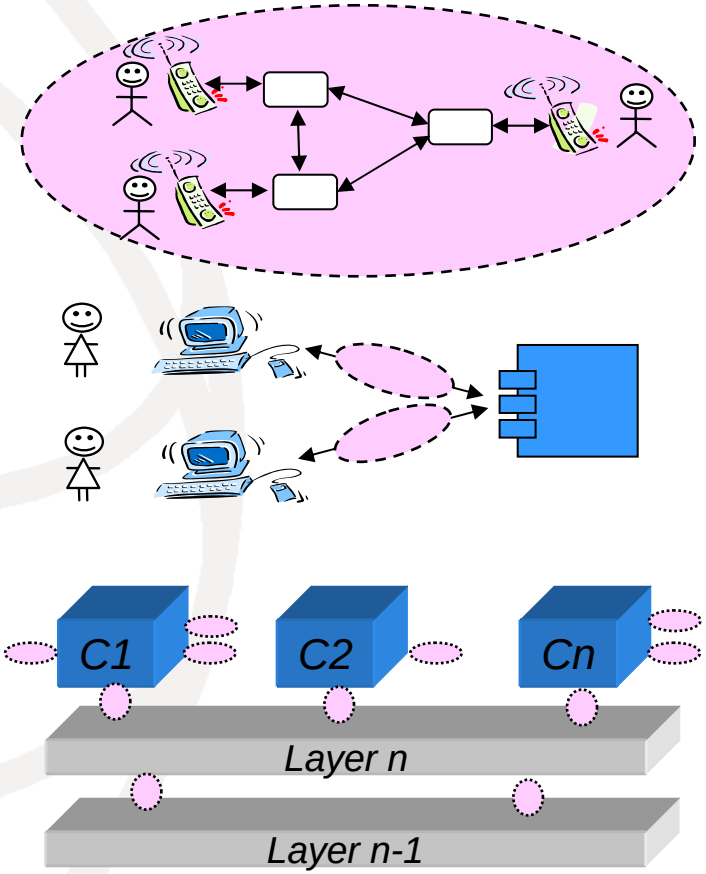
What is a service?

A service is:

an identified functionality aiming to establish some goals/effects among collaborating entities.

Captures:

- active services
- passive services
- end user services
- component interfaces (Web Services, CORBA, JINI, ...)
- layered functionality (ISO OSI)



Service essentials:

- Service is *functionality*; it is behavior performed by entities.
- Service imply *collaboration;* it makes no sense to talk about service unless at least two entities collaborate.
- Service behavior is *cross-cutting*; it imply coordination of two or more entity behaviors
- Service behavior is *partial*; it is to be composed with other services

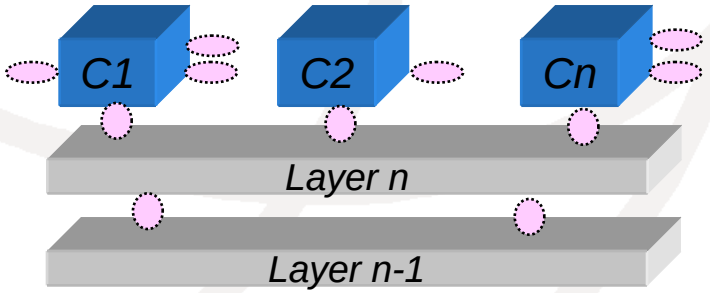
Will contemporary SOA or WS be the solution to NGSE?

Only if

- passive services are all you need
- there is little need for statefull sessions
- you are not too worried about interoperability and performance
- you are happy to live in a concrete architecture

Because these ”services” are essentially

- invocation interfaces bound to concrete components
- used for integration and distribution
- not for engineering end user and community services



Next Generation Service Engineering

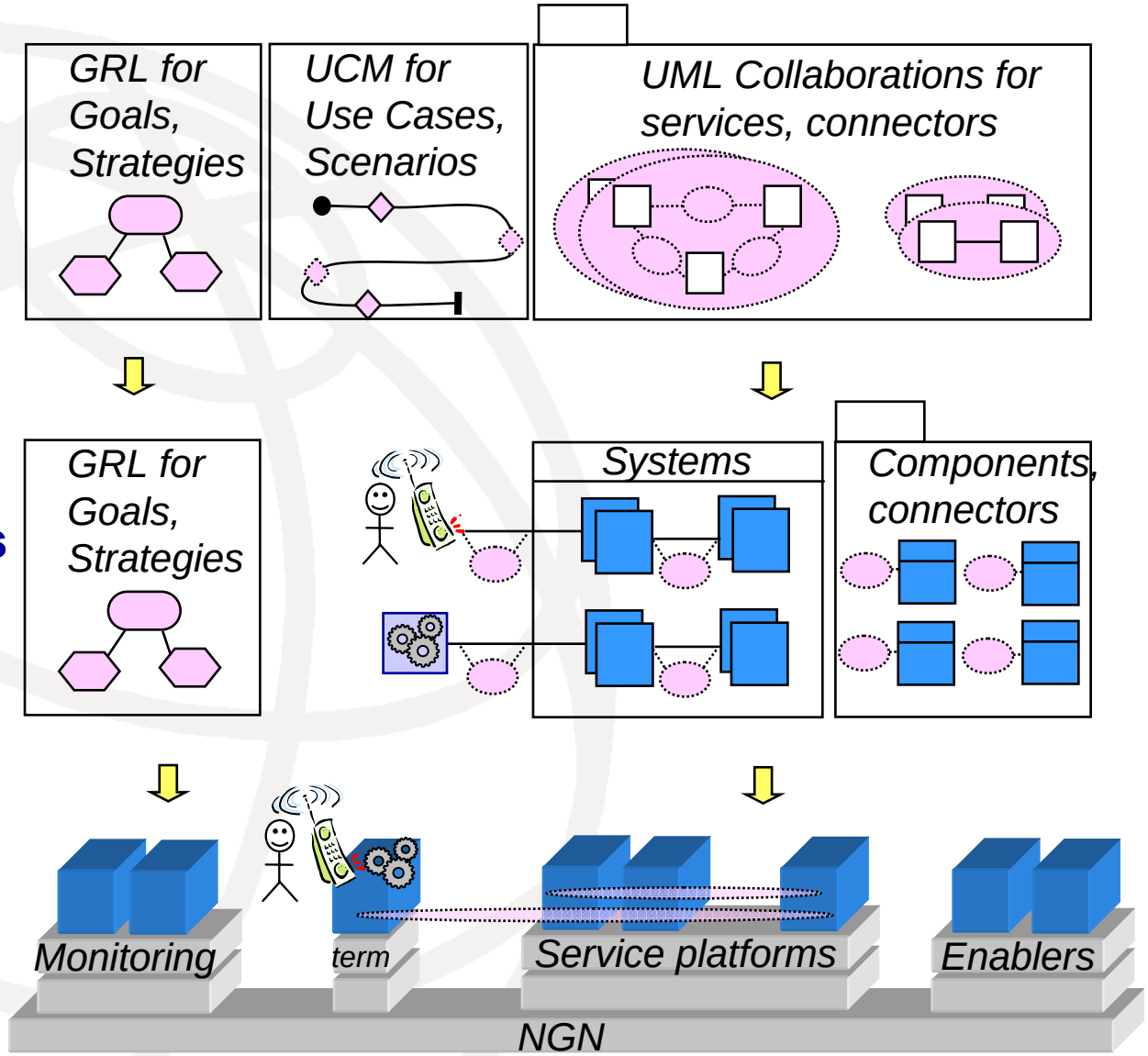
Service models

Model transformation

Functionality models

Model transformation

Realization



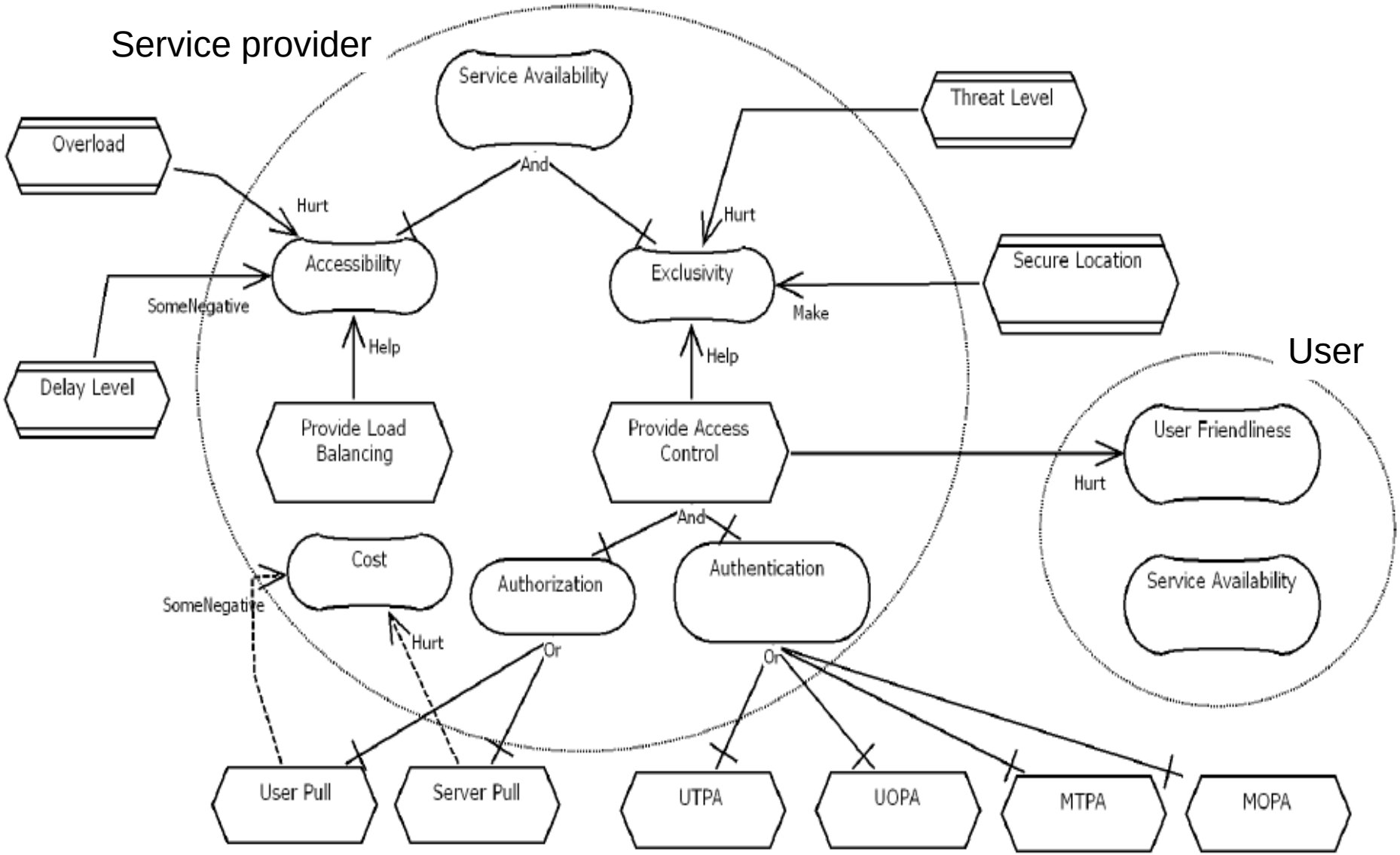
Case study: MMoIP + Availability

- Service Availability
  - Exclusivity
  - Accessibility
- Cost
- User friendliness
- How to handle them all?
- What of external factors?
  - Threats
  - Overload
  - Delays

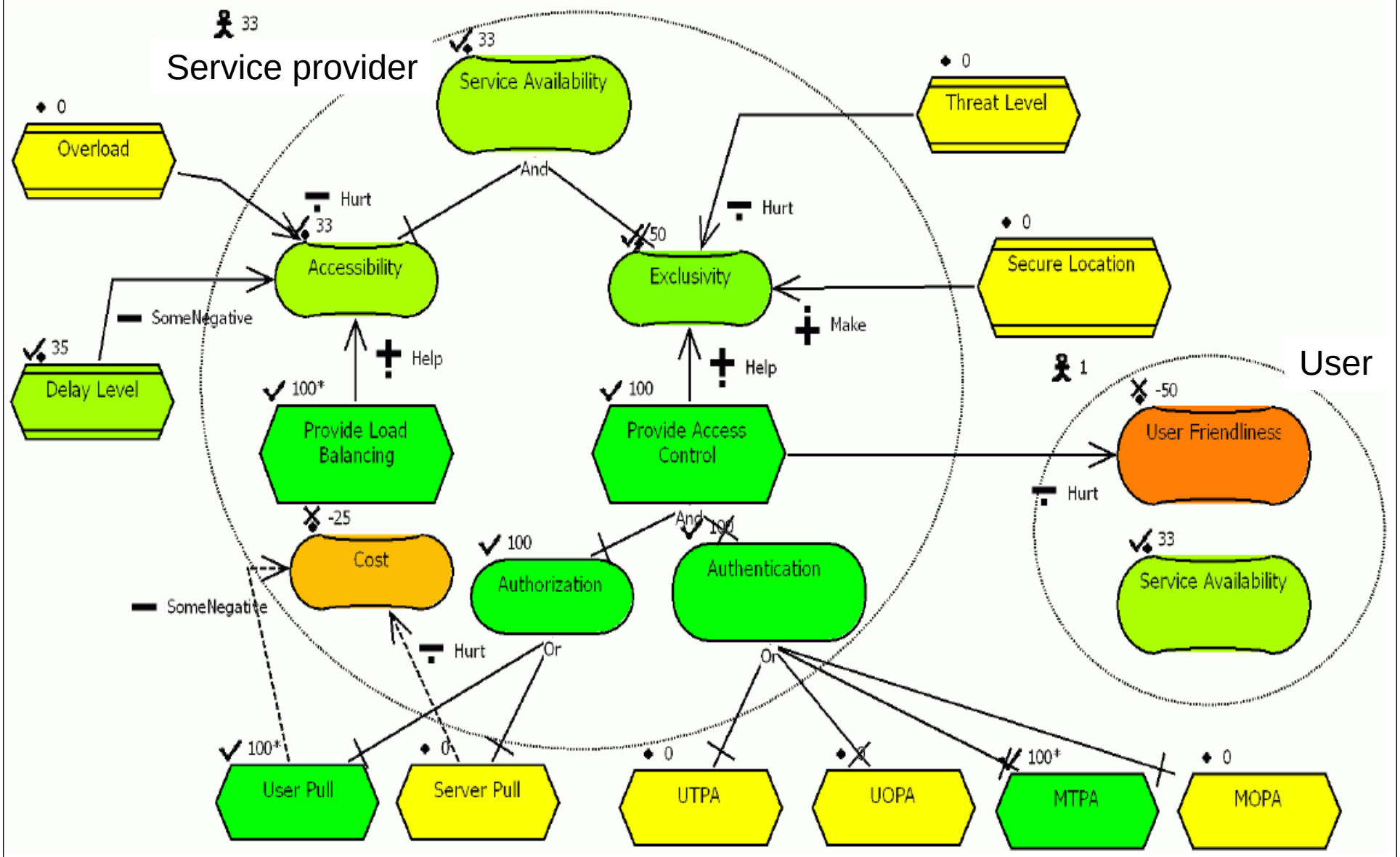
Case study: Models for MMoIP

- GRL for variability and strategy analysis
- UCM to specify and analyze scenarios
- UML 2 collaborations to specify and analyze services
- UML 2 collaborations as contracts for lookup and compatibility
- Policies to manage run-time adaptation
- GRL for monitoring and decision making at runtime

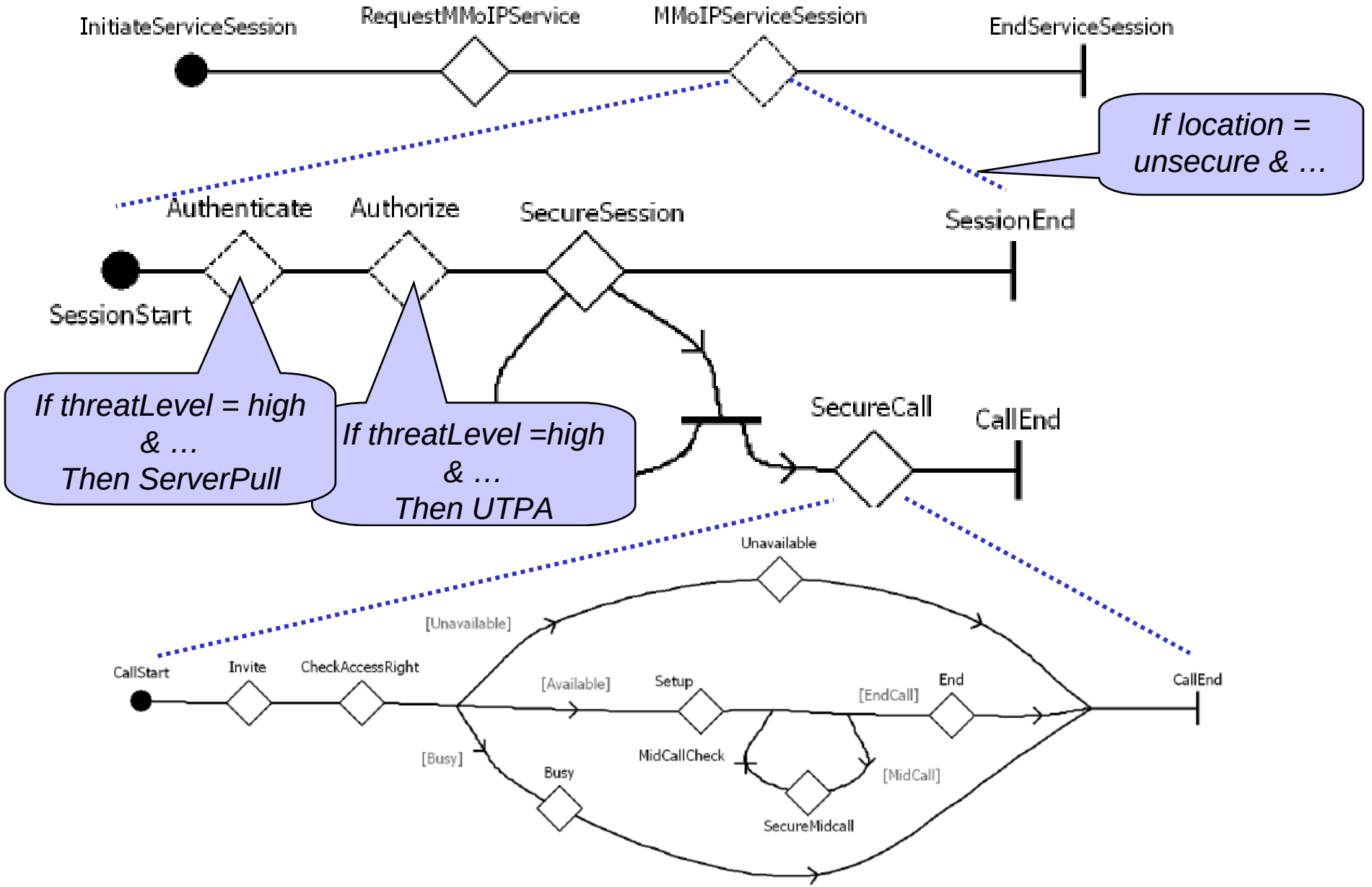
Case study: GRL Model for Availability



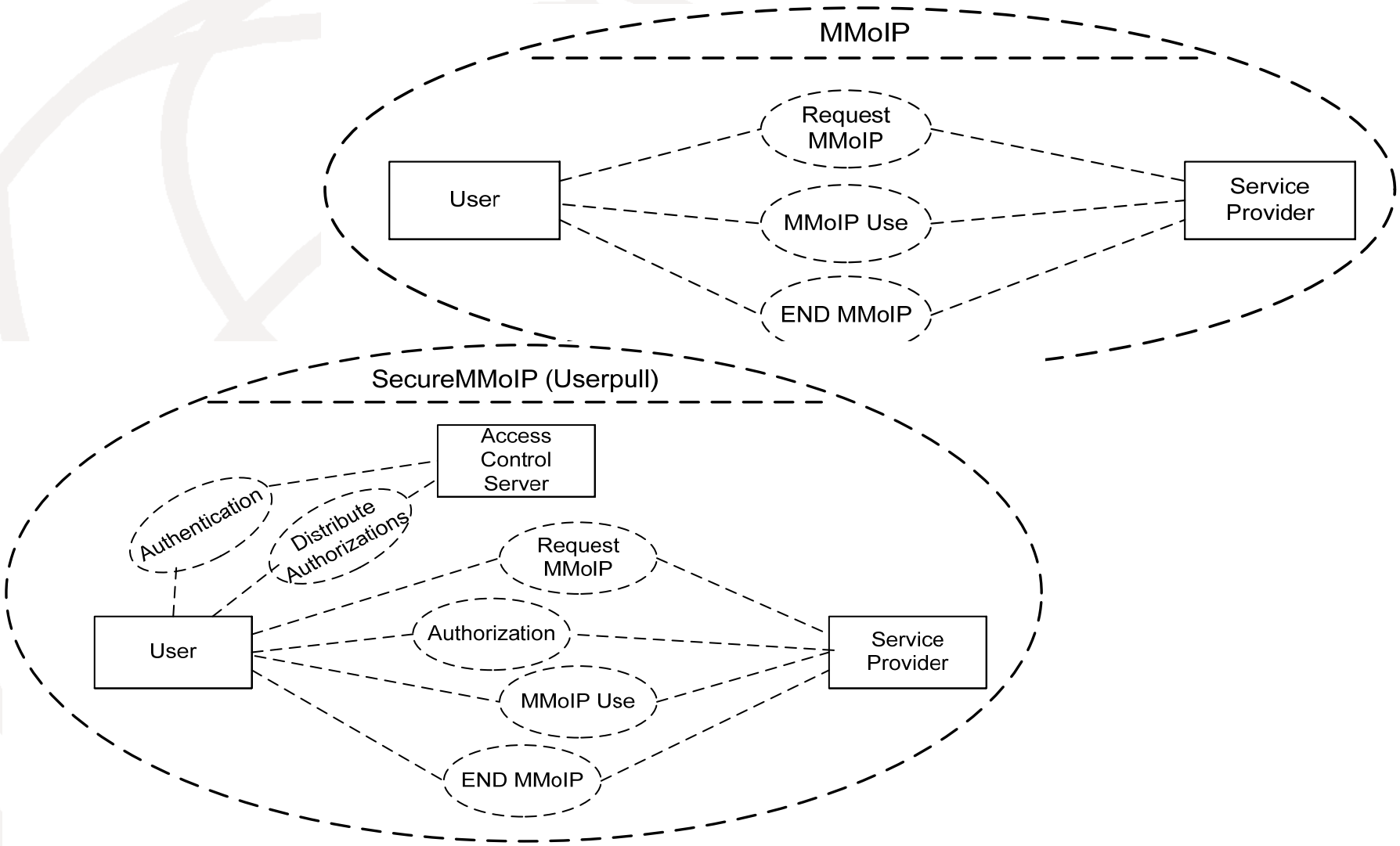
Evaluation of a GRL strategy



Use Case Maps with dynamic stubs for adaptation

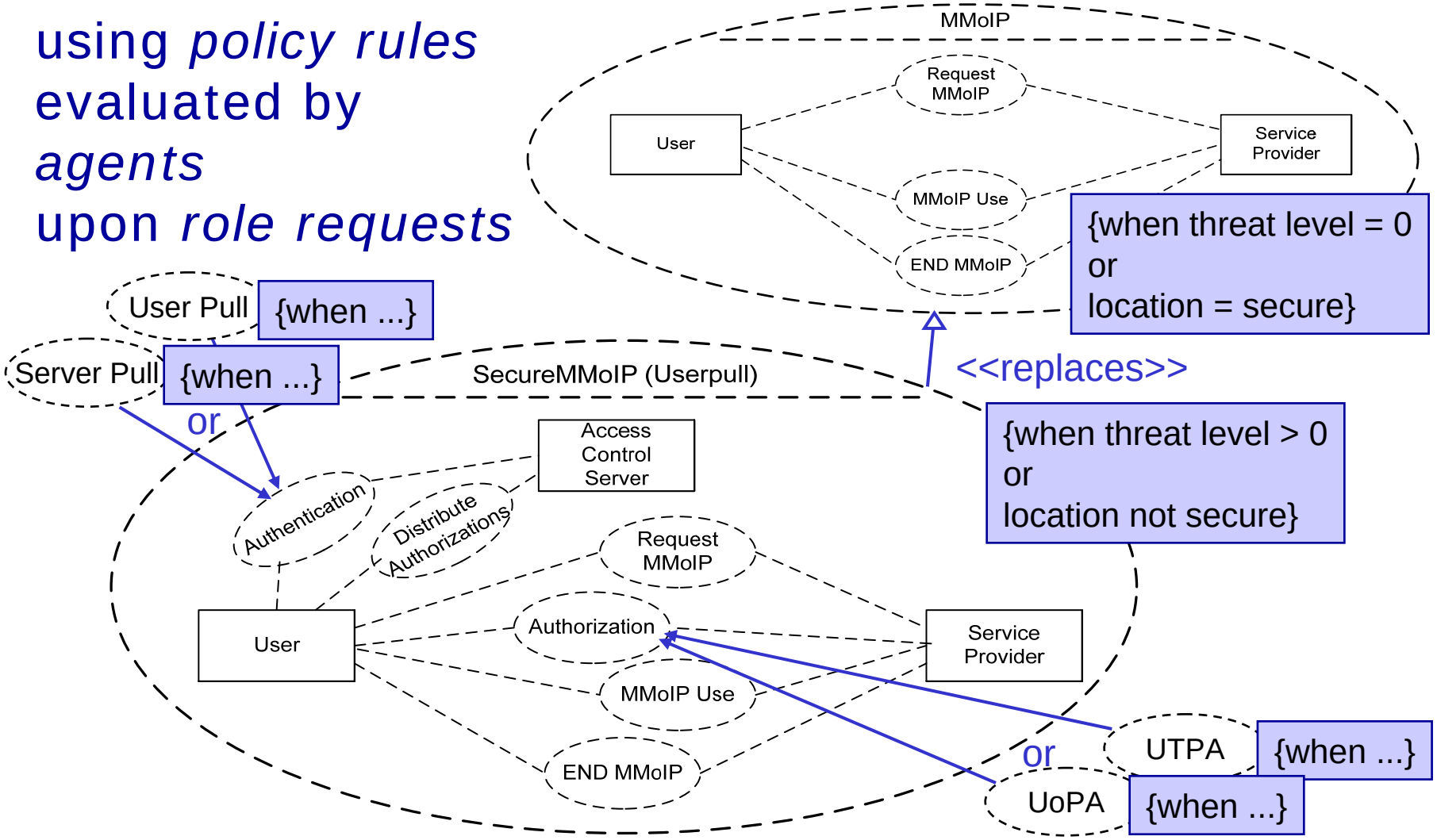


UML 2 Collaborations for service structure and behavior



Compositional adaptation by replacement and insertion

using *policy rules*
evaluated by
agents
upon *role requests*

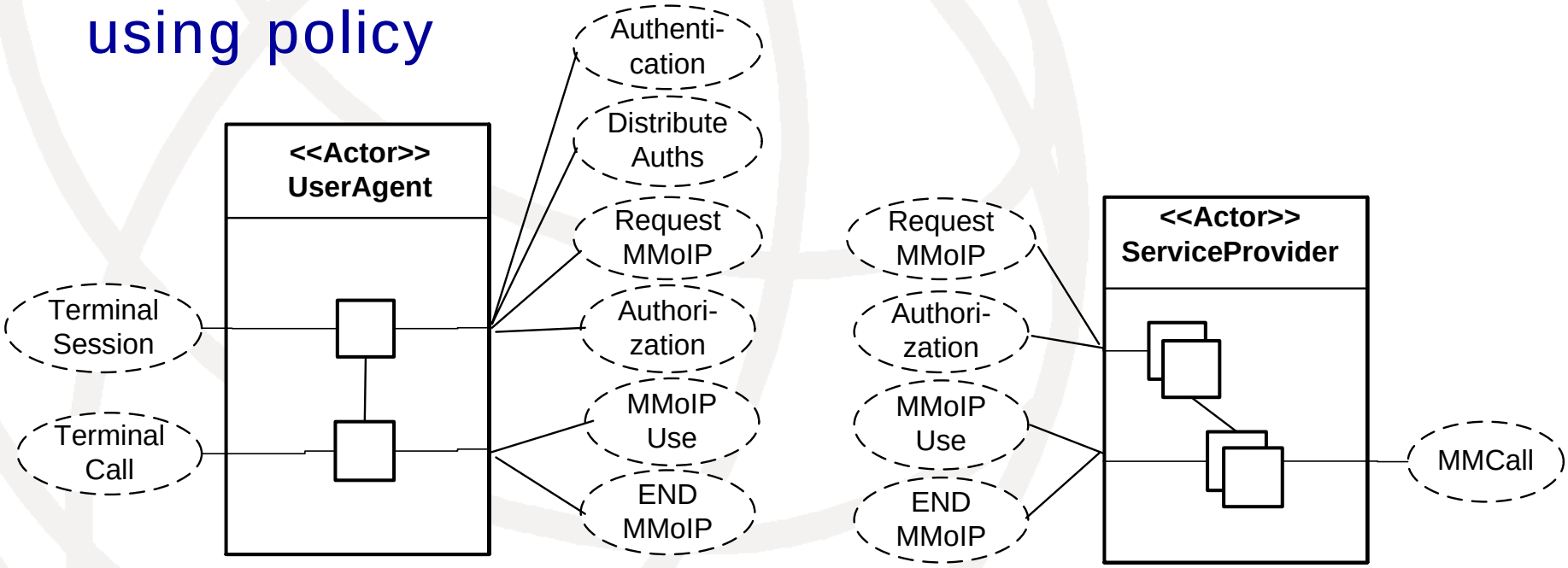


Actors playing collaboration roles

Using collaborations as contracts for:

- Dynamic Lookup
- Scalable compatibility validation

Managing dynamic role binding and adaptation using policy



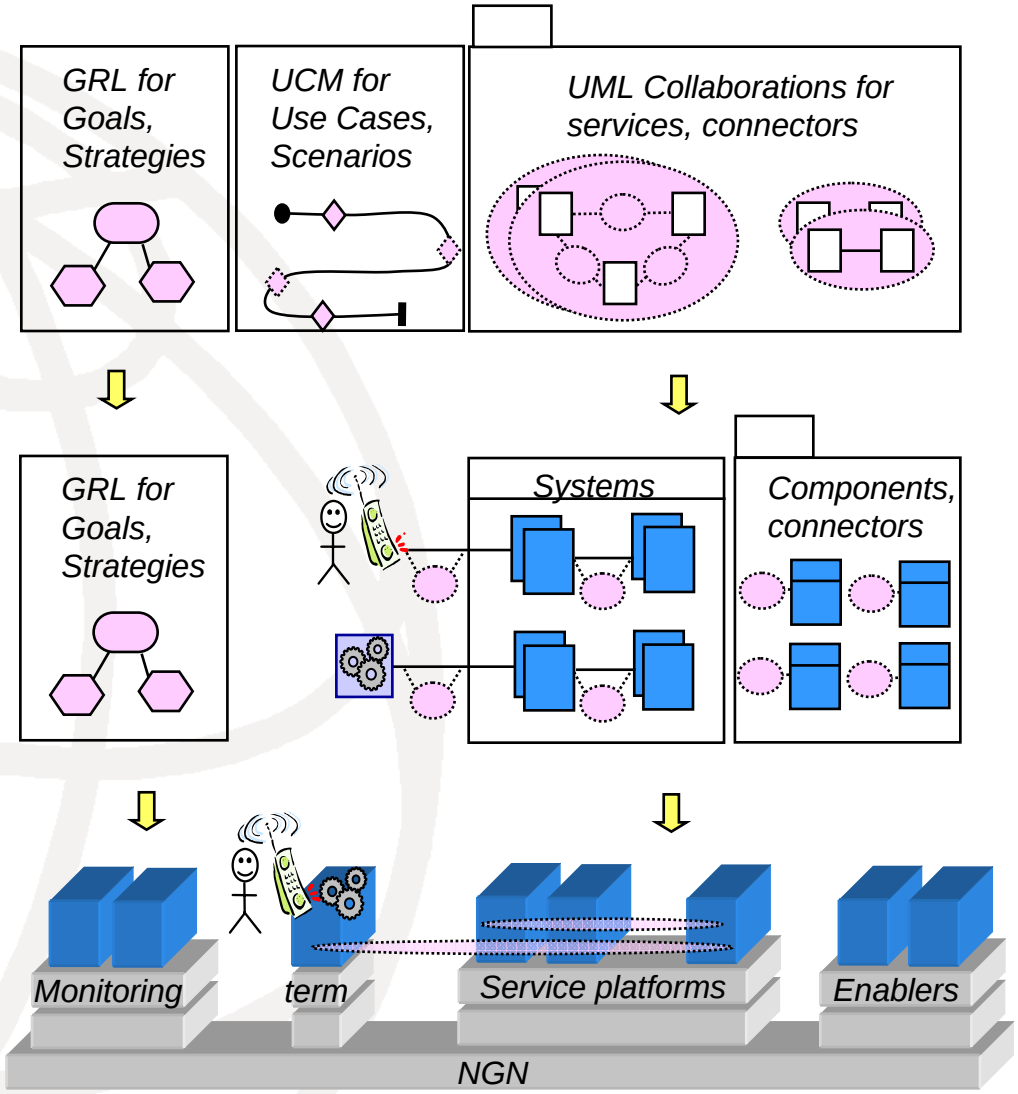
NGSE in a nutshell

Introduce:

- Service models

and gain:

- Service analysis
- Design synthesis
- Service composition mechanisms
- Contracts for lookup and validation
- Adaptation to situation using policy



For more information

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