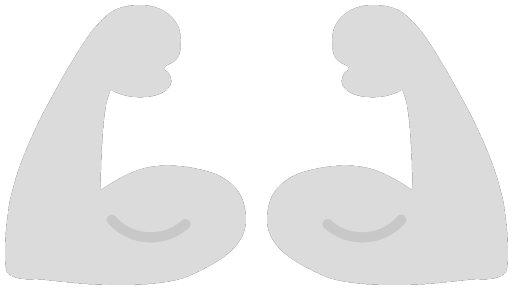
BICEPS Overview



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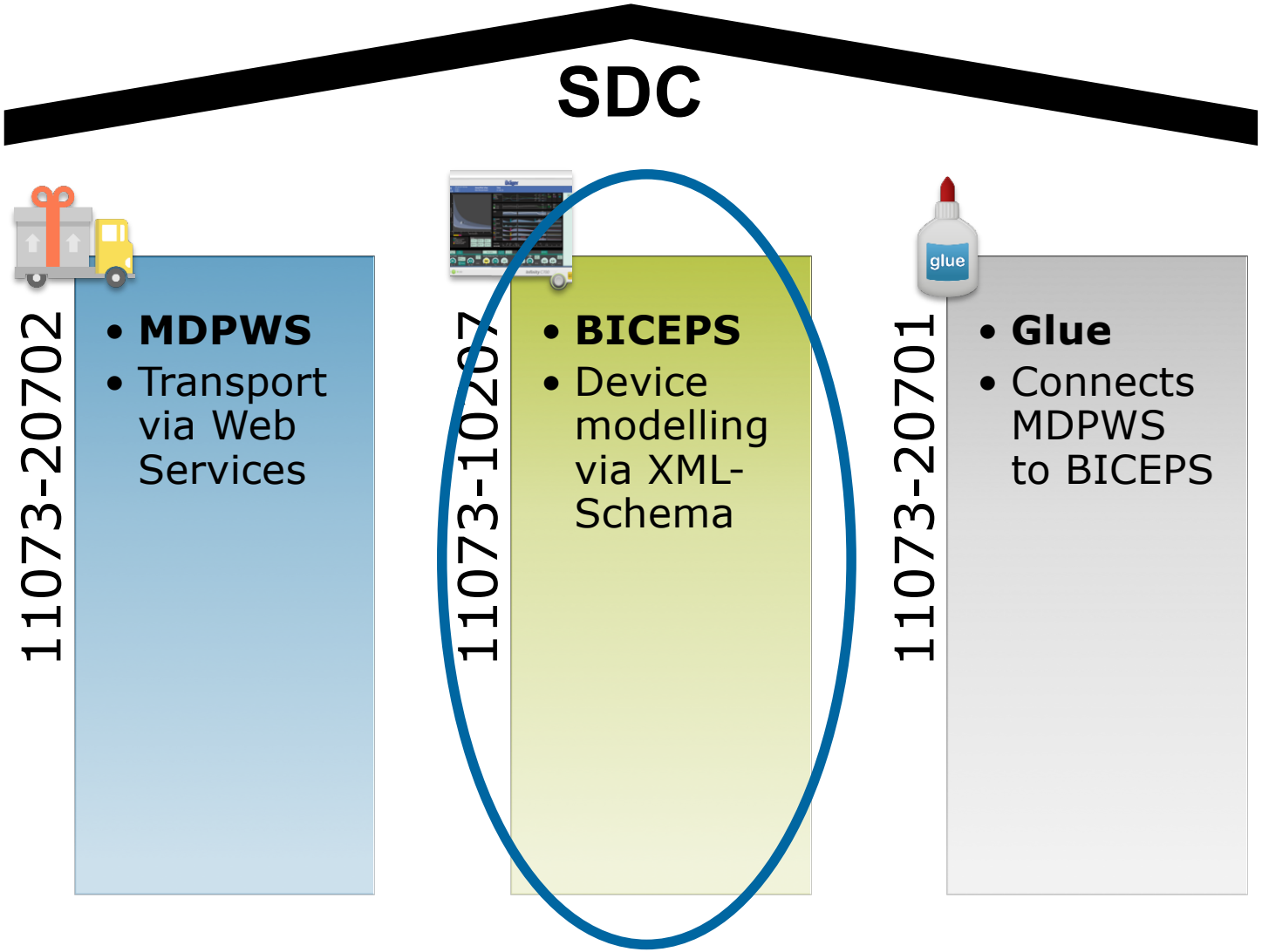
Orientation



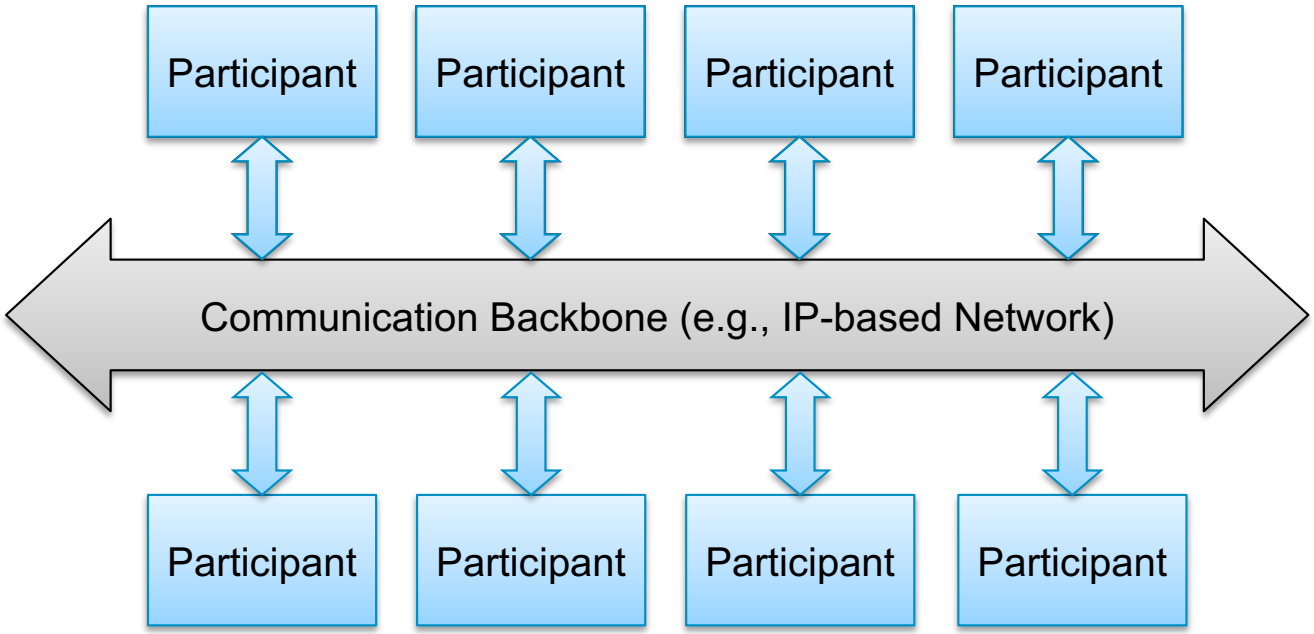
At a glance

- Official title: 11073-10207 – Domain Information & Service Model for Service-Oriented Point-of-Care Medical Device Communication
- Non-normative title: BICEPS = Basic Integrated Clinical Environment Protocol Specification
- Conceptual model based on ideas of 11073 classic DIM and SOMDA
- Semantic description of medical device capabilities and state information
- Compatible with ICE architecture led by MD PnP

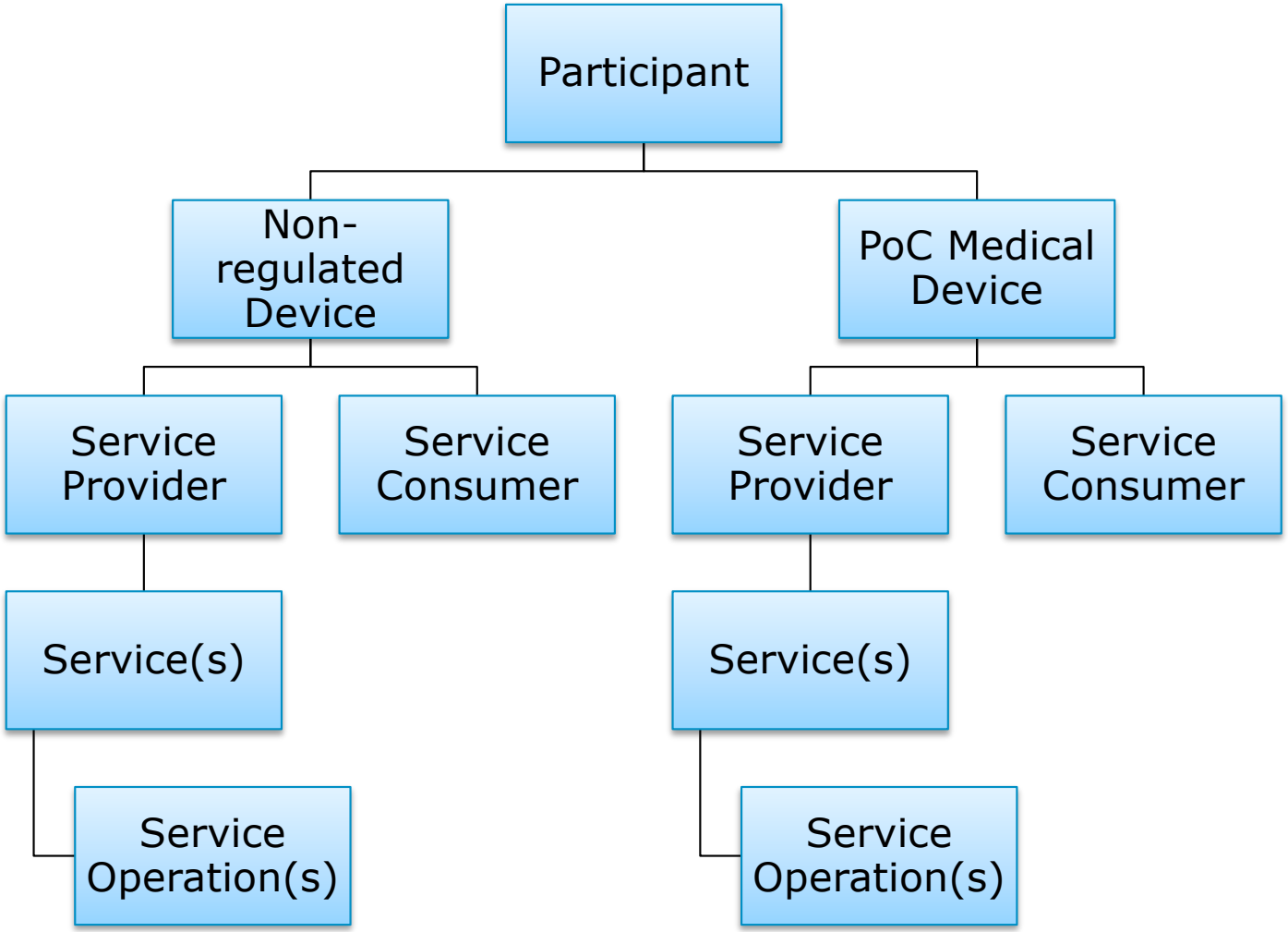
BICEPS does not define means to convey
data over a physical layer!

SOMDA

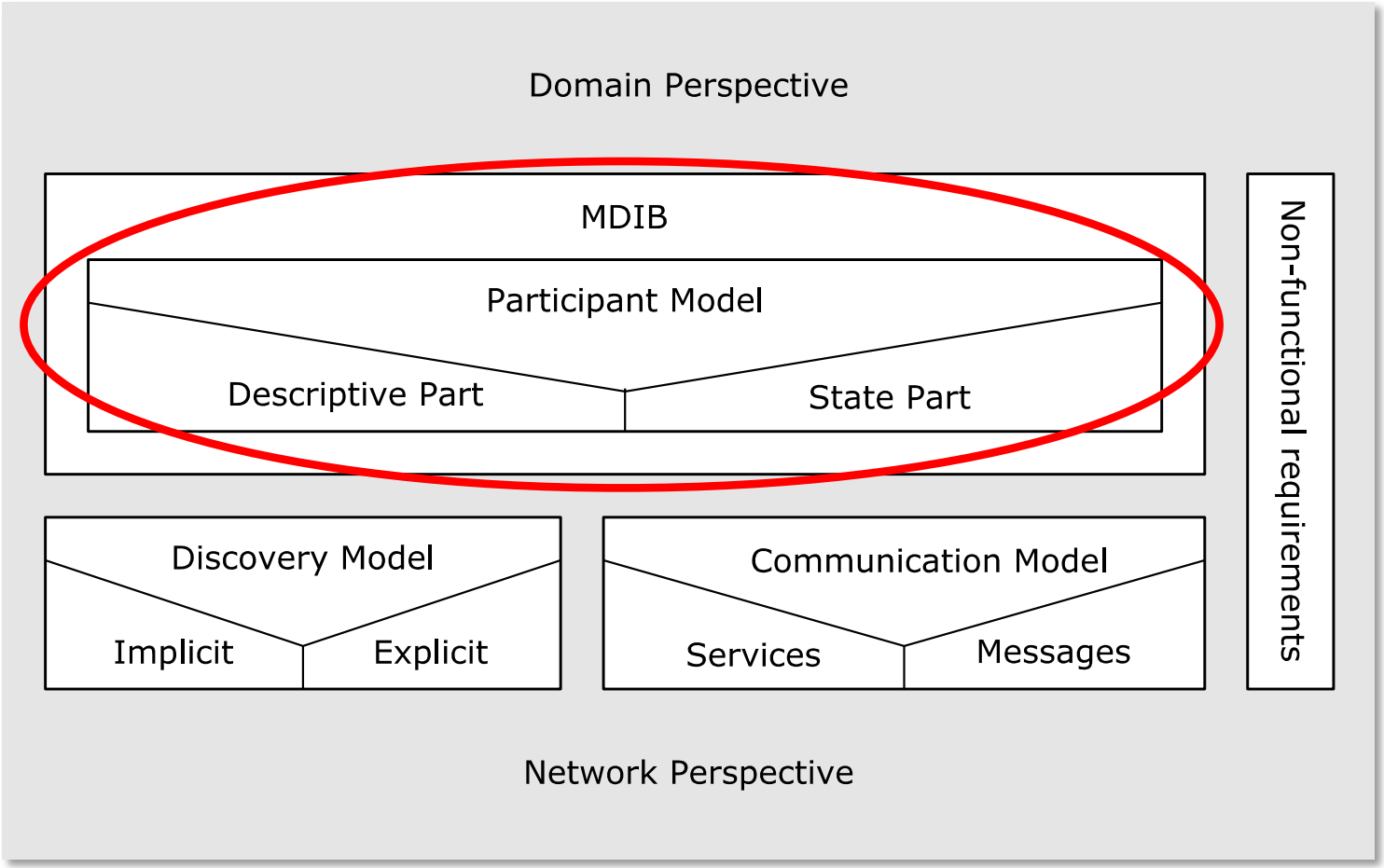
SOMDA = Service-Oriented Medical Device Architecture



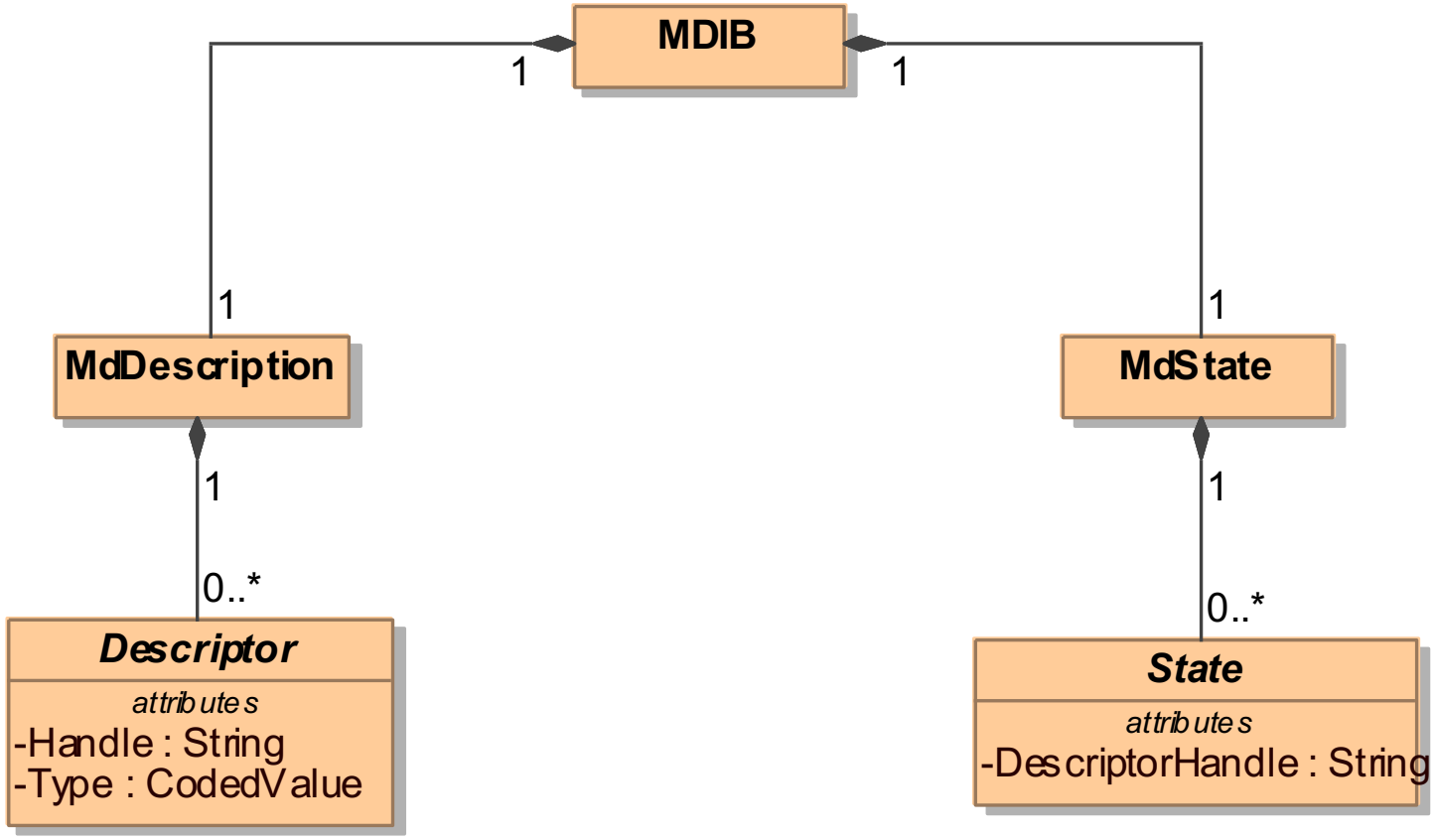
Wording


Participant
Non-regulated Device
PoC Medical Device
Service Provider
Service Consumer
Service Provider
Service Consumer
Service(s)
Service(s)
Service Operation(s)
Service Operation(s)

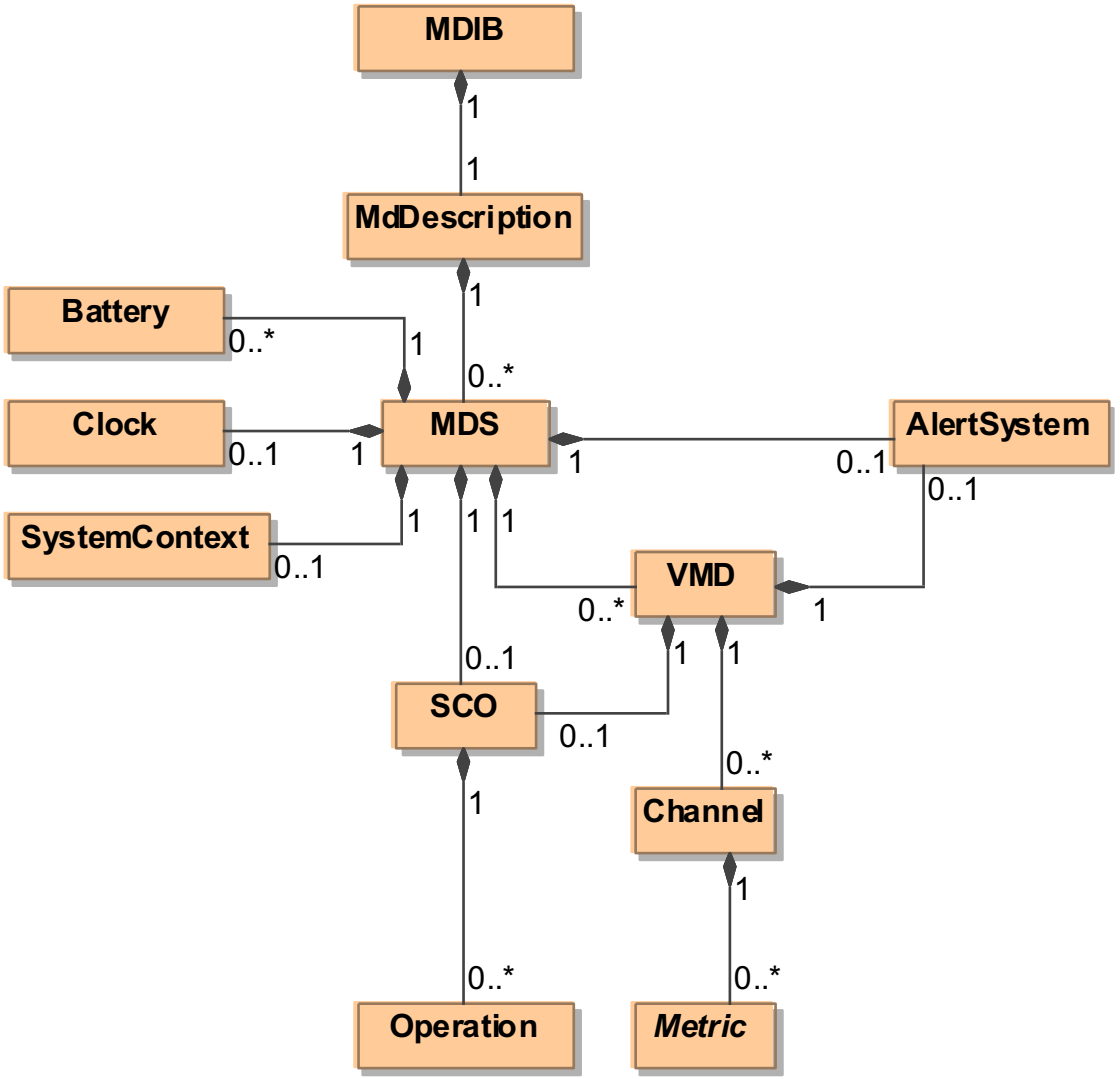
Component view



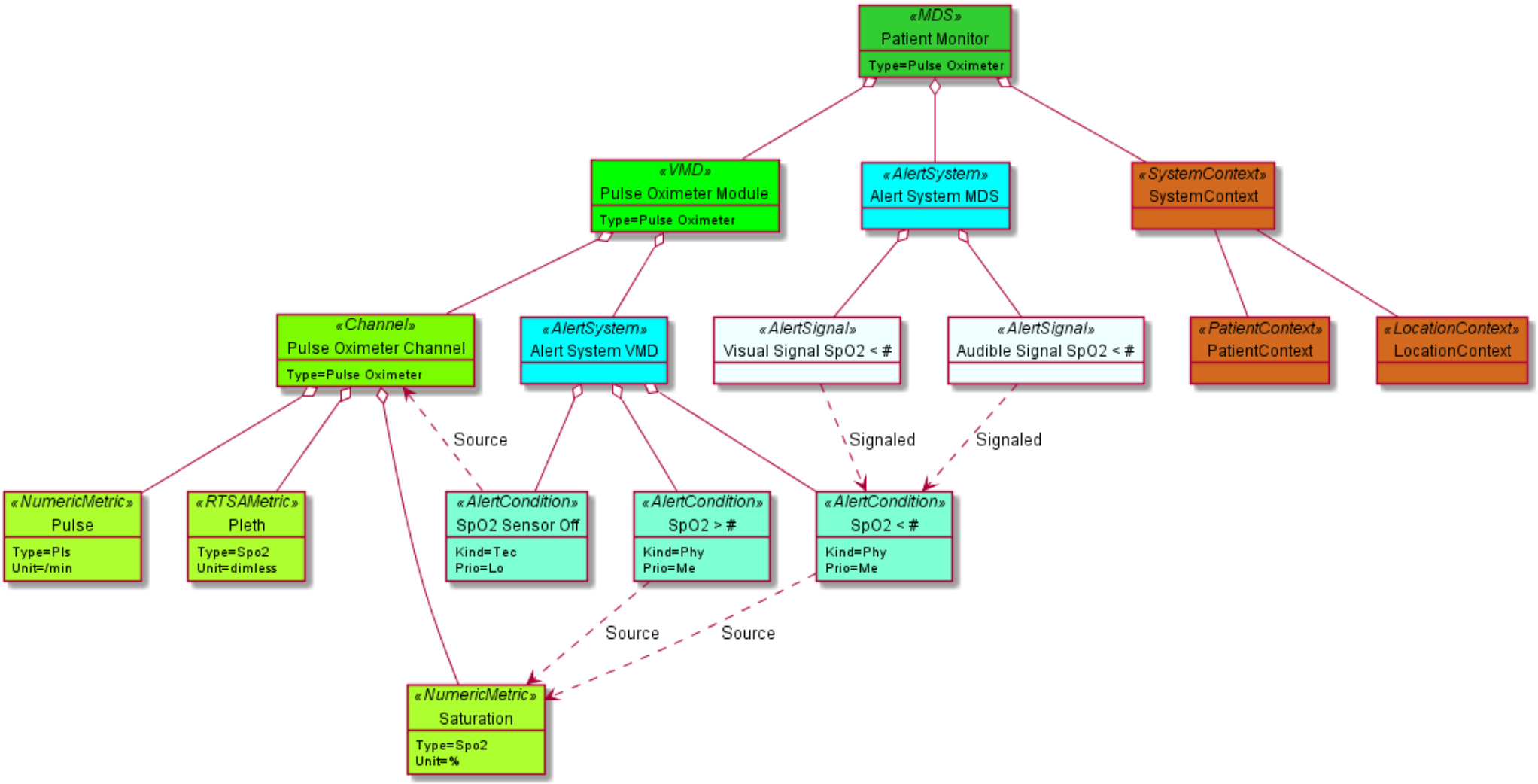
Participant model
MDIB



Participant model
Descriptive part



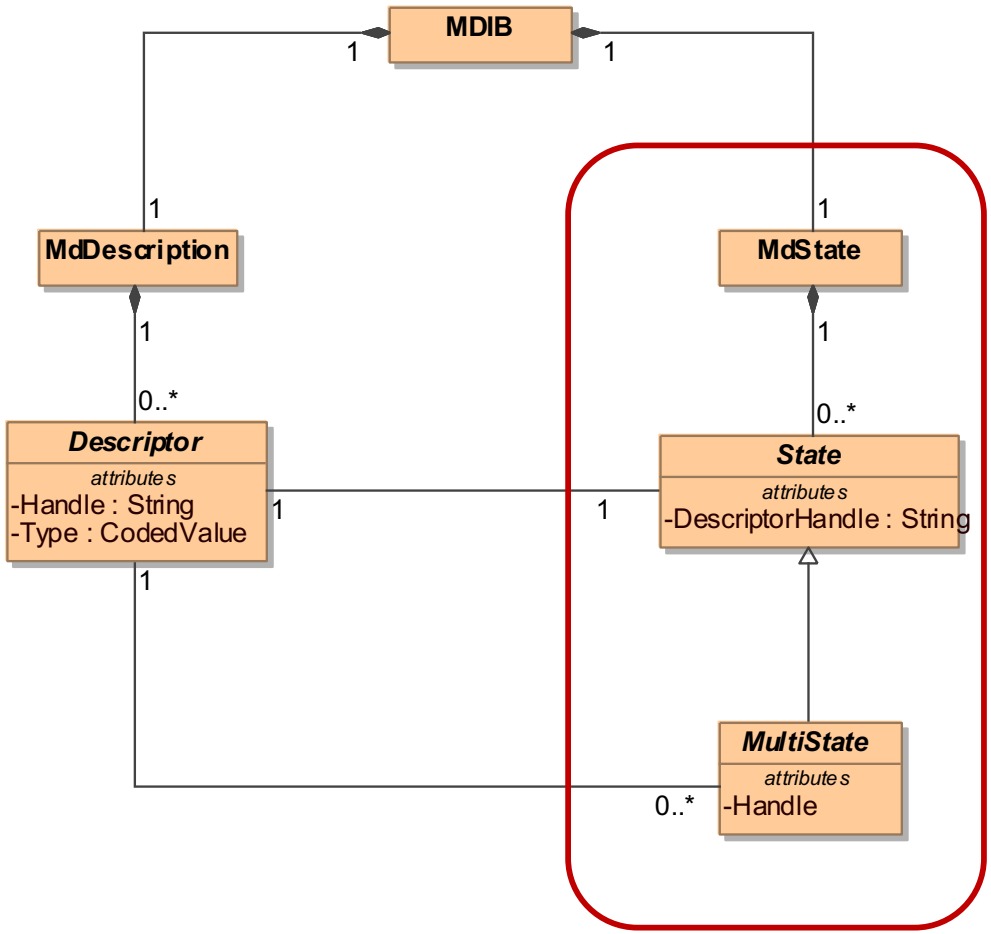
Participant model
Containment tree



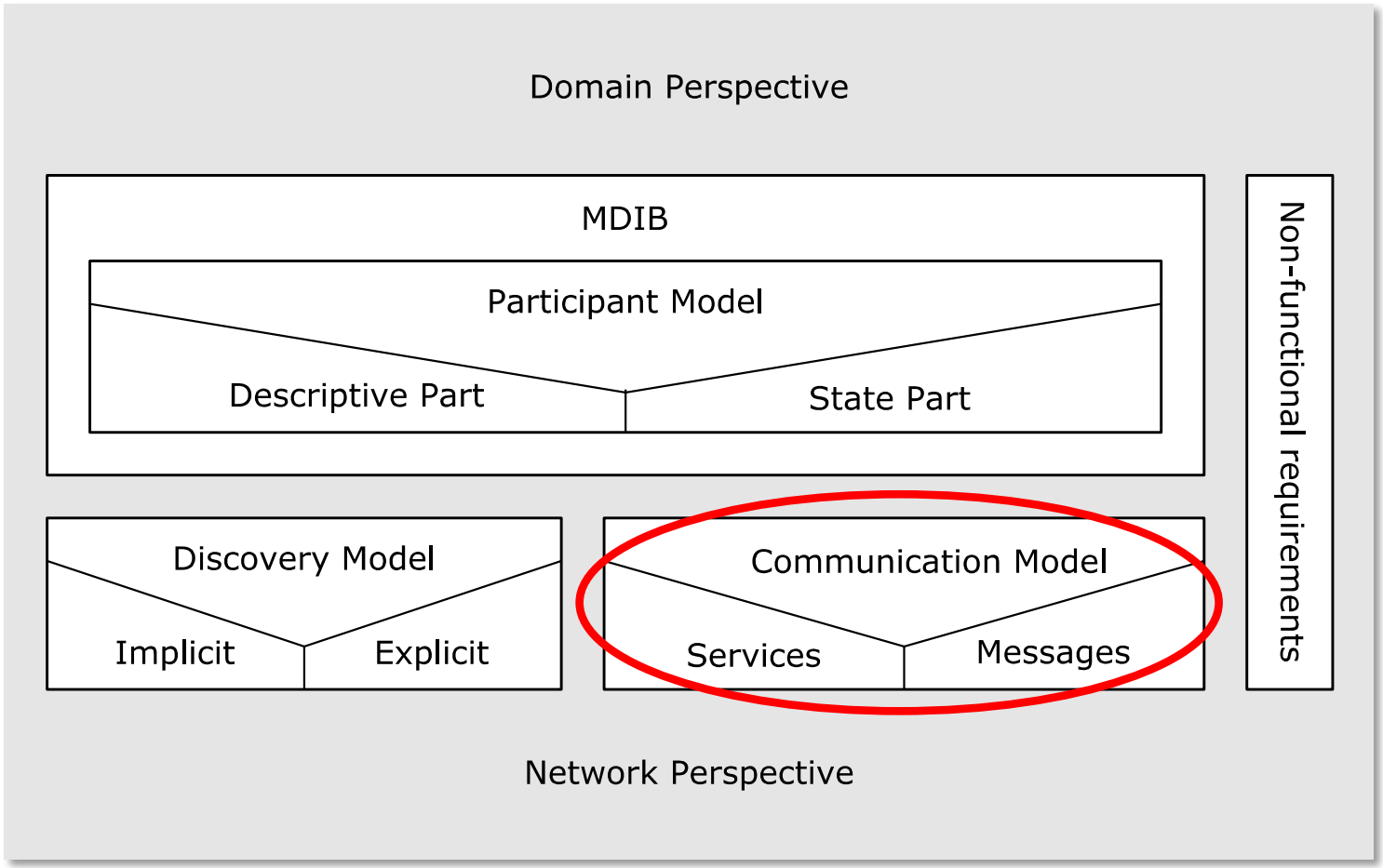
Example
Pulse Oximeter

Participant model
State part

- Volatile state (of measurements, settings, contextual info)
- Might change frequently
- Single state: w/o handle; is identifiable by the descriptor handle
- Multi state: w/ handle; because not uniquely identifiable by the descriptor



Component view



Communication Model

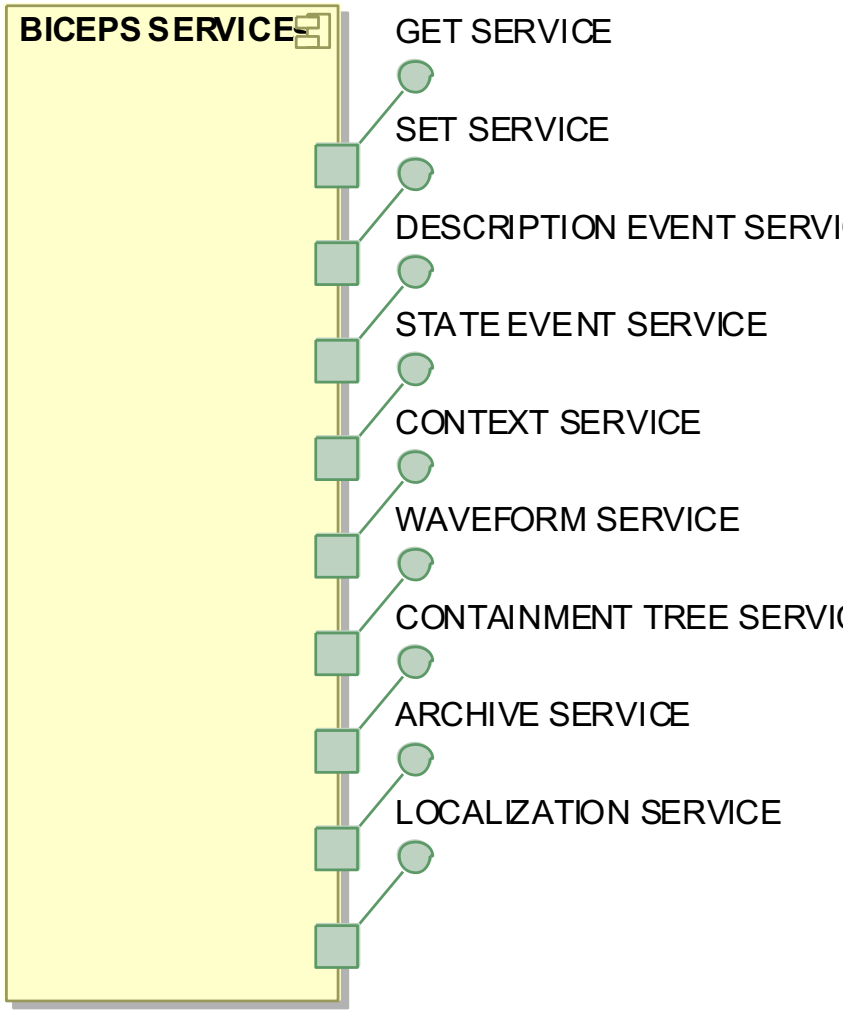
- BICEPS is based on Service-oriented Architecture (SOA)
  - In SOA, service operations are invoked to exchange messages
- BICEPS Communication Model defines
  - Set of services
  - Set of messages

Services
What is a Service?

- A service is an abstract construct in a Service-Oriented Architecture (SOA)
- A service is hosted at a service provider
- Service consumers invoke service operations of the services a service provider exposes to the SOA communication backbone
- In BICEPS, there are two kinds of service operations
  - Request-response
    - Driven by the service consumer
  - Notification
    - Event-driven by the service provider
- BICEPS is based on SOA principles and does not define an implementation
  - the Glue spec is a set of rules that ties together MDPWS and BICEPS

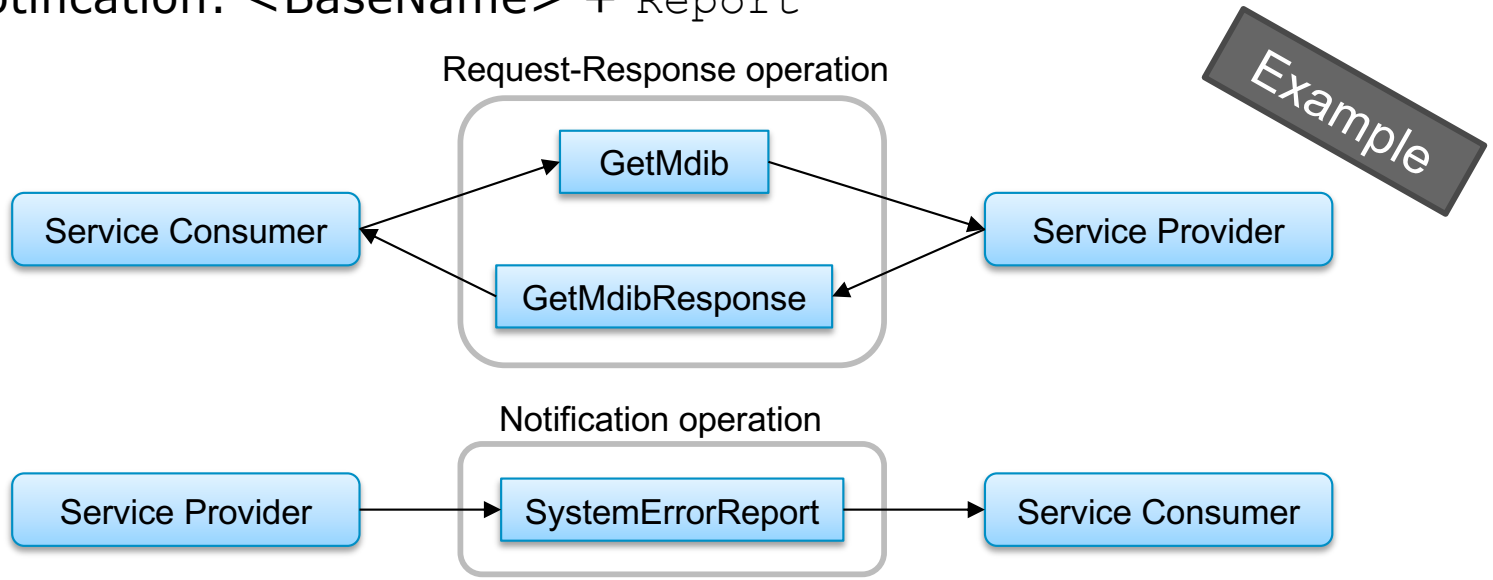
Services
Means to access the MDIB

- **GET**
  mandatory, request-response of whole MDIB, or descriptive and state part separately
- **SET**
  MDIB SCO for remote control
- **STATE EVENT**
  State change events
- **DESCRIPTION EVENT**
  Descriptor change events
- **CONTEXT**
  Retrieve and set context states
- **WAVEFORM**
  Retrieving streaming data
- **CONTAINMENT TREE**
  Traverse containment tree and retrieve descriptors in finer granularity
- **ARCHIVE**
  Access historical data
- **LOCALIZATION**
  Retrieve human-readable descriptions if not stored in the MDIB directly



Messages
Separation of operations and messages

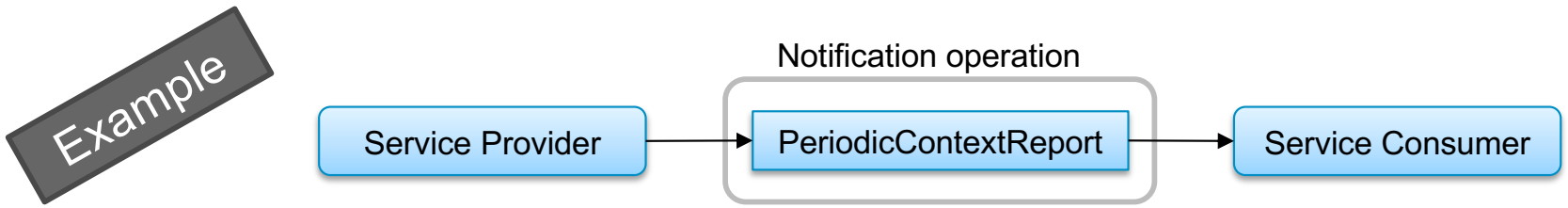
- A service operation can be considered as an interprocess function taking input parameters and computing output results
- The BICEPS Message Model defines the input parameters and output results of the BICEPS Service Model
- Naming convention for messages:
  - Request: <BaseName>
  - Response: <BaseName> + `Response`
  - Notification: <BaseName> + `Report`



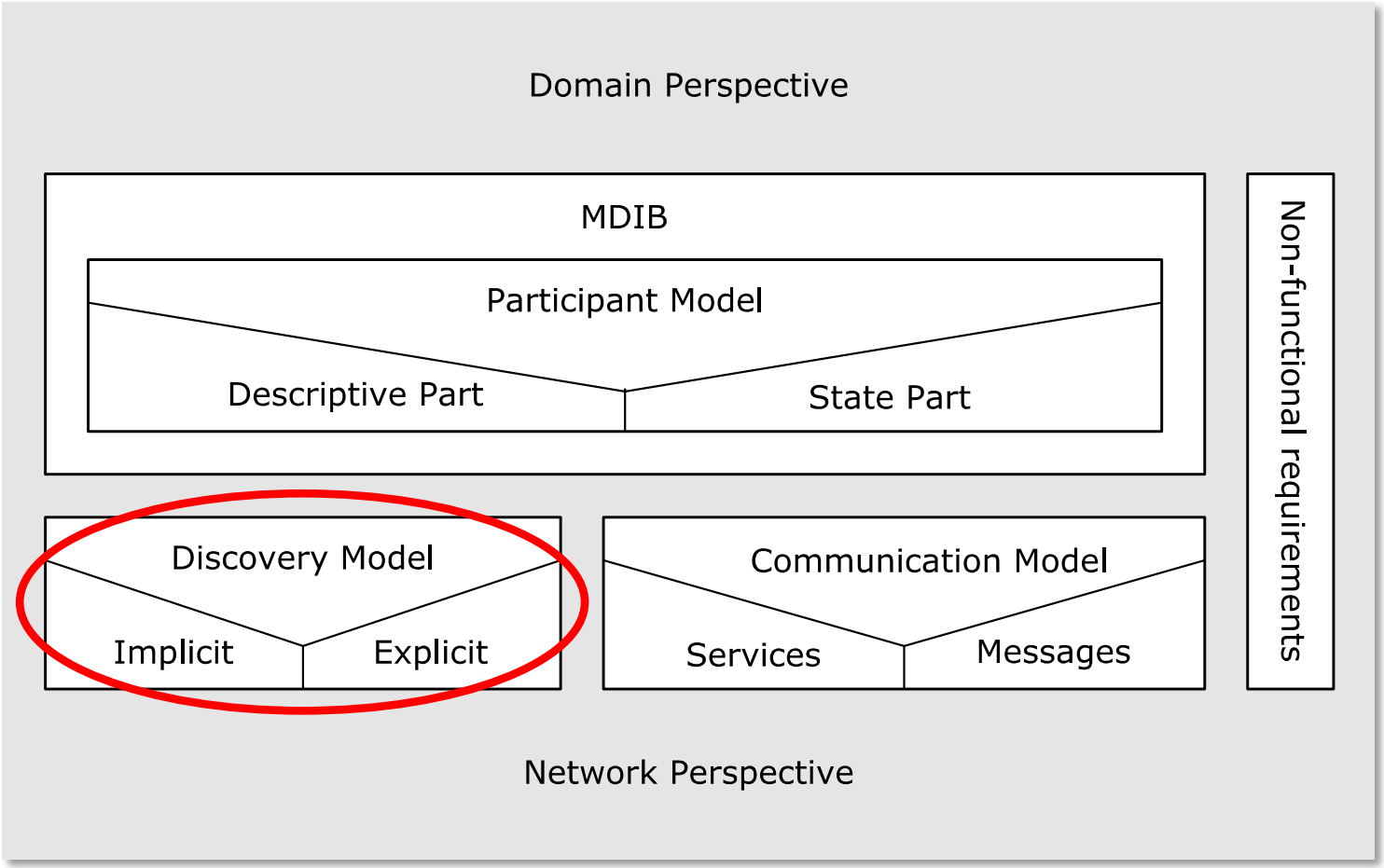
Messages
Two report flavors

- Episodic reports: delivered on change
- Periodic reports: delivered continuously at a given period

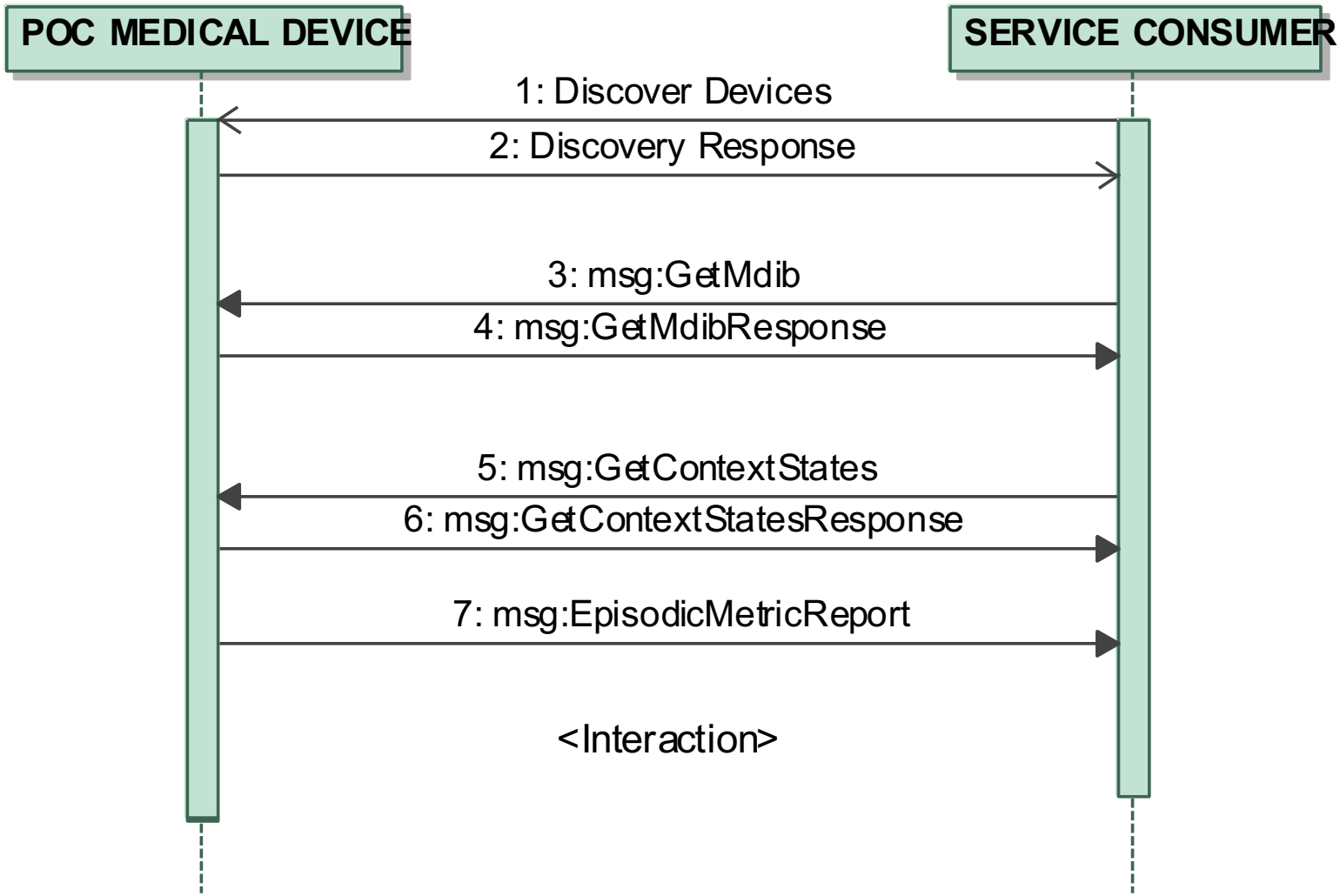
- Naming convention for reports that are available either episodically or periodically:
- [`Periodic` | `Episodic`] + <BaseName> + `Report`



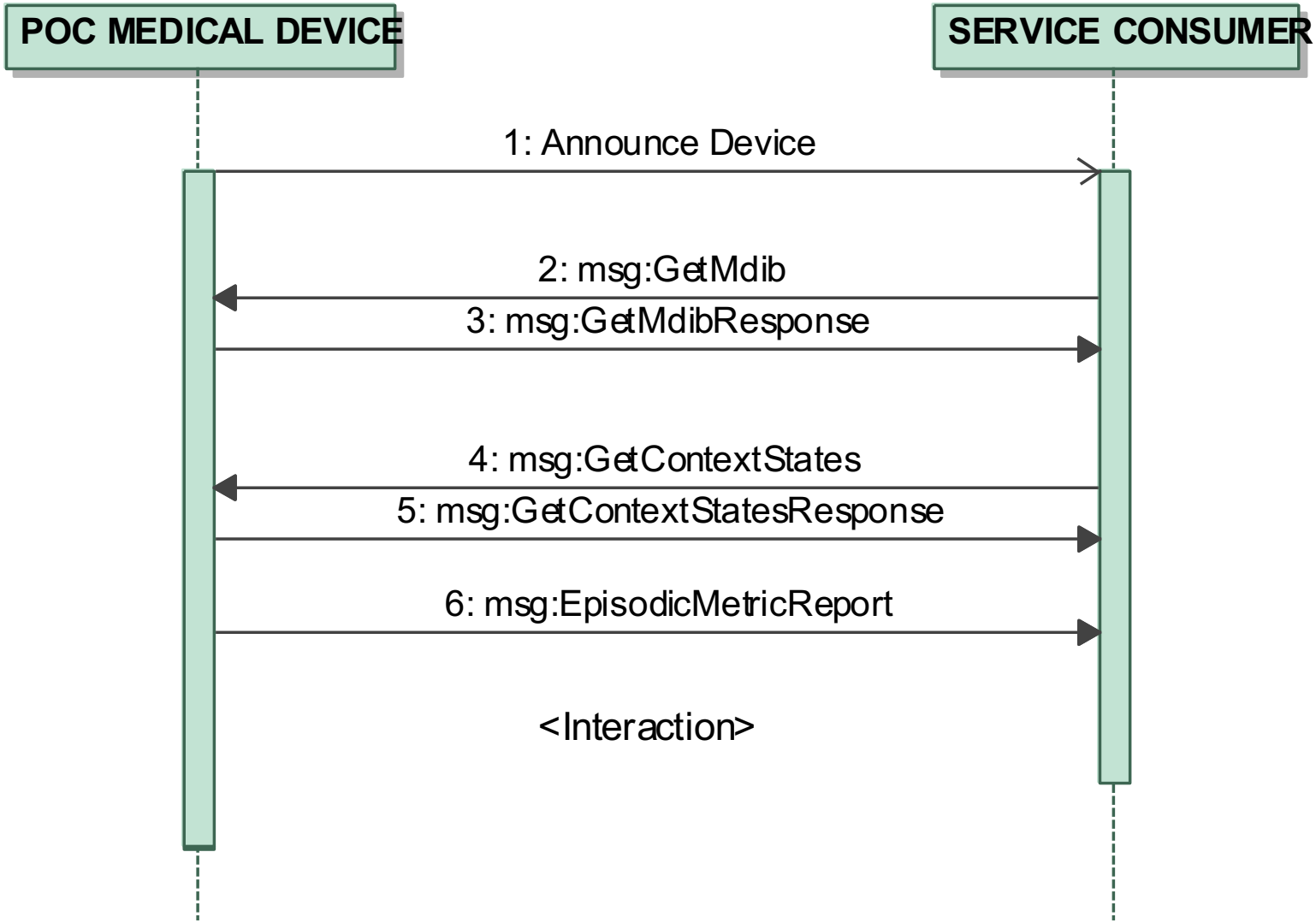
Component view



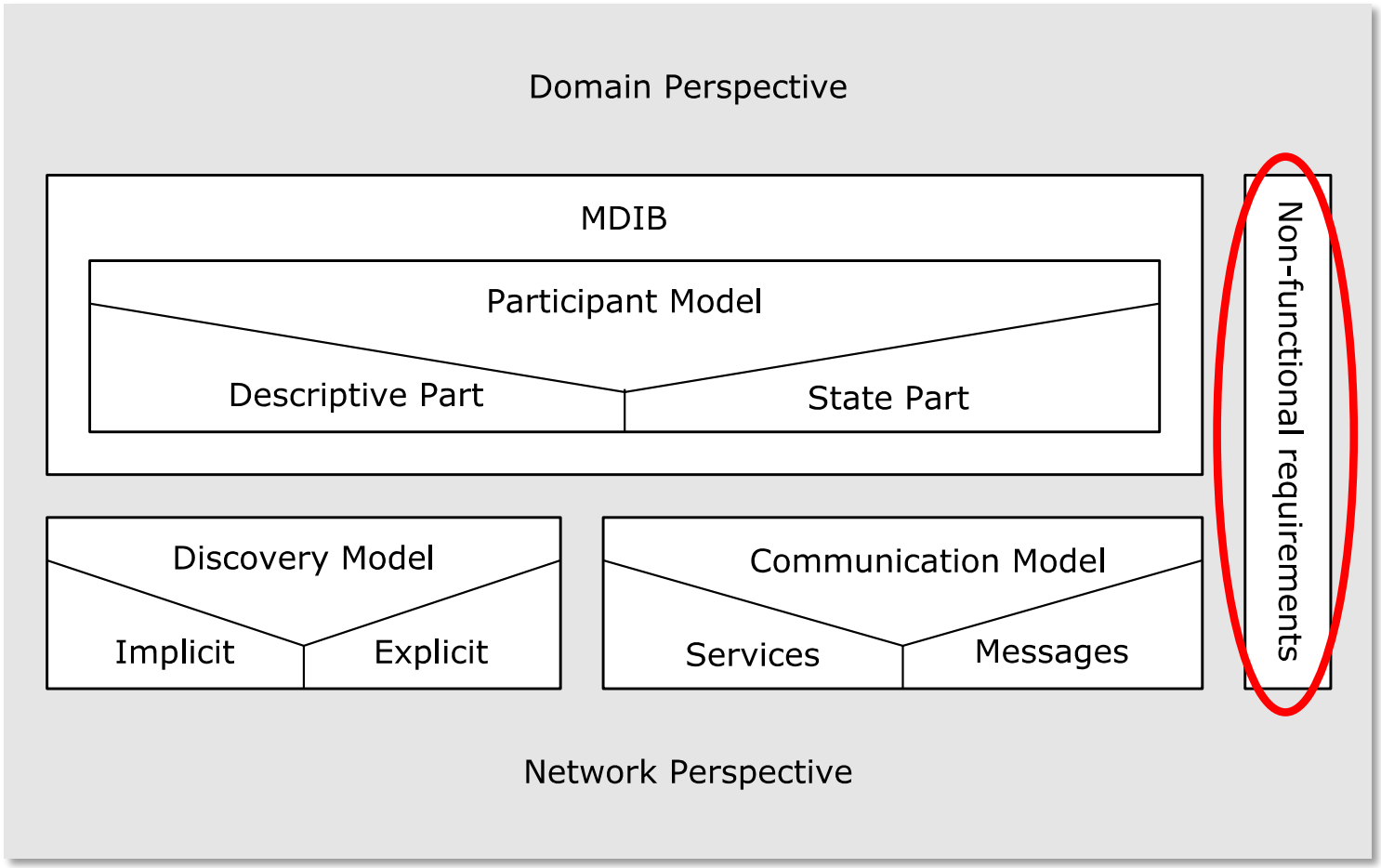
Discovery model
Explicit discovery



Discovery model
Implicit discovery



Component view



Non-functional Requirements

- Patient Safety & Cyber Security Concerns
  - A BICEPS compliant binding is required to be able to establish
    - confidentiality between participants
    - trust through authorization
    - data integrity
    - connection loss detection between participants that exchange messages
    - accountability between participants that exchange messages
- Clinical Effectiveness & Regulatory Considerations
  - A BICEPS compliant binding is required to
    - support time synchronization between participants
    - support provision of defining QoS metrics between participants
    - distinguish unique messages in a sequence of messages with potential duplicates

Thank you for your attention!

Contact information

David Gregorczyk

david.gregorczyk@draeger.com

Stefan Schlichting

stefan.schlichting@draeger.com