IHE Patient Care Devices
SDC Initiative Group
2019-06-27

IHE | Integrating the Healthcare Enterprise

SDC@IHE

White Paper Topics for Discussion

SDC@IHE White Paper

Topics for Discussion

1. Core Use Case Examples **– 6/27**
2. SDC Standards & Functional Capabilities **– 2/27**
3. SDC Mapping to IHE Tech Framework Constructs **- 6/27**
4. SDC CA Framework (testing & tooling) – 7/3
    - *NOTE: See ongoing discussion in IHE PCD Standards & Tooling weekly (a.k.a. "DPI Call")*
5. Device Profiling: From Normative "Gold" to On-the-Wire Validation – 7/3

Core Use Case Examples

Core Use Case Examples

White paper contains:

- ✓ Four core use cases that can be used to establish the core requirements for integrating SDC-enabled devices and systems into IHE TF.
- ✓ Appendix identifying and referencing the large body of use cases that have been developed to understand interoperability of devices in high acuity healthcare contexts.

Key Questions:

- ✓ Right (4) use cases to target?
- ✓ Folded into TF-1? Where?
- ✓ Level of detail in white paper – actor diag? transactions? High-level only (like QH example)?

Core Use Case Examples

Example #1: Functional Endoscopic Sinus Surgery (FESS)

John Miller (13yrs, m) has chronic rhinosinusitis, which is an inflammatory condition in which the nose and his left maxillary sinus is swollen and the drainage of the mucus is prevented. John's chronic rhinosinusitis doesn't respond to medication anymore. After consulting with his physician, he and his parents decide to resolve the issue with a Functional Endoscopic Sinus Surgery (FESS). The FESS will be done in as a day surgery, so that John can get home in the evening.

*Before the day of the surgery, a **CT scan** is taken that is used to guide the surgeon during the surgery.*

*In order for the surgery to start, John is put under general **anesthesia** and monitored with a **patient monitor** by a pediatric anesthesiologist, esp. his mean arterial blood pressure which has been reduced in order to provide optimal visibility of the surgical field due to reduced capillary bleeding.*

*During the intervention, the Surgeon has a **constant view of the patient's vitals** (including MABP) and the **control functions** to execute the intervention.*

*During the procedure one of the surgical devices has a technical issue. It generates a **technical alert** which notifies the responsible biomedical technician. He/she decides to replace the device and connects it to the network where it is **automatically discovered and configured** allowing the intervention to continue.*

There are no additional technical or clinical problems, the surgery is a success and John can go home with his parents.

NOTE: Proposed for the HIMSS'20 SDC Showcase Demo

Core Use Case Examples

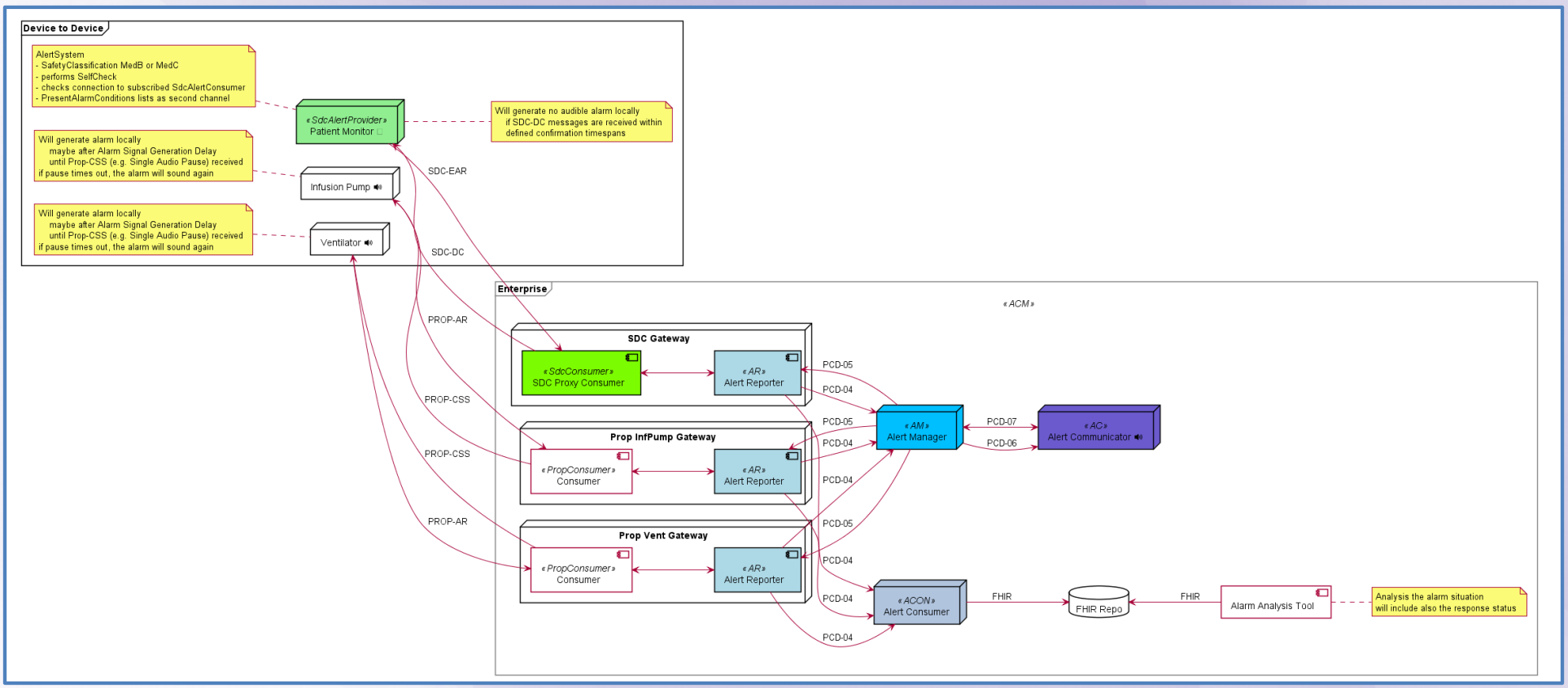
Example #2: NITRD '19 MDI Use Case

NITRD.1 – Seamless changes of medical devices
NITRD.2 – Capture of data and settings
NITRD.3 – Supervisory control established
NITRD.4 – Autonomous patient therapy
NITRD.5 – Data flows through the Continuum of Care
NITRD.6 – Capture of equipment configurations
NITRD.7 – Black Box Recorder

Source: https://www.nitrd.gov/nitrdgroups/index.php?title=Medical-Device-Interoperability-2019

Core Use Case Examples

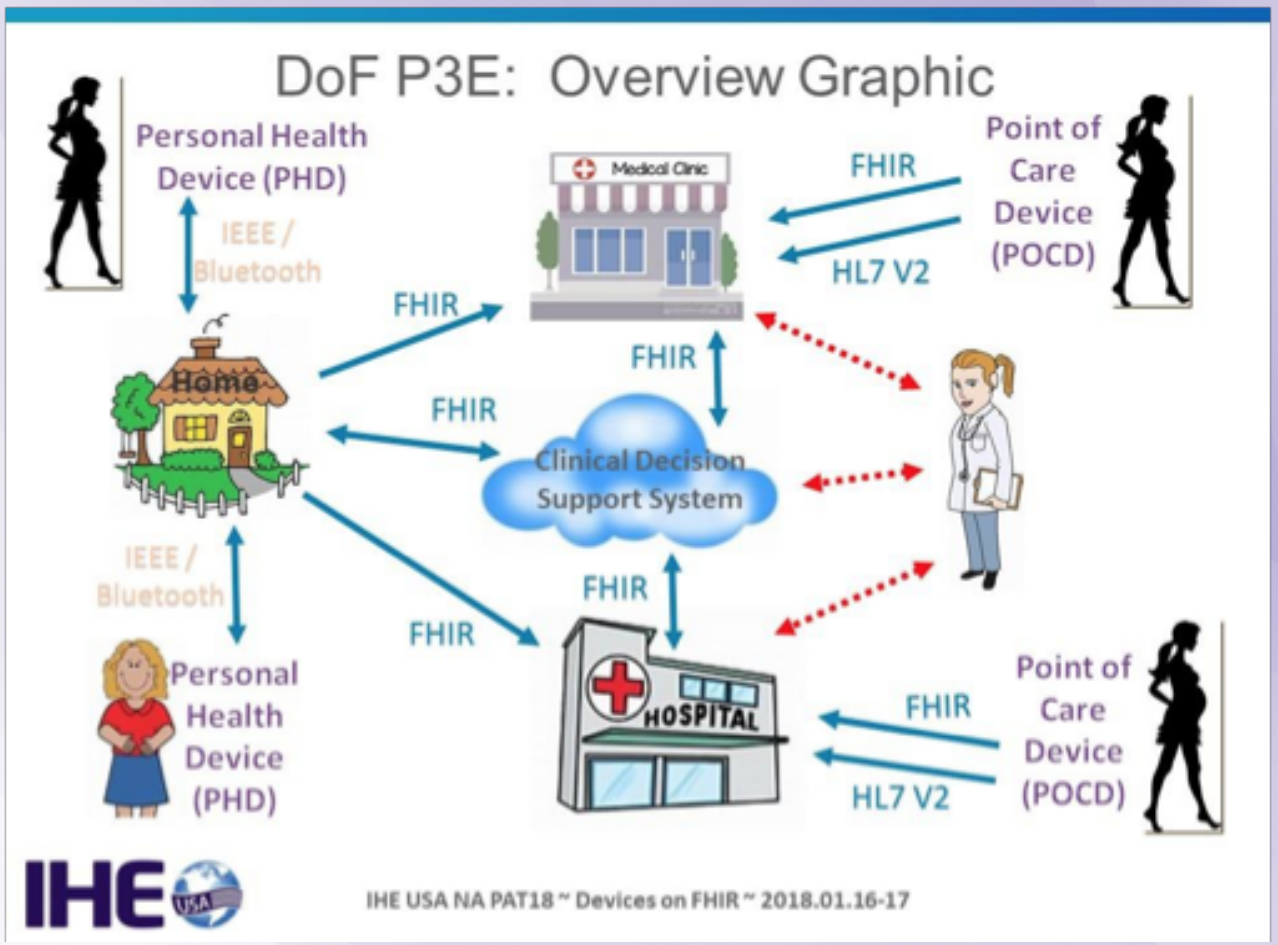
Example #3: SDC to Enterprise



Source: IHE PCD **Quiet Hospital** initiative; HIMSS'20 Showcase proposal; graphic is version 3 – work in progress

Core Use Case Examples

Example #4: SDC with DoF (PoCD / PHD)



Source: **IHE DoF PAT '18 + HL7 FHIR DevDays**

SDC Standards & Functional Capabilities

SDC Standards & Functional Capabilities

SDC Core Elements:

- ✓ Standards set (baseline & in-process)
- ✓ General Architecture (device-to-device w/ Gateway)
- ✓ TF-1 Functions: reporting, alerting, controlling
- ✓ TF-2 Functions: Core SDC services

Key Questions:

- ✓ Safety, security & risk mitigation for Key Purposes?
- ✓ Device Specializations?
- ✓ Imaging integration?
- ✓ …

SDC Standards & Functional Capabilities

The concept of a

clinical workplace service-oriented medical device architecture

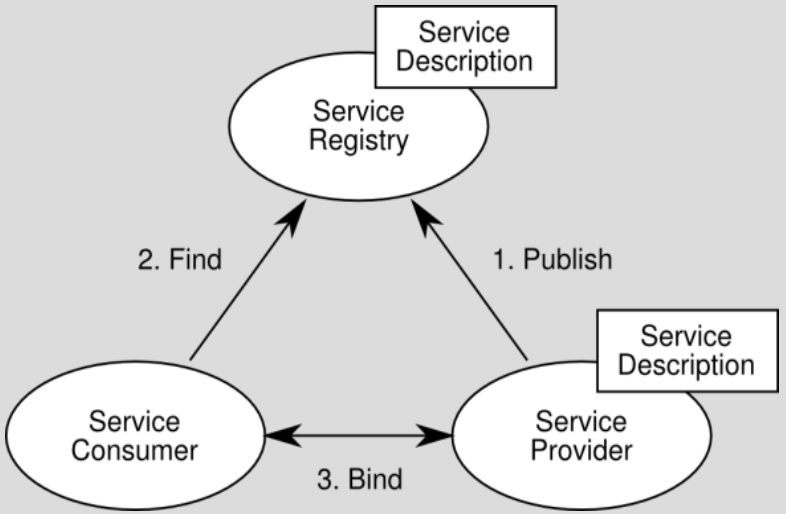
transfers the concept of a

service-oriented architecture

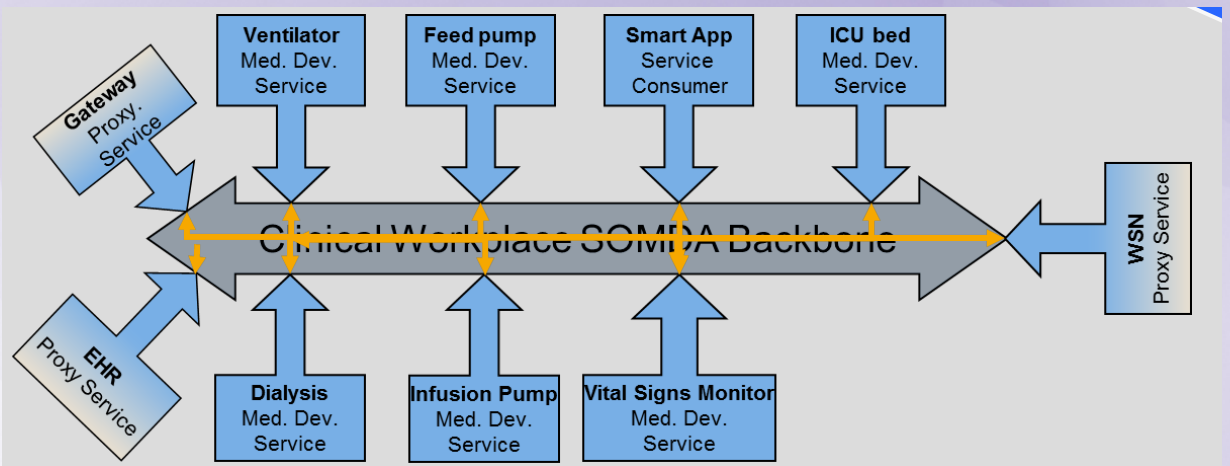
to the domain of

distributed system of medical devices for one clinical workplace.

Actors?

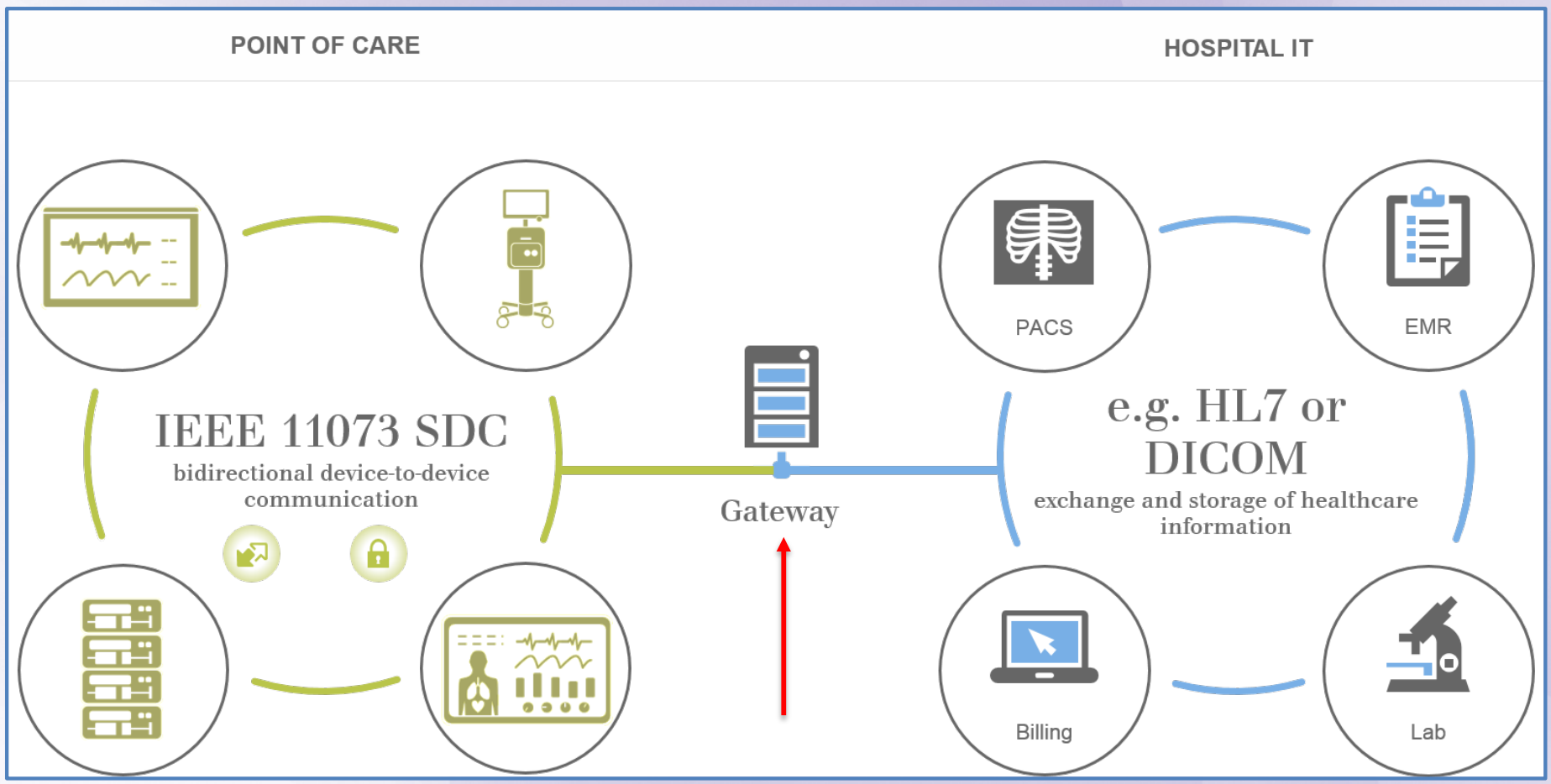


Device-to-Device



Conceptual view of a SOMDA for a clinical workplace

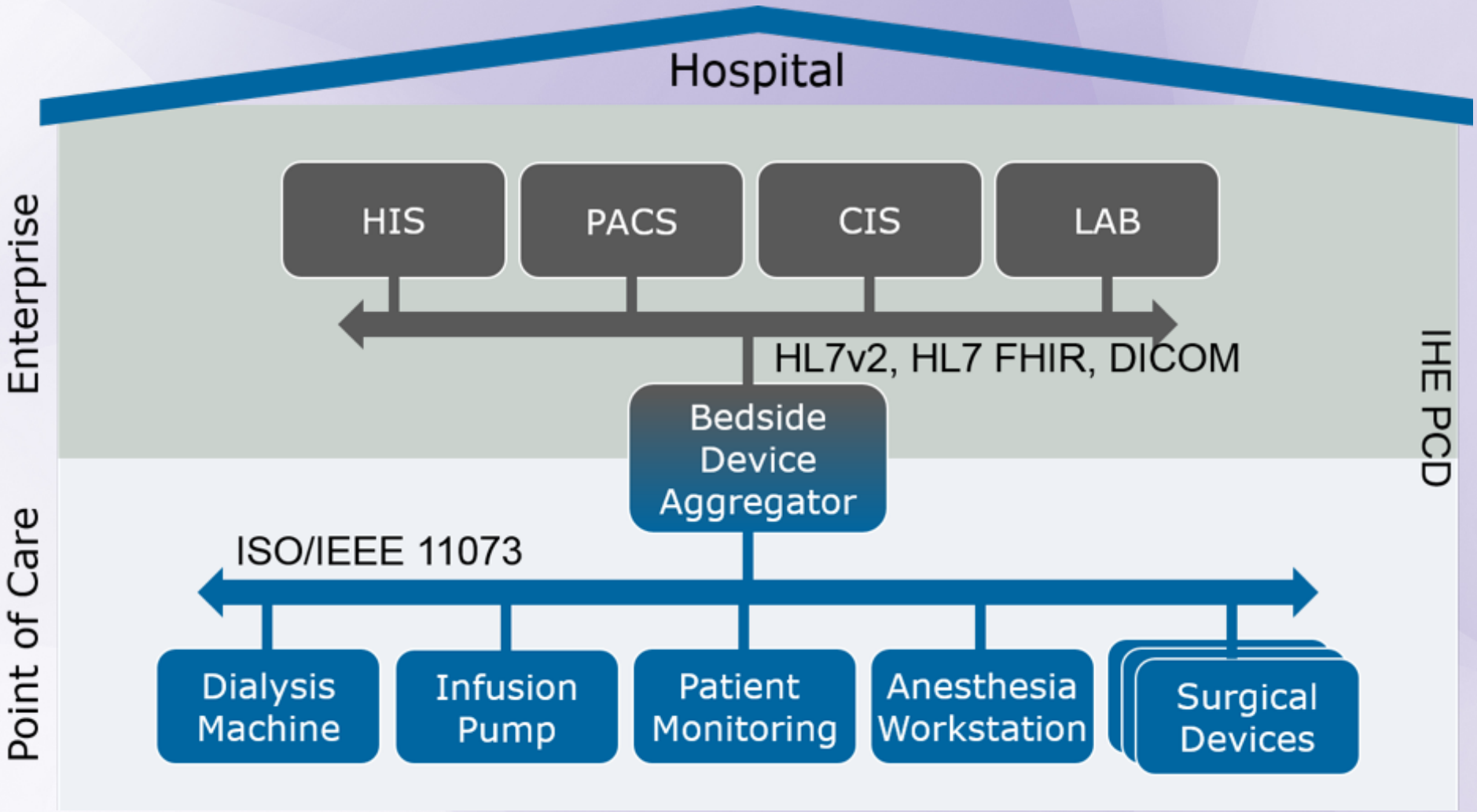
SDC Standards & Functional Capabilities



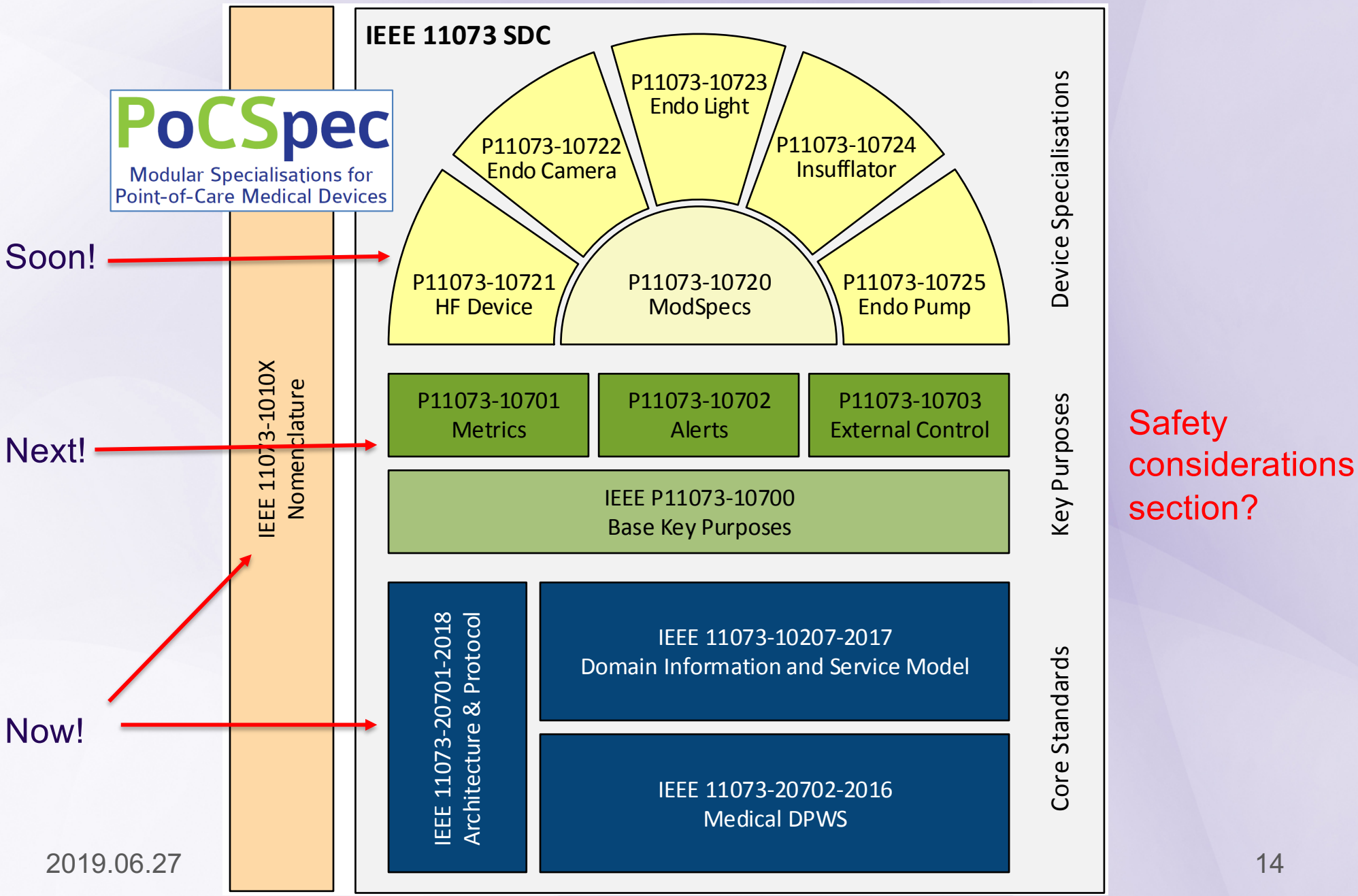
SDC Point-of-Care Context

IHE "Enterprise" Context

SDC Standards & Functional Capabilities



SDC Standards & Functional Capabilities

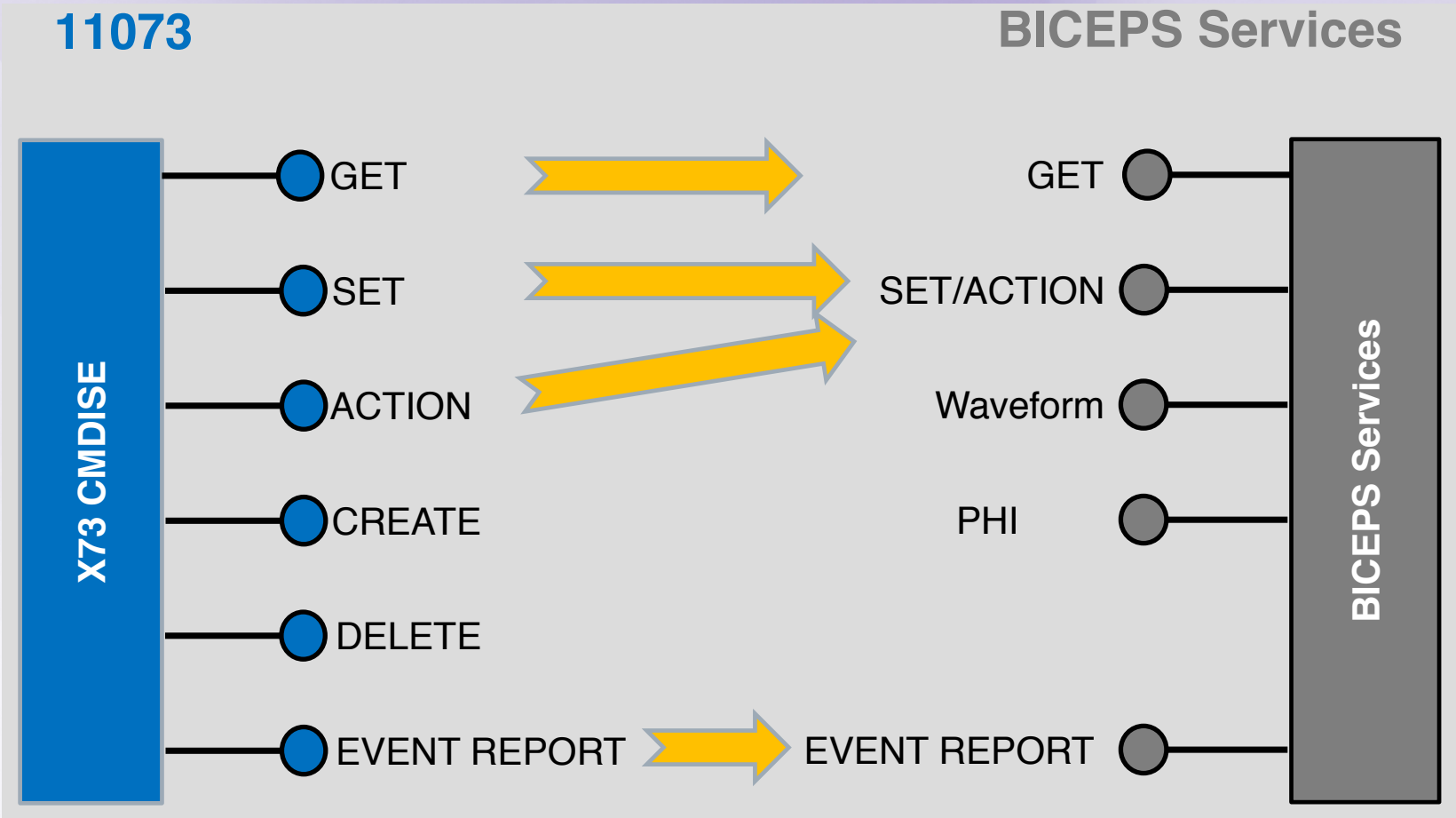


Safety considerations section?

SDC Standards & Functional Capabilities

Questions:

1. Map BICEPS Services to TF-2 transactions?
2. …

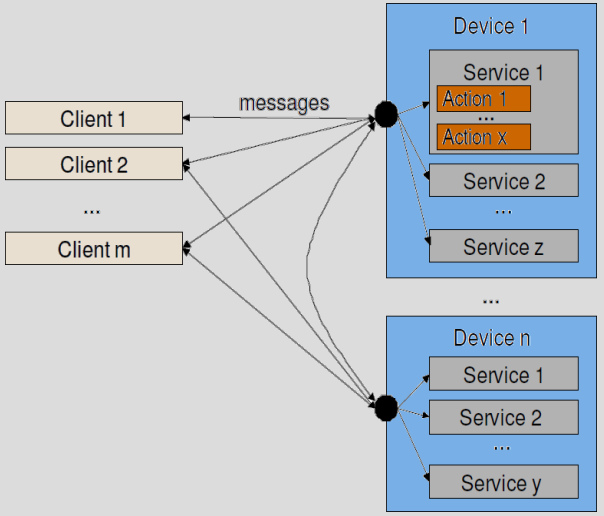


SDC Standards & Functional Capabilities

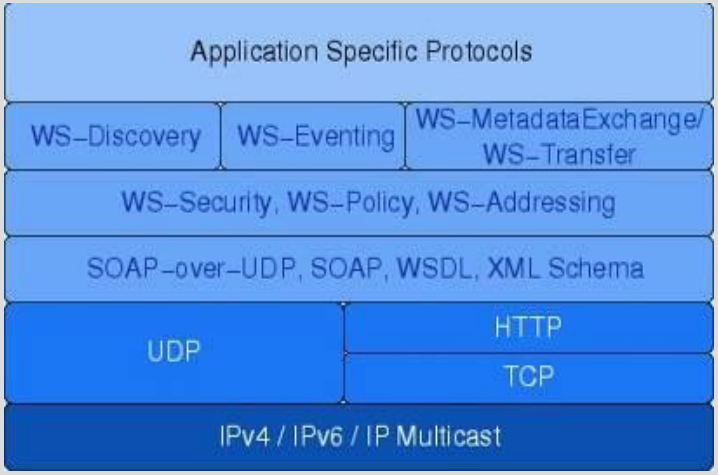
Questions:

1. Map MDPWS Services to TF-2 transactions also?
2. Security Considerations section?
3. Relationship to ITI WS-* Appendix (used for DEC @ IHE-KR CAT)

- 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/

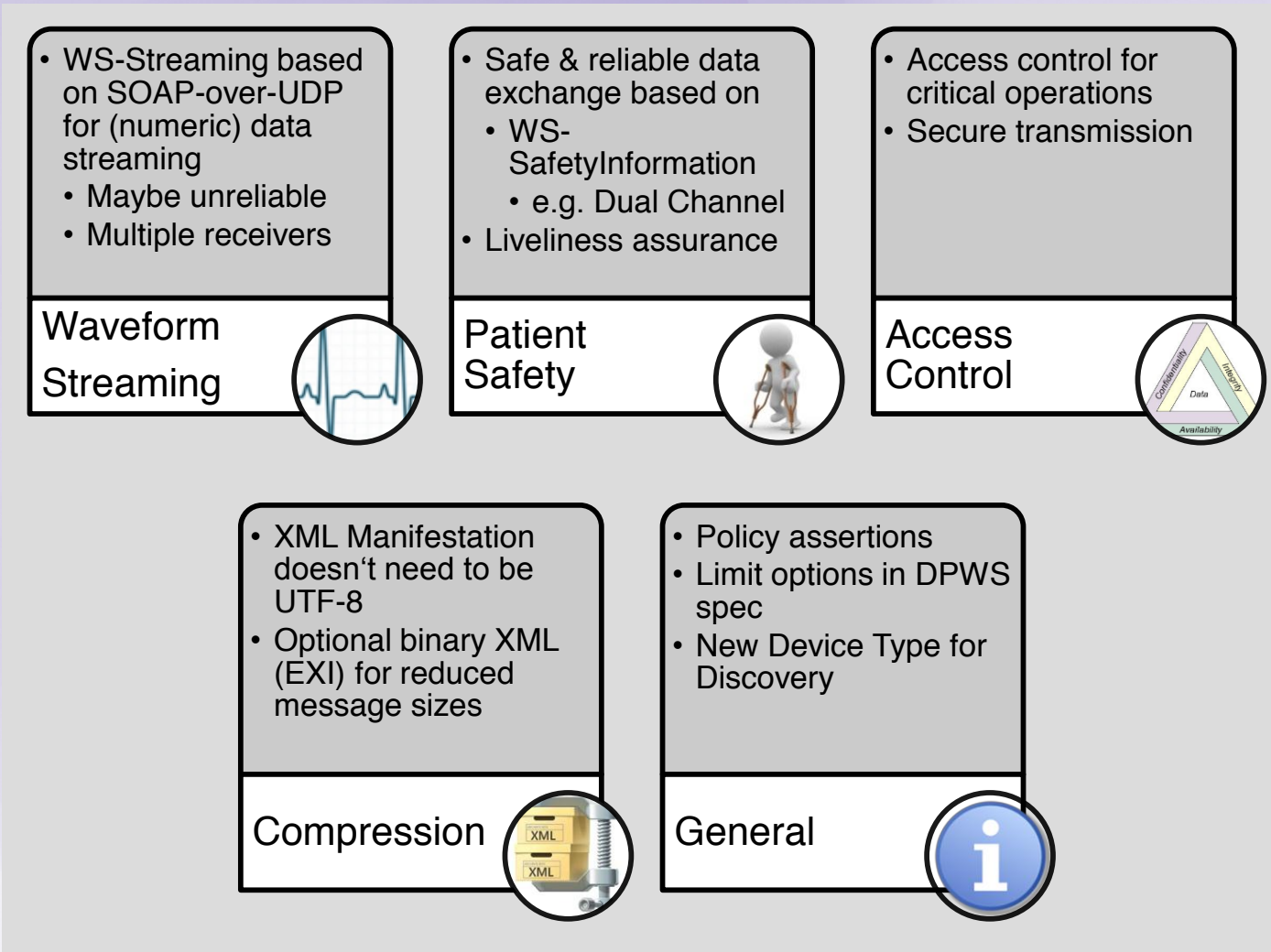
SDC Standards & Functional Capabilities

Questions:

1. Where to include these MDPWS extensions?

Profile options:

1. Binary XML?
2. Secure exchange?
3. …



- Add some sequence diagrams

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SDC Mapping to IHE Tech Framework Constructs

(Conceptual Approach Only!)

SDC Mapping to IHE TF

Mapping considerations:

- ✓ IHE TF Volumes & Components (traditional)
- ✓ Scale from basic SDC to specializations to therapeutic protocols & clinical workflow

Key Questions:

- ✓ Where to present SDC architecture content (TF-1 / 2)?
- ✓ Profiling: Family vs. Profile vs. Options
- ✓ How to relate to existing IHE PCD profiles for reporting, alerting and (limited) controlling @ Enterprise context?

SDC Mapping to IHE TF

#1 Challenge for SDC@IHE

IHE TF-1 – Interoperability Profiles:

- ✓ Perspective: Primarily clinical
- ✓ Actors / Transactions / Options / Constraints / Dependencies
- ✓ Use Cases / Process Flows / Sequence Diagrams
- ✓ General Principles / Concepts (see XDS.b ITI TF-1)
- ✓ Implementation Strategies / Considerations

IHE TF-2 – Transactions:

- ✓ Core tech reference detail to SDC standards

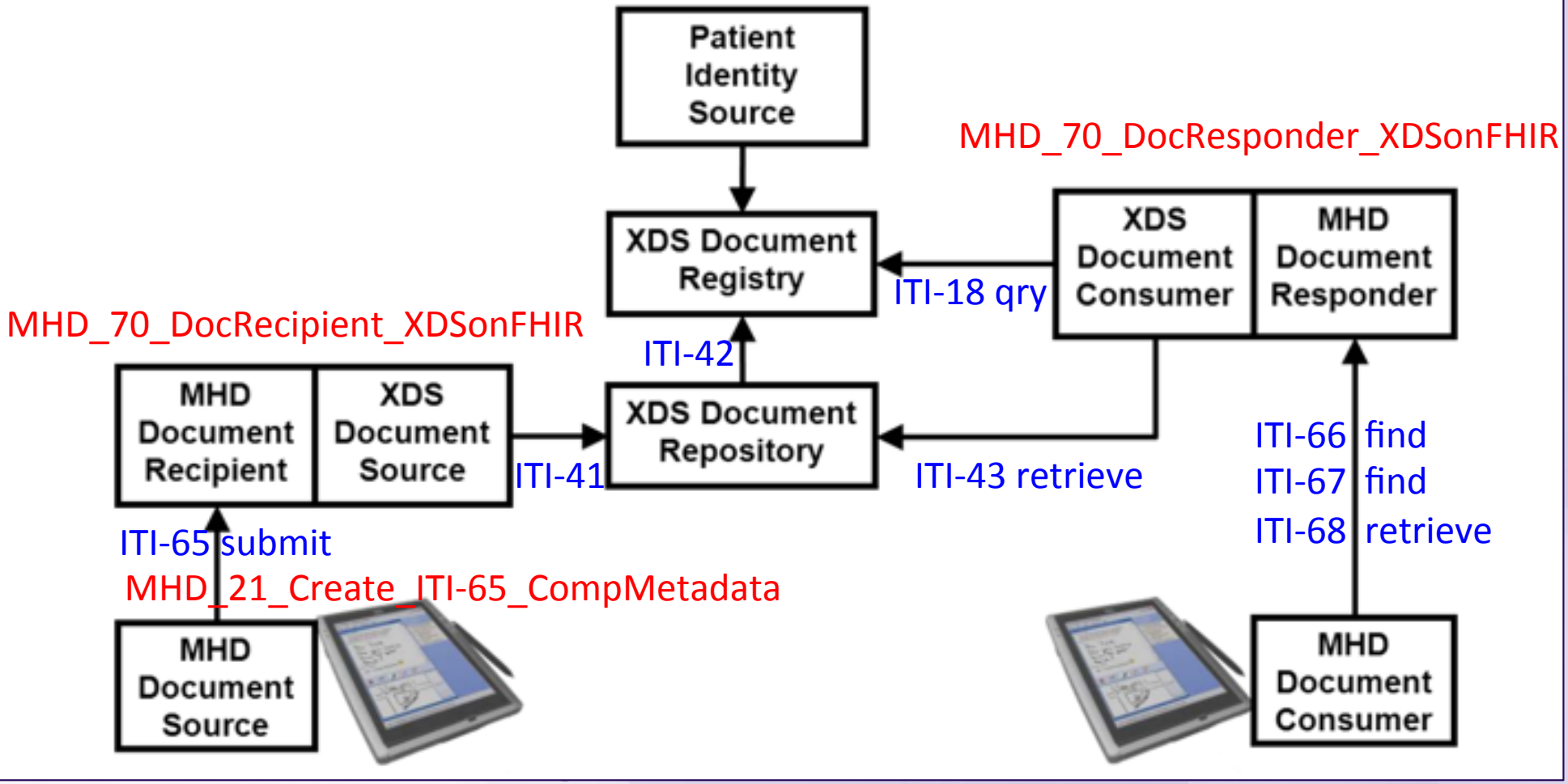
IHE TF-3 – Semantic Content:

- ✓ General terminology use to device specializations
- ✓ Value sets bindable to actors & transactions

SDC Mapping to IHE TF

The "XDS on FHIR" Option - MHD in an XDS Environment

'Conversion' of MHD transactions into XDS transactions
These are tests run by MHD actors that have this capability.



Changing the Way Healthcare CONNECTS

http://www.ihe.net

Additional Information

IHE TF Elements