IHE DEV - DPI
@ Boston
2019-10-16 to 17

IHE | Integrating the Healthcare Enterprise

# IHE DEV SDPi

## *White Paper + Profiles Roadmap*

# IHE DEV SDPi Profiles

**SDPi – Service-oriented Device Point-of-care Interoperability**

- ✓ **Overview / Background**
- ✓ **SDPi White Paper – Update & Approval for Publication**
- ✓ **Roadmap Review & 2019 / 2020 Planning**
- ✓ **DEV Technical Framework:**
  - **TF-1 Profiles (vol. organization)**
  - **TF-2 Transactions (#'s, labels, …)**
  - **Grouped Actors: V2, PCD profiles, FHIR**

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# MDI: *The Standards Story*

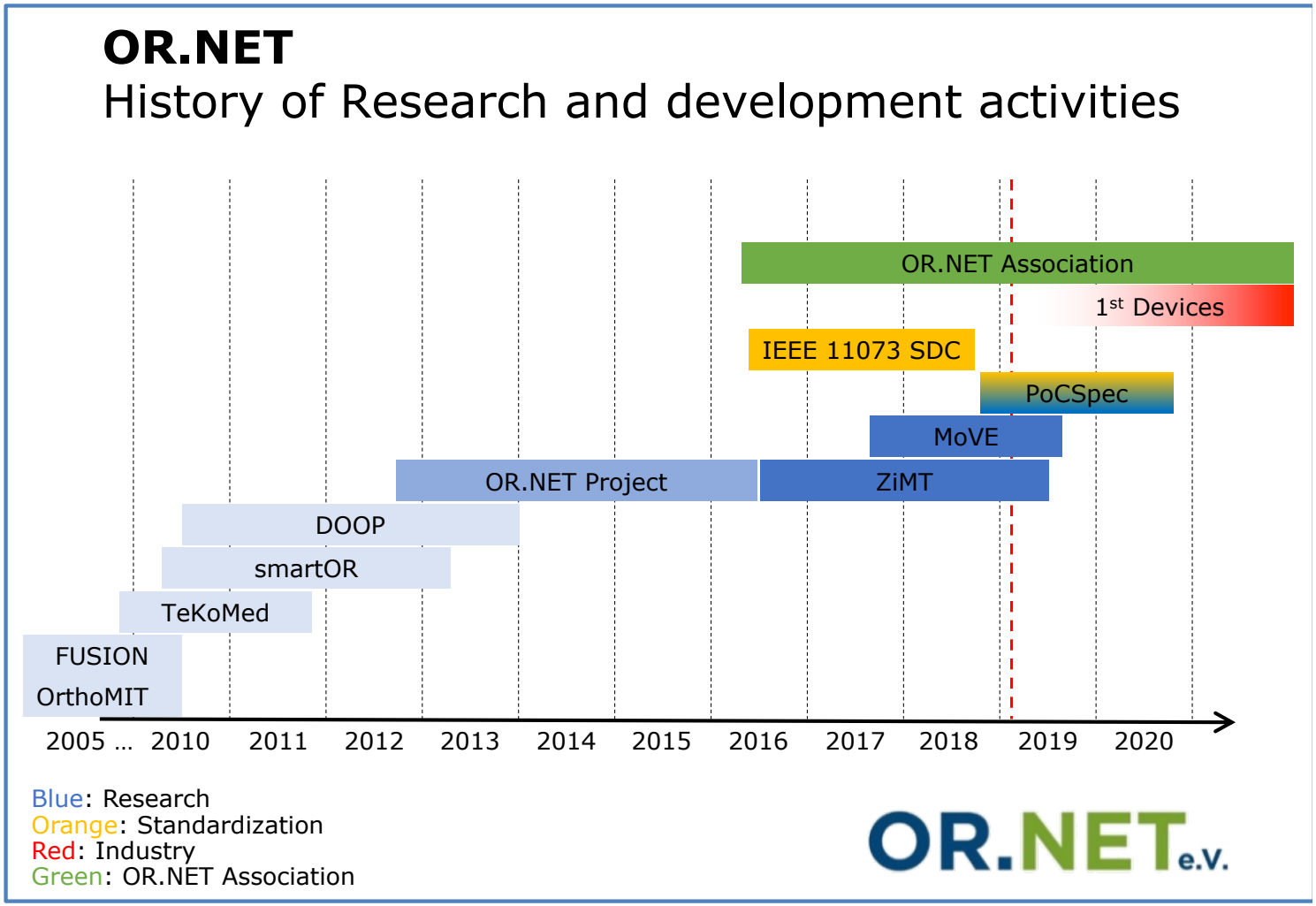
- Today, devices use 100's of proprietary or "semi-standard" protocols.
- Using *common semantic base* is #1 objective.

| Program | IHE PCD | IEEE PHD / Continua | IEEE SDC / IHE SDPi | HL7 Devices on FHIR | OpenICE / MDPnP |
|---|---|---|---|---|---|
| **Primary Use Context** | Healthcare Enterprise | Home / Mobile | High Acuity (OR/ICU/ED) | Enterprise / Mobile / Home | High Acuity (OR/ICU) |
| **Technical Base** | HL7 V2.6 [1] | IEEE 11073 | WS* | REST / HTTP | OMG DDS |
| **Maturity / Production Systems** | Dozens of commer-cially available products | 100's of Certified PnP Products | Prototyped; First devices placed into patient use | PoCD & PHD IGs; FHIR Connectathons; Continua FHIR Guidelines | Prototyped; See MDPnP.org for latest |
| **Semantics** | IEEE 11073 Terminology & Model [2] | | | | |

[1] + 2.7, 2.8.x [2] Core 11073 terms mapped to LOINC

# SDC Community

- ✓ Standards
- ✓ Open Sources
- ✓ Testing Tools




See IHE SDPi White Paper Appendix B for references.

# SDC Standards & Functional Capabilities

The concept of a

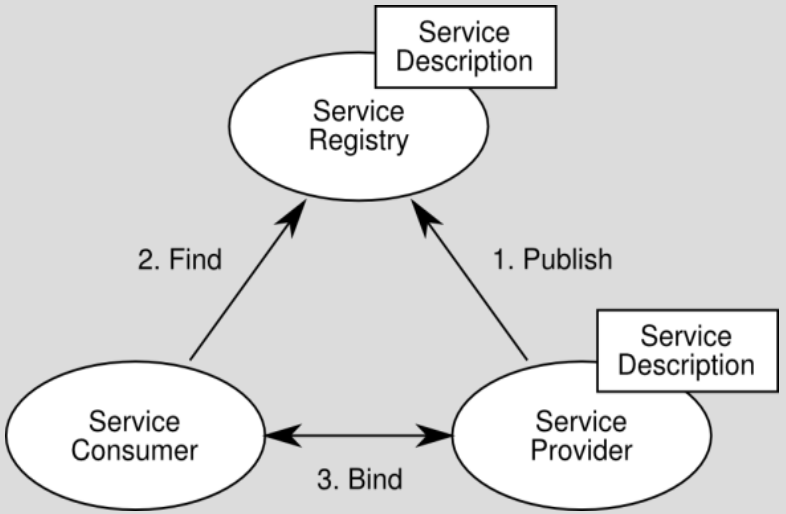
**clinical workplace service-oriented medical device architecture**

transfers the concept of a

**service-oriented architecture**

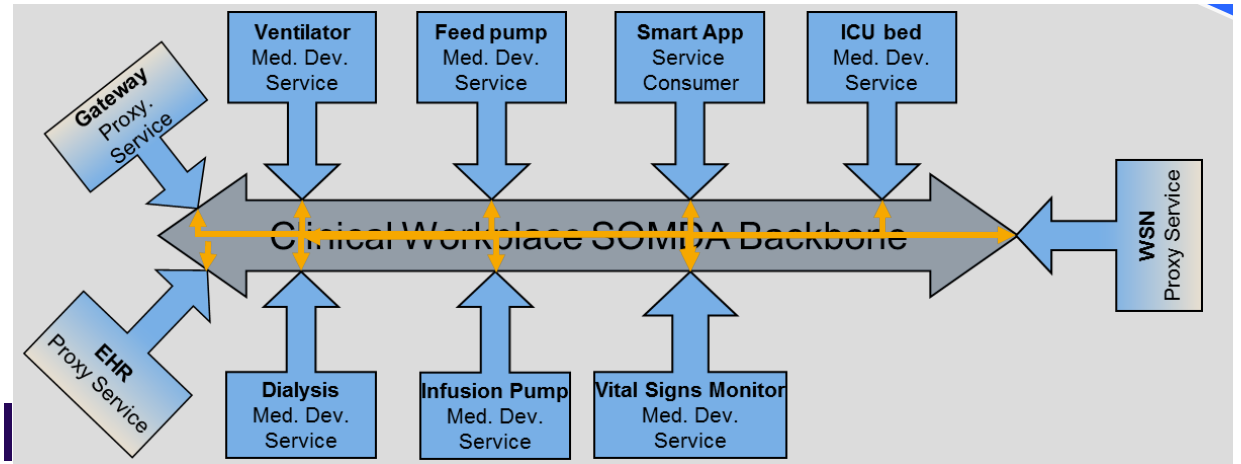
to the domain of

**distributed system of medical devices for one clinical workplace.**



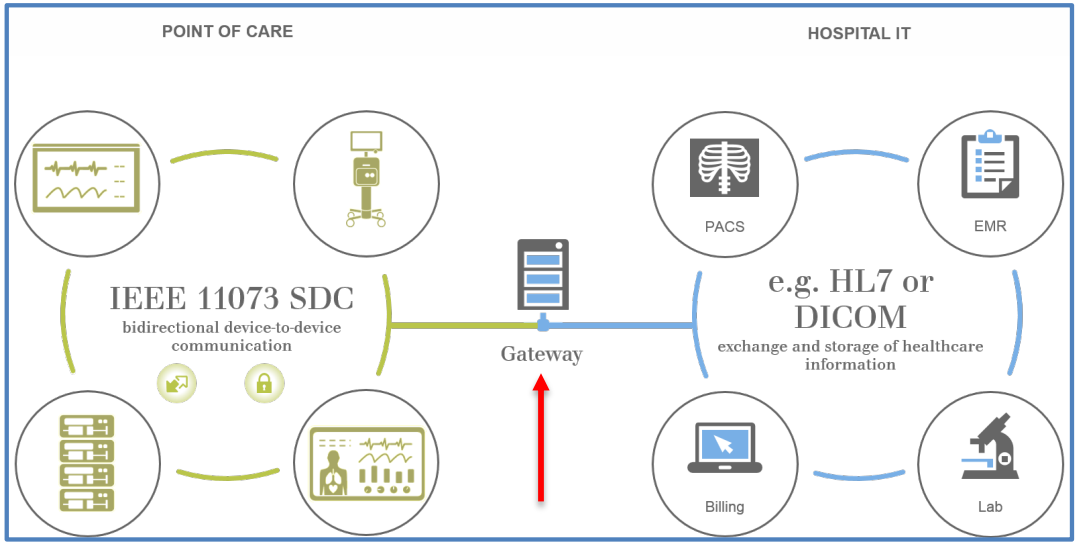

(Sources: SDC overview presentations)

Device-to-Device Plug-and-Play Reporting / Alerting & Control




Conceptual view of a SOMDA for a clinical workplace

# MDI: *It's All Connected!*




SDC Point-of-Care Context  IHE "Enterprise" Context

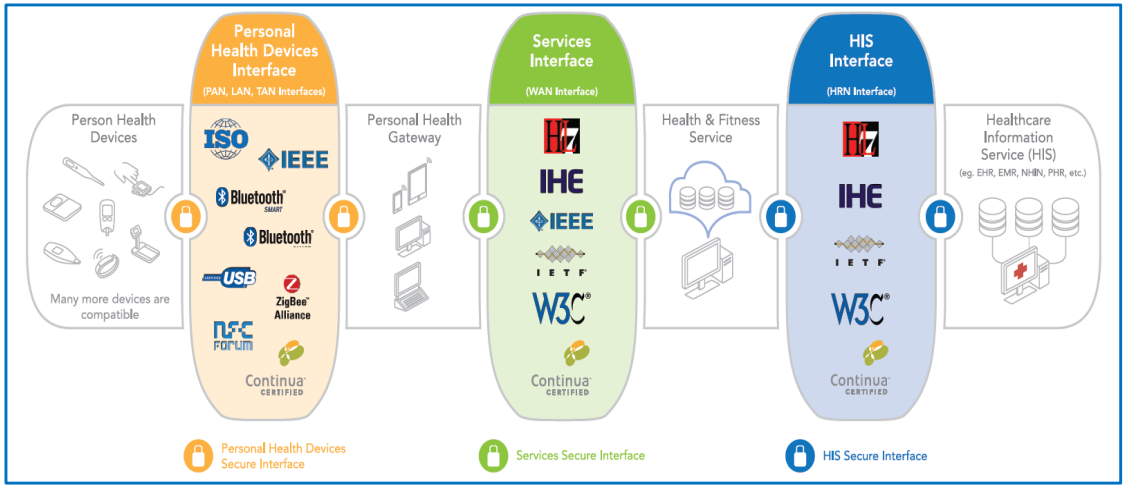
Proposed IHE PCD Restructuring

**IHE PCD => IHE Devices**

**Subdomains for …**

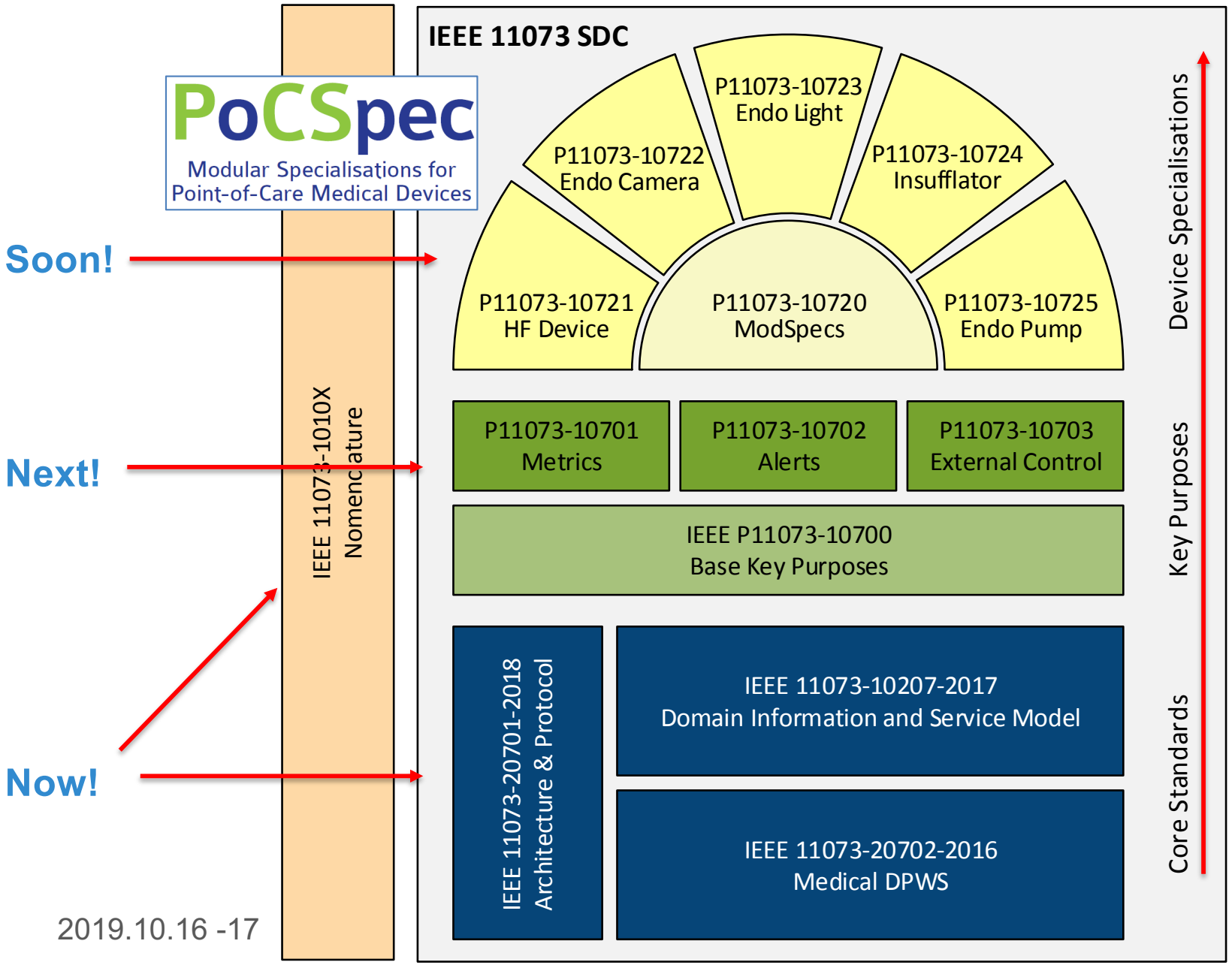
- ✓ **Device Point-of-care Interoperability (DPI)**
- ✓ **"PCD" Device-Enterprise Integration**
- ✓ **Personal Connected Health (PCH)**

**3 Device Use Contexts … One consolidated IHE Technical Framework**




Download @ www.pchalliance.org/continua-design-guidelines

# DEV::DPI::SDPi Layers




Note: SDC specializations allocated 11073 -1072x to -10799

+

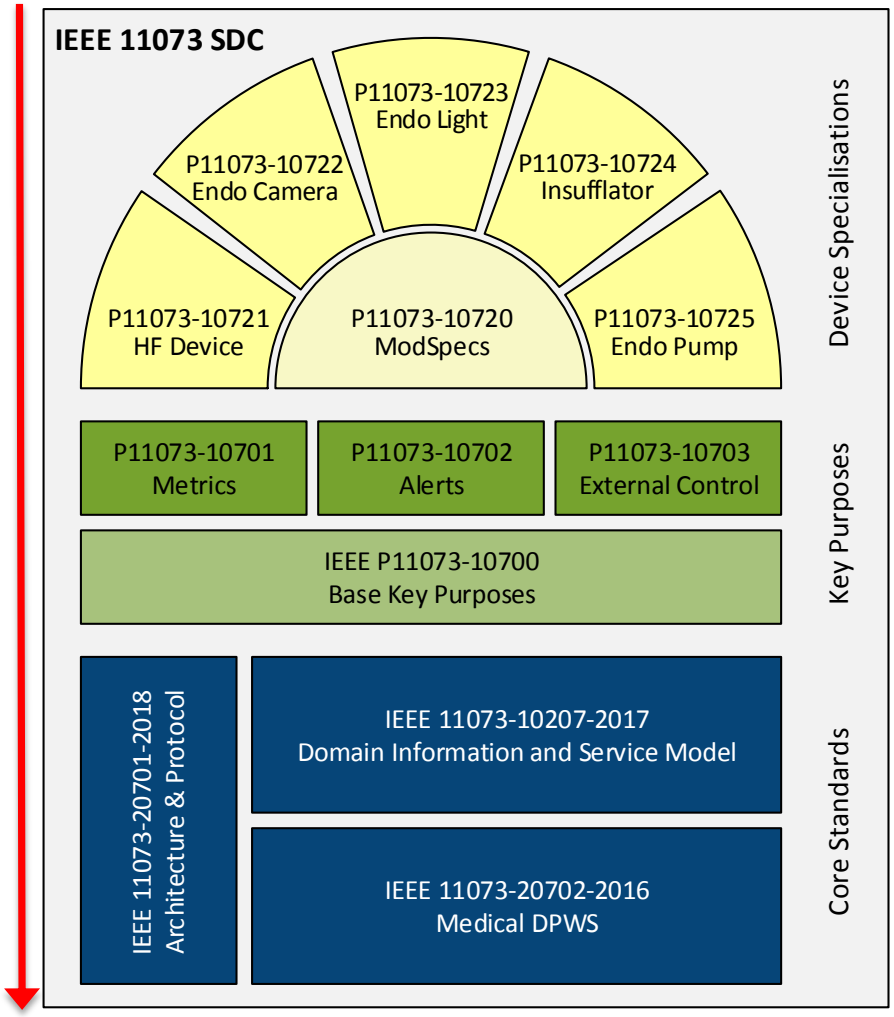
-10107 Control Term.

(Source: SDC overview presentations)

# IEEE SDC / IHE SDPi

## SDC SES Design Approach

1. Establish ***Key Purposes*** of Interoperability from MDS to interface:
   - Connectivity
   - Reporting
   - Alerting
   - External Control
2. Integrate “testable assertions” into each standard **(”Rxxxx”)**
3. Bind Rxxxx from layer to layer
4. Address both Functional & Non-functional (RM) Aspects
5. ***Per-device System Function Contribution defined***



# Core IEEE 11073 SDC Standards

**SDC**

11073-20702

- **MDPWS**
- Transport via Web Services
- ~50 pages
- Approved fall 2016

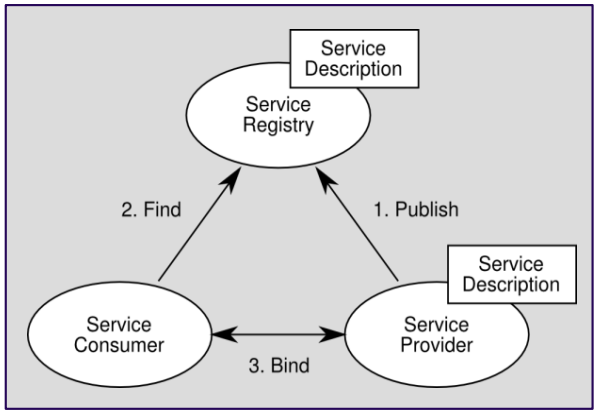
11073-10207

- **BICEPS**
- Device modelling via XML-Schema
- ~400 pages
- Approved fall 2017

11073-20701

- **Glue**
- Connects MDPWS to BICEPS
- ~50 pages
- Approved fall 2018

# SDC Standards & Functional Capabilities




**Basic Discovery & Exchange**

(note: distributed "registry" architecture)

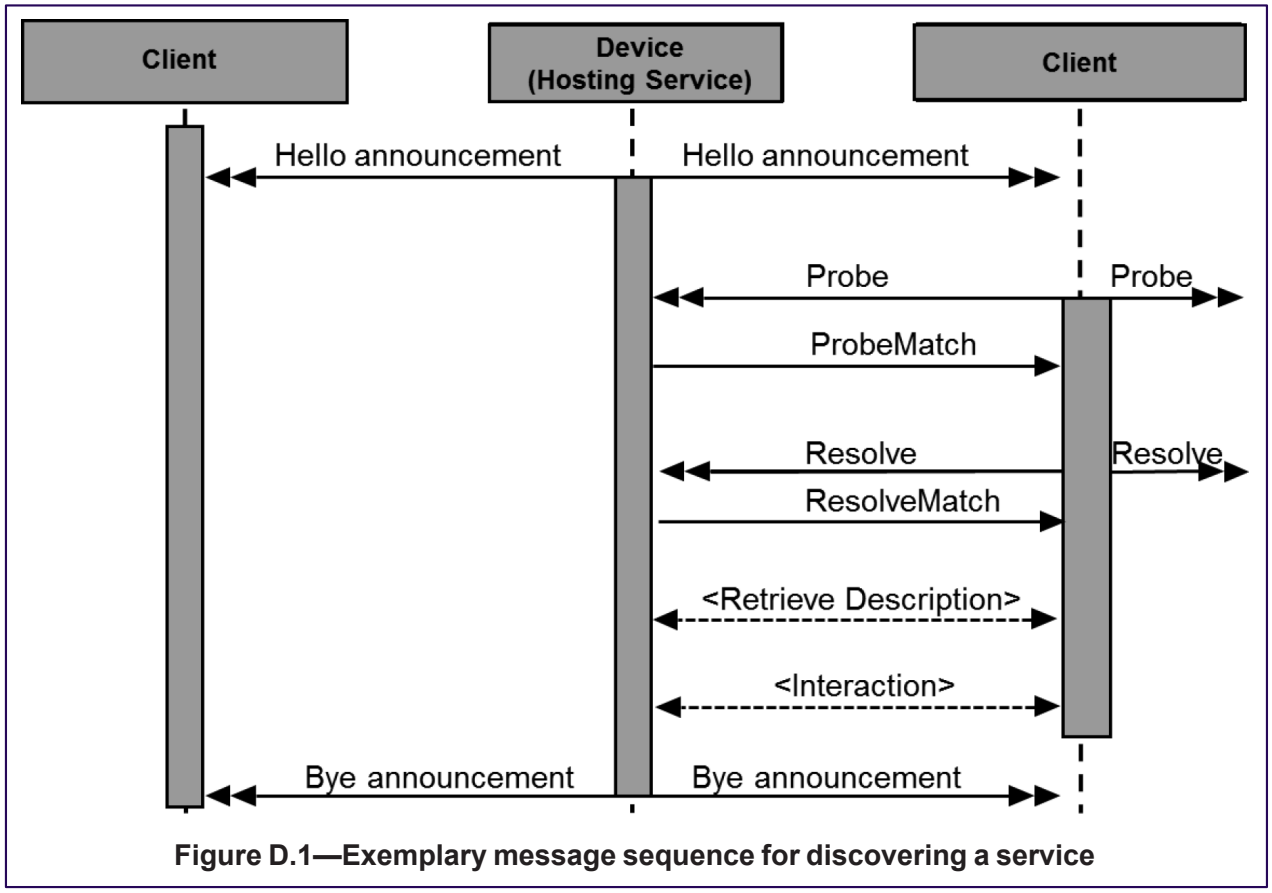
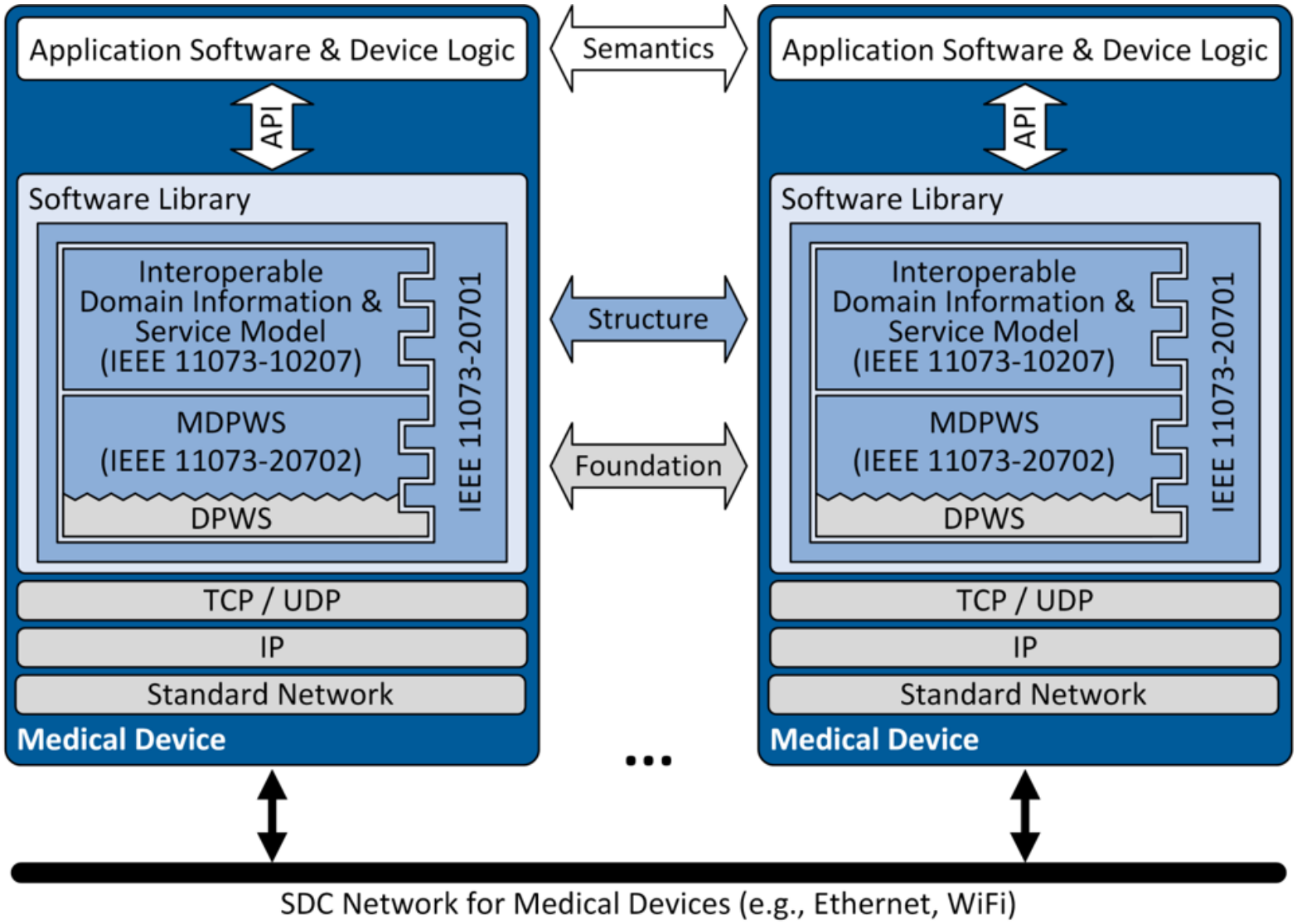



**Figure D.1—Exemplary message sequence for discovering a service**

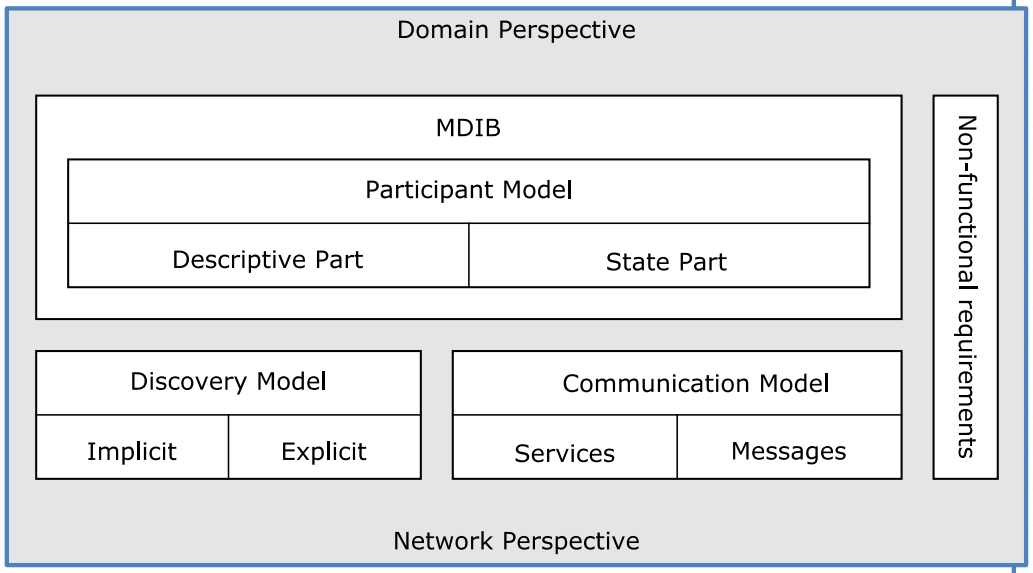
(Source: 11073:20702)

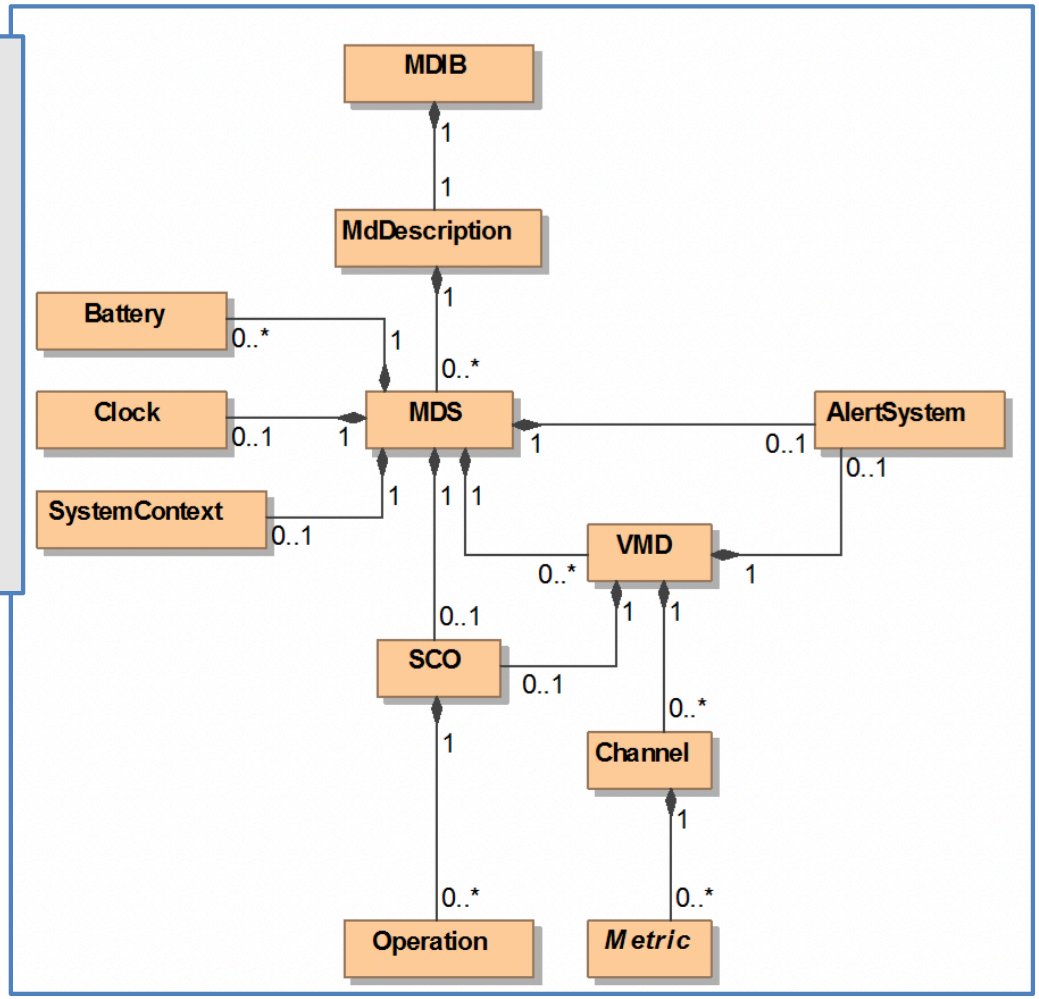
# SDC Standards & Functional Capabilities



# ISO/IEEE 11073-10207

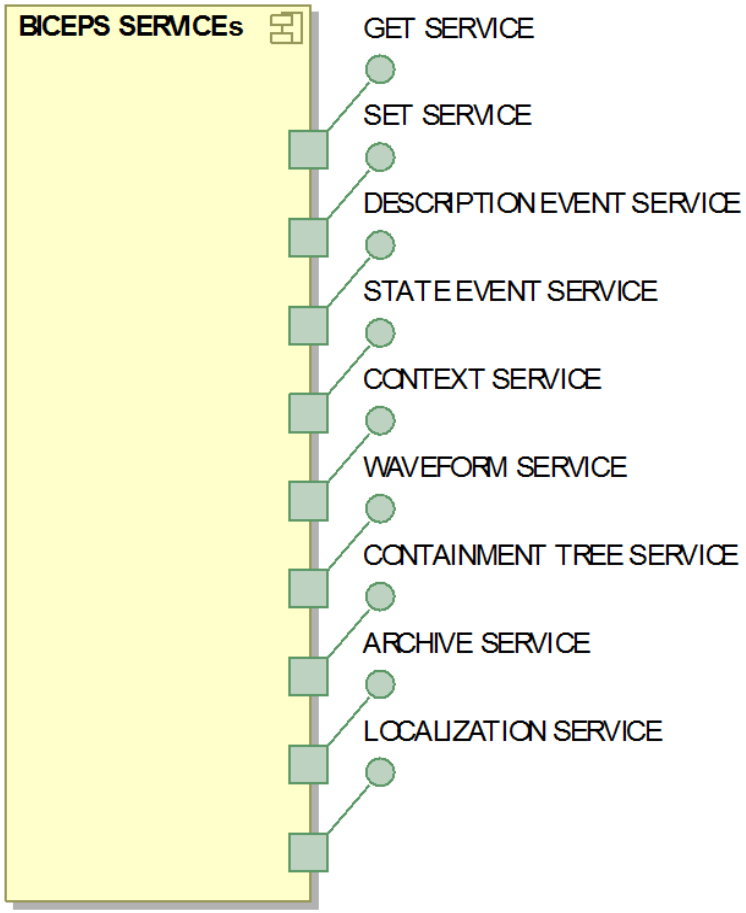
## BICEPS Fundamentals:

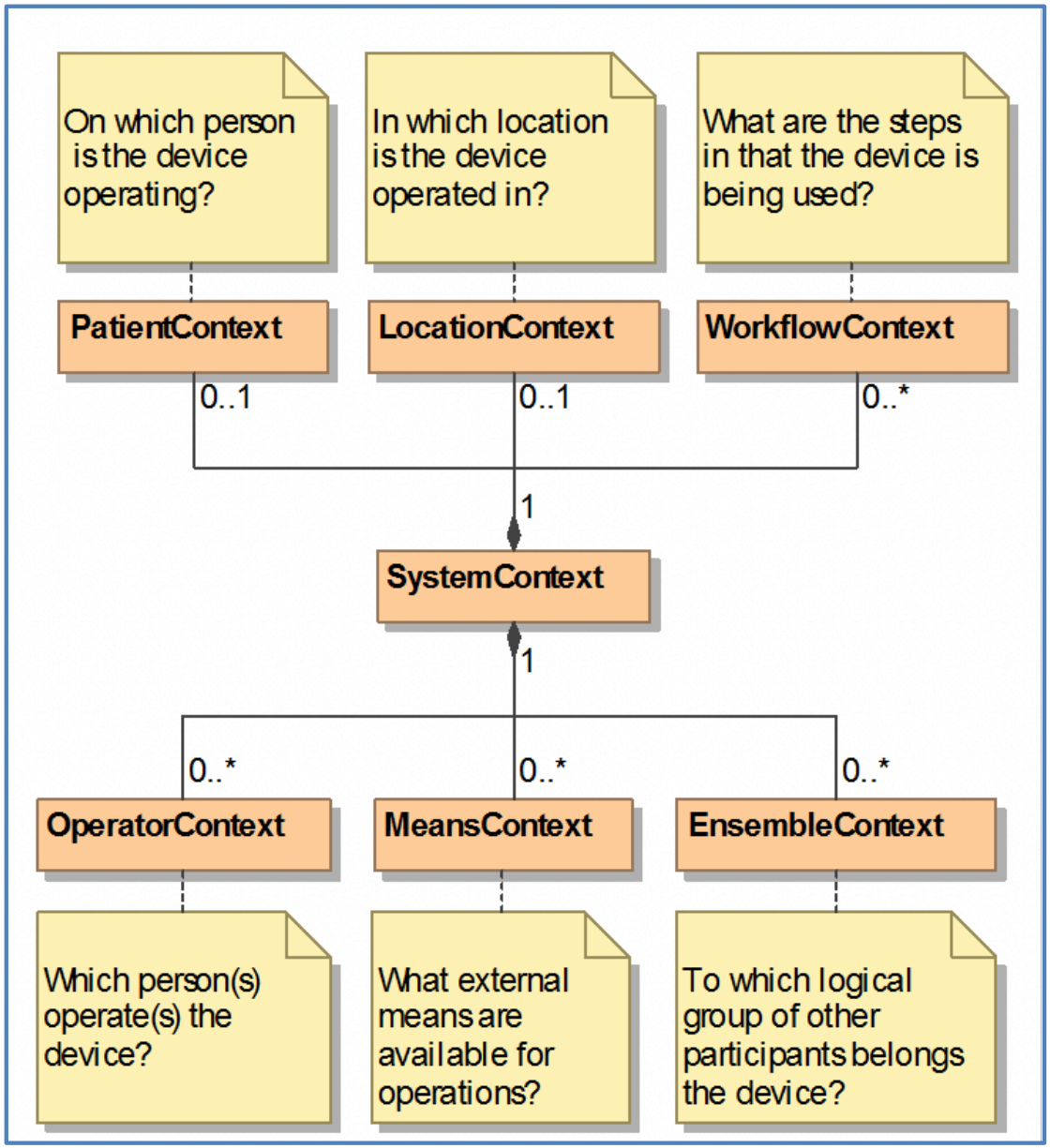


# ISO/IEEE 11073-10207

## Support for device clinical "system contexts" & Communication Services

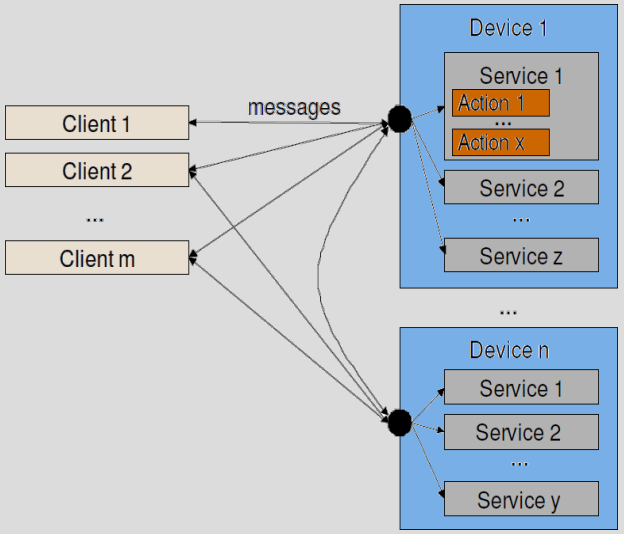


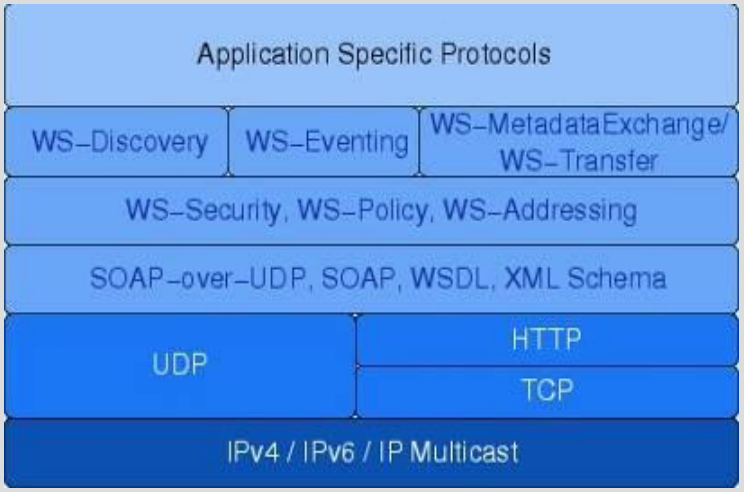



# ISO/IEEE 11073-20702

## Medical Device Profile for Web Services (MDPWS)

- DPWS:2009* is the core of MDPWS
  - OASIS standard (since 07/2009)
  - Utilizes a subset of the WS-* standard
  - Covers
    - Service discovery,
    - Interface description,
    - Messaging,
    - Event propagation, and
    - Secure information transmission
  - Designed for resource-constrained devices



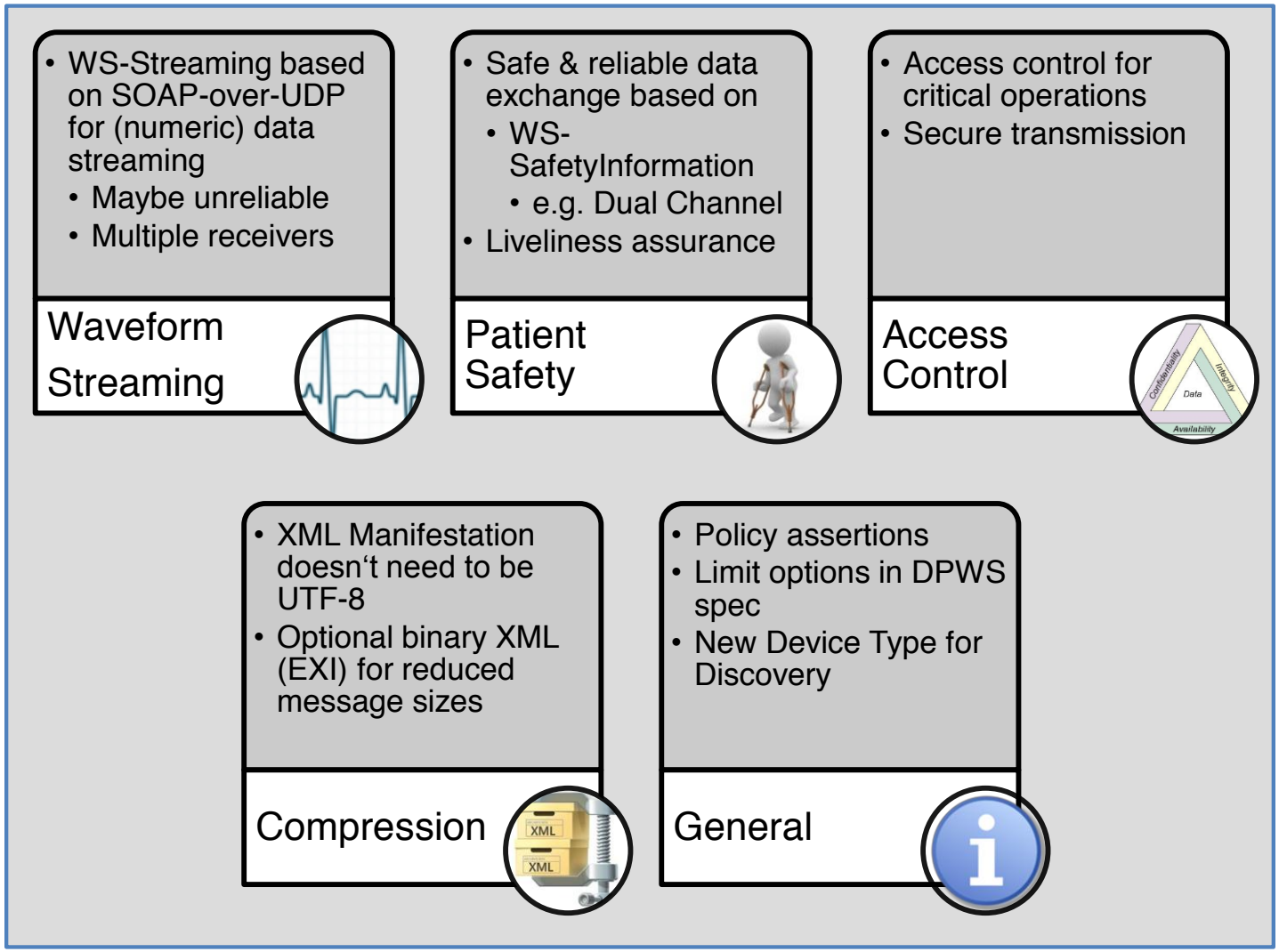




- MDPWS
  - Added some missing parts e.g. safe transmission of control requests

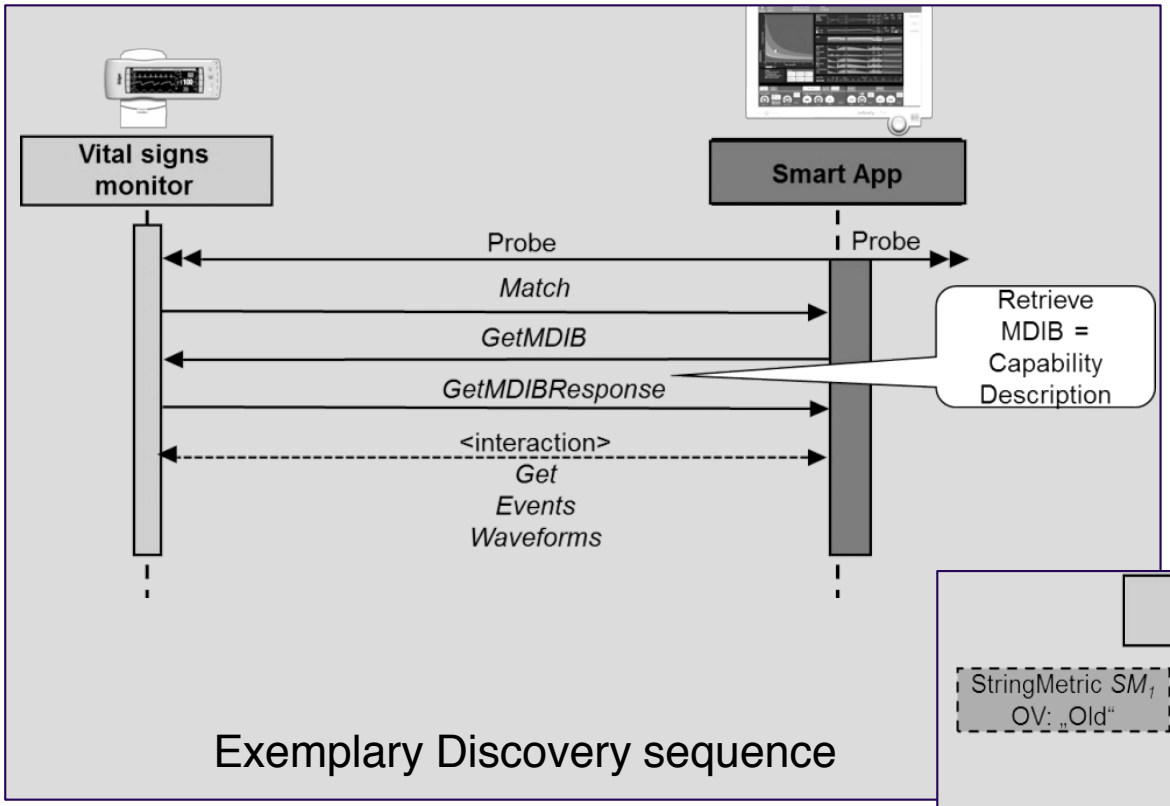
*See https://www.oasis-open.org/committees/ws-dd/

# ISO/IEEE 11073-20702

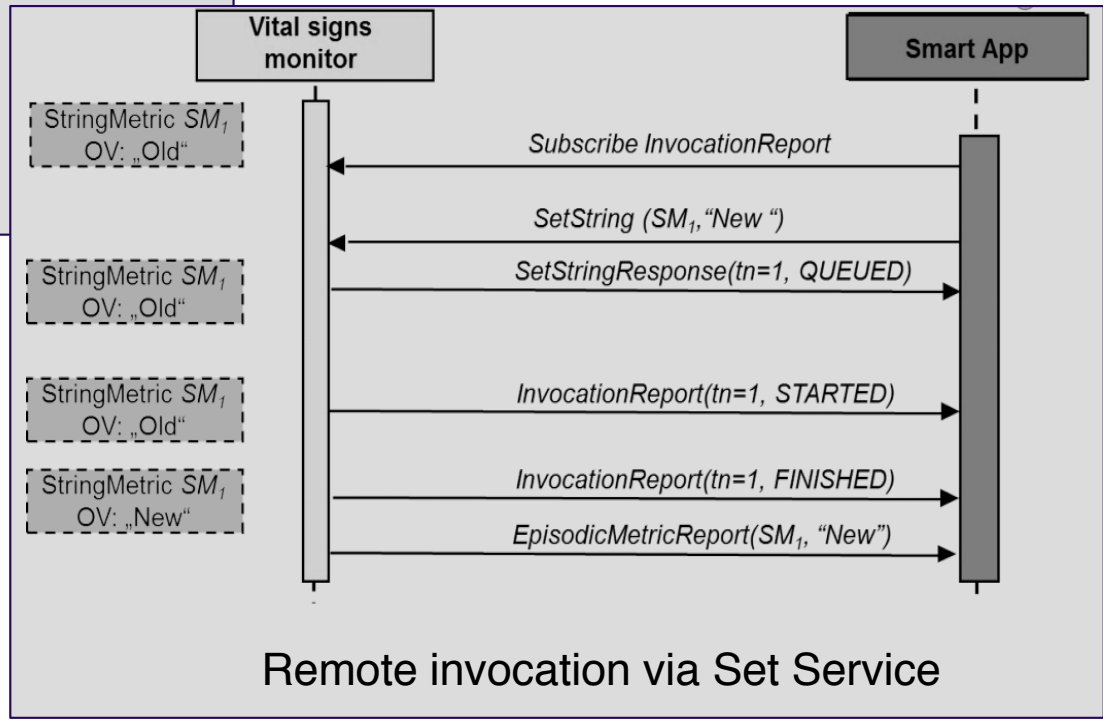
## Medical Device Profile for Web Services (MDPWS)



# Example SDC Scenarios

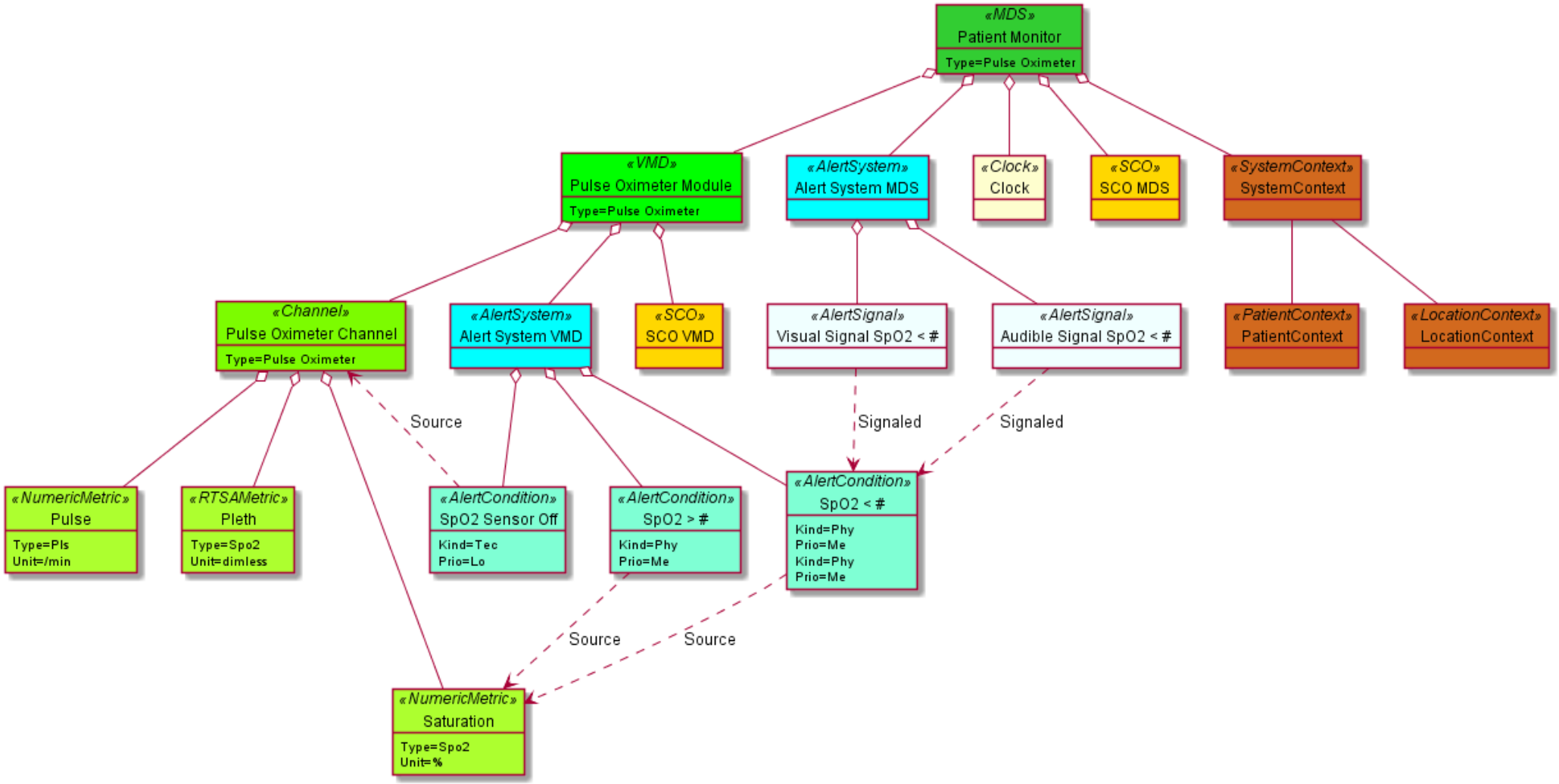



Exemplary Discovery sequence




Remote invocation via Set Service

# Example Participant Model: SpO2



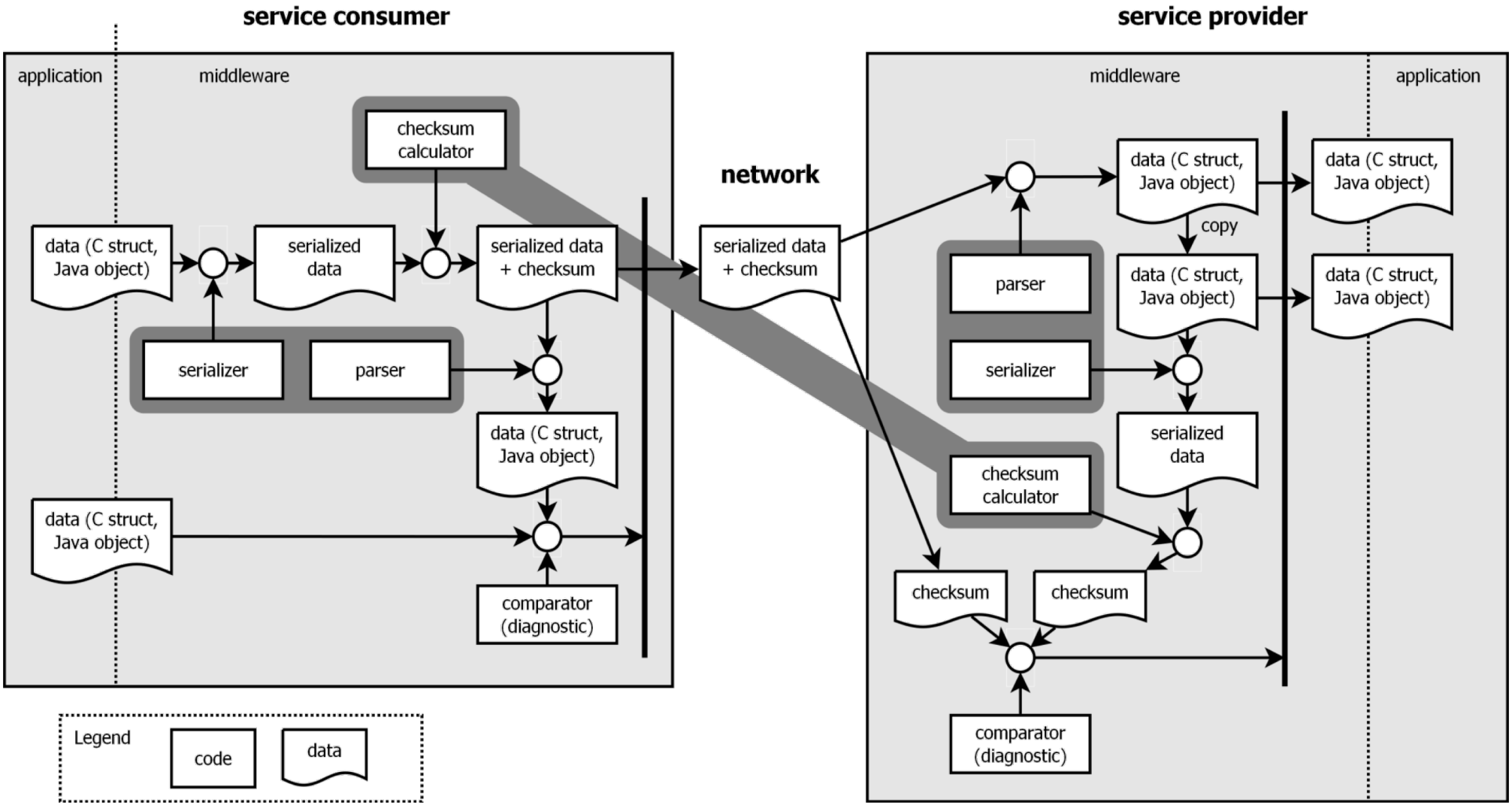

**Source: Stefan Schlichting**

# Core differences between HL7 FHIR & IEEE SDC:

| | IEEE 11073 SDC | HL7 FHIR |
|---|---|---|
| **Web service realisation** | SOAP | (typically) RESTful |
| **Communication topology** | end-to-end | (typically) centralised repositories |
| **Dynamic discovery** | WS-Discovery | not intended |
| **Synchronous communication** | request-response | request-response |
| **Asynchronous notifications** | WS-Eventing | yes |
| **Semantic annotations** | coded values | coded values |
| **Remote control** | built-in | not intended |
| **Safety mechanisms** | Medical DPWS: SafetyContext, DualChannel | not applicable |
| **Data compression** | optional (EXI) | optional (gzip for RESTful) |
| **Data streaming** | Medical DPWS: Streaming | not intended |
| **PHR management** | not intended | built-in |
| **Data traceability** | optional (distributed) | built-in (repository-based) |

# MDPWS: Safe Communication

## Dual Channel Transmission: Service provider detects a failure by means of an invalid checksum.



# IHE DEV SDPi Profiles

## SDPi – Service-oriented Device Point-of-care Interoperability

- ✓ Overview / Background
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- ✓ Roadmap Review & 2019 / 2020 Planning
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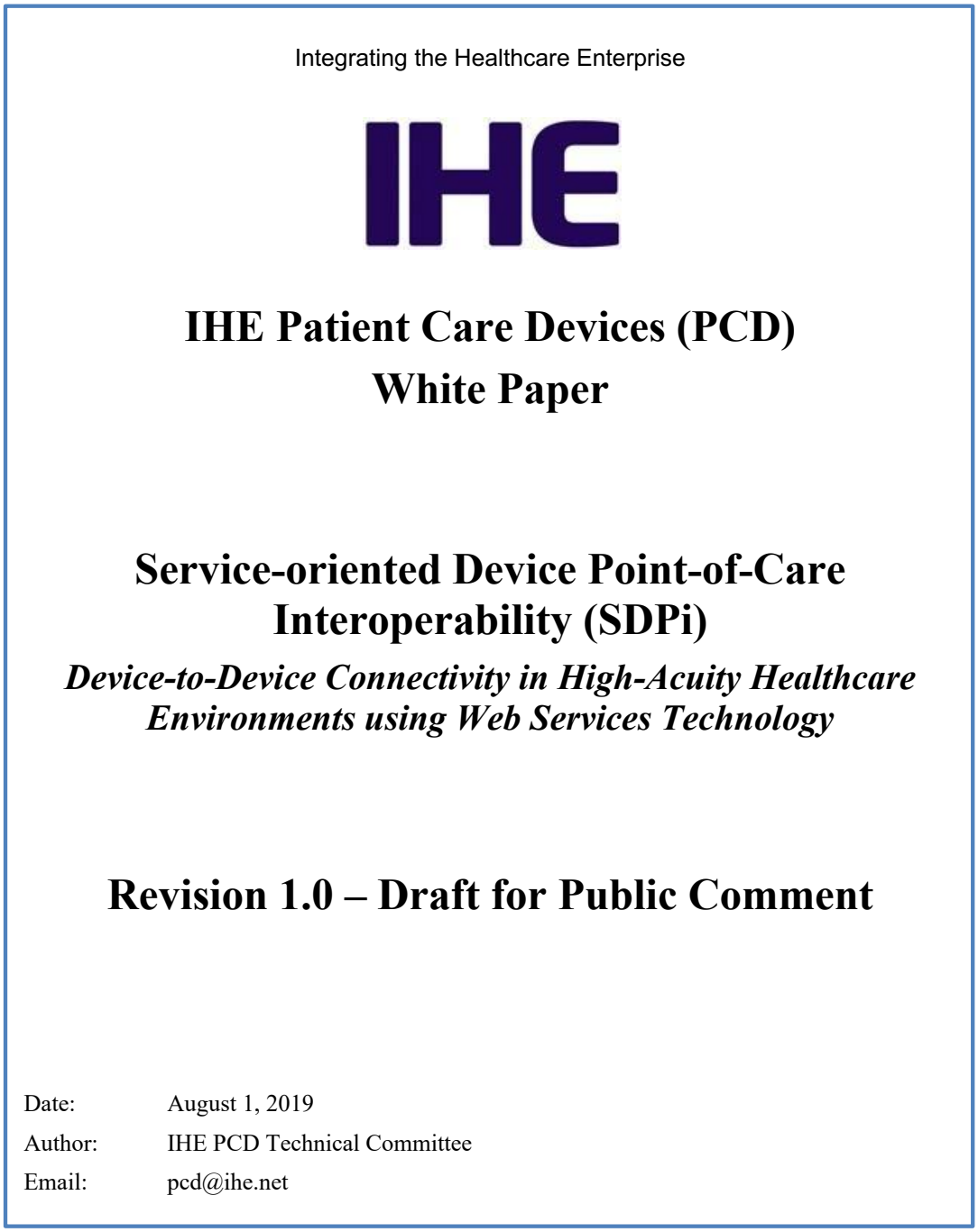
  - Grouped Actors: V2, PCD profiles, FHIR

- ✓ **Broad Public Comment Completed & Resolved by SDPi WG**
- ✓ **Roadmap Updated per Global Stakeholder Feedback**
- ✓ **Next: Publish to IHE.net**
- ✓ **Execute roadmap**

Download @
https://wiki.ihe.net/index.php/SDC@IHE_White_Paper



Integrating the Healthcare Enterprise

IHE

**IHE Patient Care Devices (PCD)**
**White Paper**

**Service-oriented Device Point-of-Care Interoperability (SDPi)**

***Device-to-Device Connectivity in High-Acuity Healthcare Environments using Web Services Technology***

**Revision 1.0 – Draft for Public Comment**

Date: August 1, 2019
Author: IHE PCD Technical Committee
Email: pcd@ihe.net

IHE Integrating the Healthcare Enterprise

## Four IHE Profiles Proposed:

**SDPi** Basic D2D PnP

**SDPI-R** Reporting

**SDPI-A** Alerting

**SDPi-xC** External Control

## Each profile will include:

Options Security, Streaming

Grouped “Gateway” Actors

PCD Device-Enterprise Profile + Devices on FHIR Integration

**Integrating the Healthcare Enterprise**

# IHE Patient Care Device (PCD) Technical Framework

## Volume 1
## IHE PCD TF-1
## Profiles

**Revision 8.0 – Final Text**

**October 23, 2018**

IHE Integrating the Healthcare Enterprise

## SDPi Proposed Roadmap:

3-Years starting 2019 October

SDPi(-x) “Basic” End of 2019

IHE PAT / CAT Events in 2020

Global engagement:
AU, EU, JP, KR, NA

First SDPi Certified Devices
@ End 2020!

Aggressive? Yes!
Aspirational? Yes Yes!

Achievable? Coalition of the Willing

Integrating the Healthcare Enterprise

IHE

# IHE Patient Care Device (PCD) Technical Framework

## Volume 1
## IHE PCD TF-1
## Profiles

**Revision 8.0 – Final Text**
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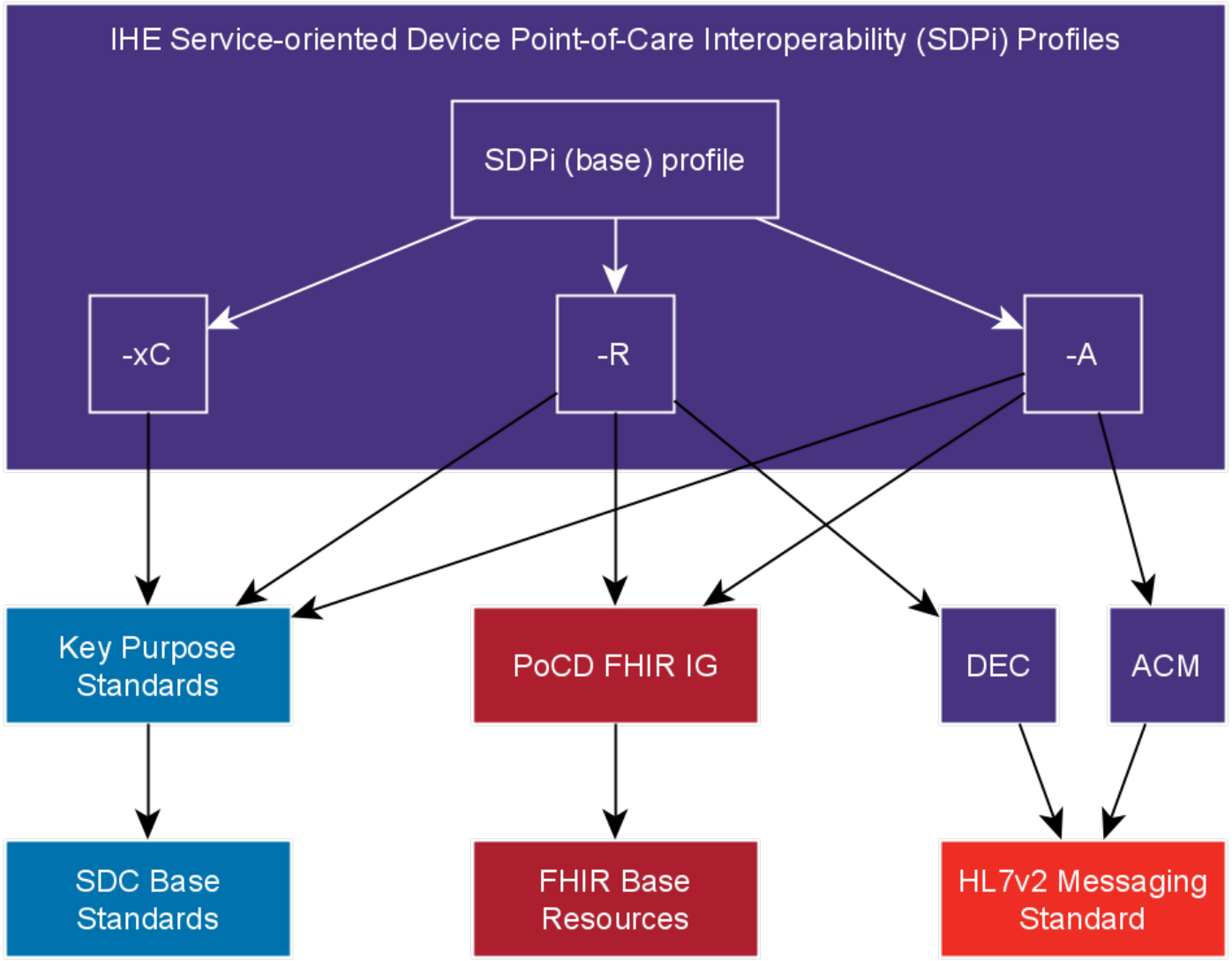
# DEV::DPI::SDPi Foundations

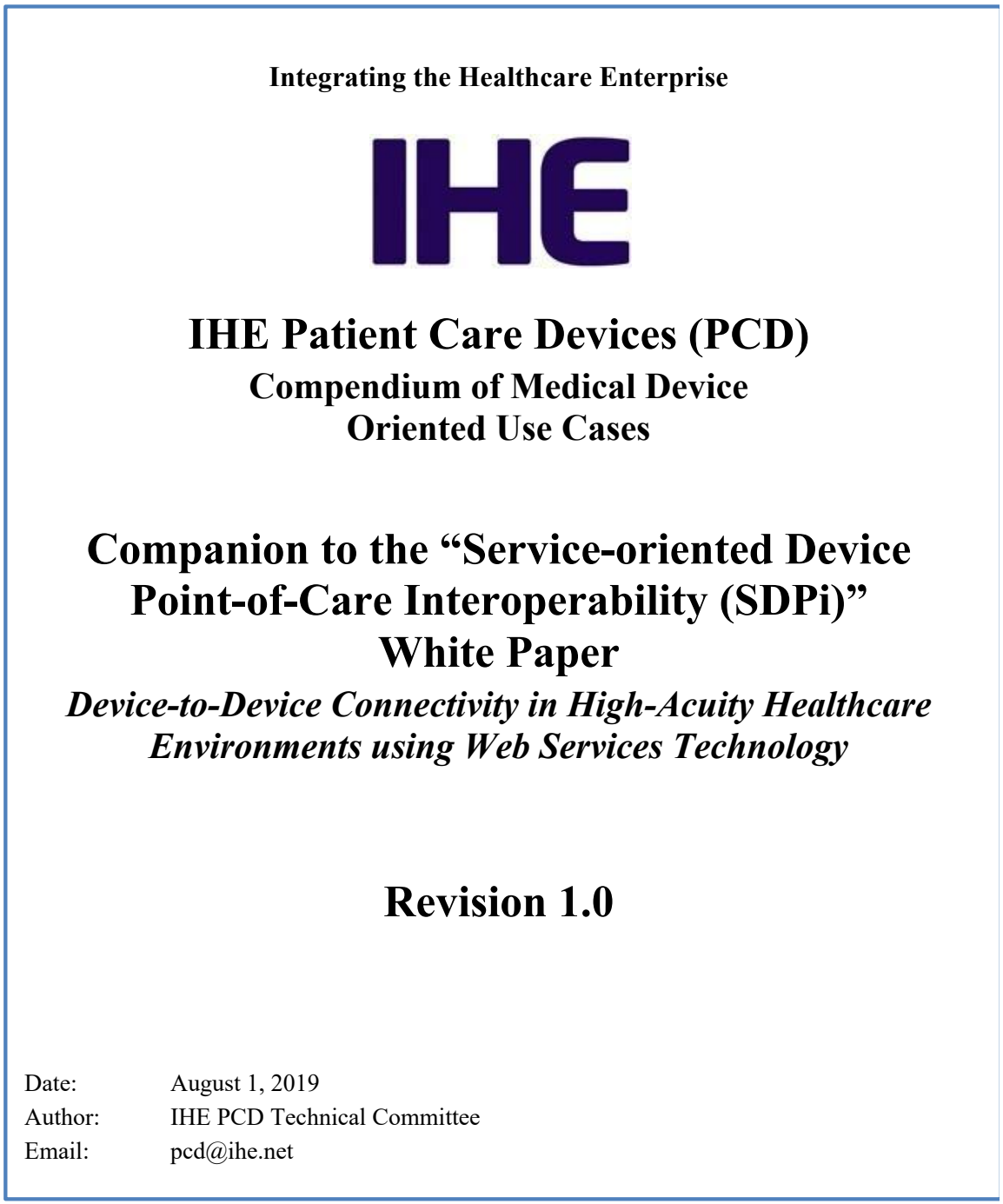


IHE Integrating the Healthcare Enterprise

**A wealth of MDI use cases have been developed over the last few decades …**

**SDC & IHE SDPi build upon this rich heritage!**

Download @
https://wiki.ihe.net/index.php/SDC@IHE_White_Paper



Integrating the Healthcare Enterprise

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# IHE Patient Care Devices (PCD)

## Compendium of Medical Device Oriented Use Cases

## Companion to the "Service-oriented Device Point-of-Care Interoperability (SDPi)" White Paper

***Device-to-Device Connectivity in High-Acuity Healthcare Environments using Web Services Technology***

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# SDPi 3-Year Roadmap

- 2019
  - OCT–DEC SDPi TI Ready (4 profiles)
  - NOV FHIR DevDays (AMS)
- 2020
  - JAN IHE NA PAT (proposed)
  - MAR IHE EU CAT + HIMSS'20 Conference
  - JUN IHE USA CAT @ FHIR DevDays '20
  - AUG (TBD) IHE Korea PAT
  - OCT (TBD) IHE Japan CAT
- …

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Changing the Way Healthcare CONNECTS

# IHE SDPi!