

IHE Devices – SDPi Supplement

Introduction & Overview

<date> 2020

SDC is a registered trademark of OR.NET

IHE Germany – SDC / SDPi Plug-a-Thon – Briefing

IHE Basics - Why profile?

From ISO/IEEE 11073 SDC to IHE SDPi TF to PATs & CATs

Orientation Tour: IHE Technical Framework & SDPi Profiles

IHE SDPi Profile Option Specifications

IHE SDPi TF-2 Transactions & MDPWS Messaging

IHE SDPi TF-3 SDC/BICEPS Content Modules & Specializations

First ... Term Usage & Assumptions

SDC

Service-oriented **D**evice **C**onnectivity

Family of ISO/IEEE 11073 SDC standards

Assumption: PAT participants have a working understanding of SDC

SDPi

Service-oriented **D**evice **P**oint-of-care **I**nteroperability

Set of (4) IHE technical framework profiles based on ISO/IEEE 11073 SDC standards

Assumption: PAT participants may have some working knowledge of IHE & TF profiles

PAT

Plug-**a**-thon

IHE testing event intended for early, informal exploration of new tech & new profiles

Assumption: PAT participants may have background in “hackathons”, plugfests, etc.

CAT

Connect**a**thon

IHE formal interoperability testing event for published profiles; includes independent monitors, test management tooling; published results

Assumption: PAT participants may have background in formal test events

Second ... Profiles? Why?!

IHE Profile

A technical specification that ***constrains*** a set of general open standards for application to a specific interoperability or integration need (described by a set of use cases) ¹

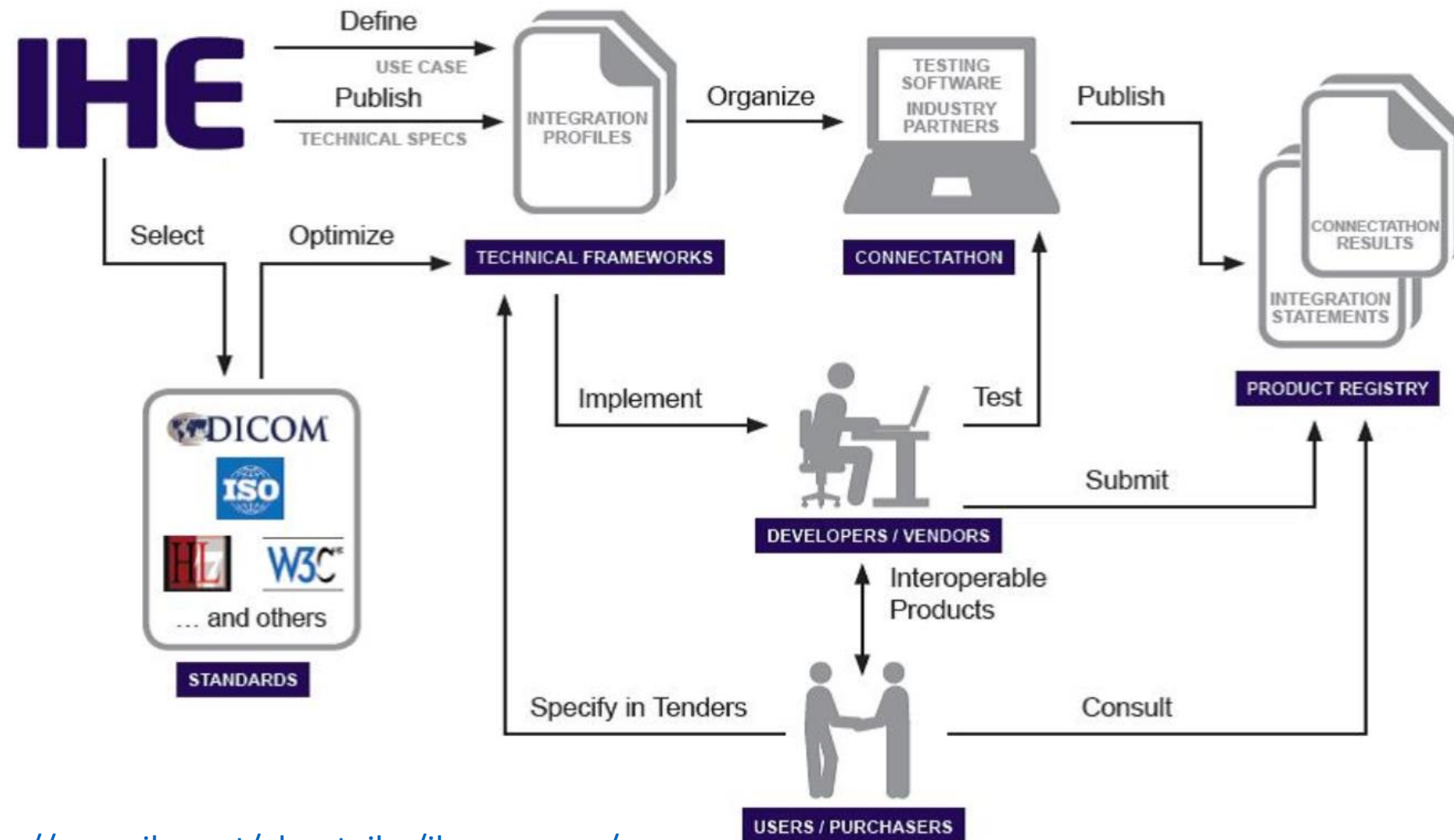
Why profiles?

As users and implementers agree how to use standards to address specific integration needs, optionality must be minimized, coordinated usage of multiple standards considered, and national / regional allowances factored

Isn't a well architected family of standards sufficient?

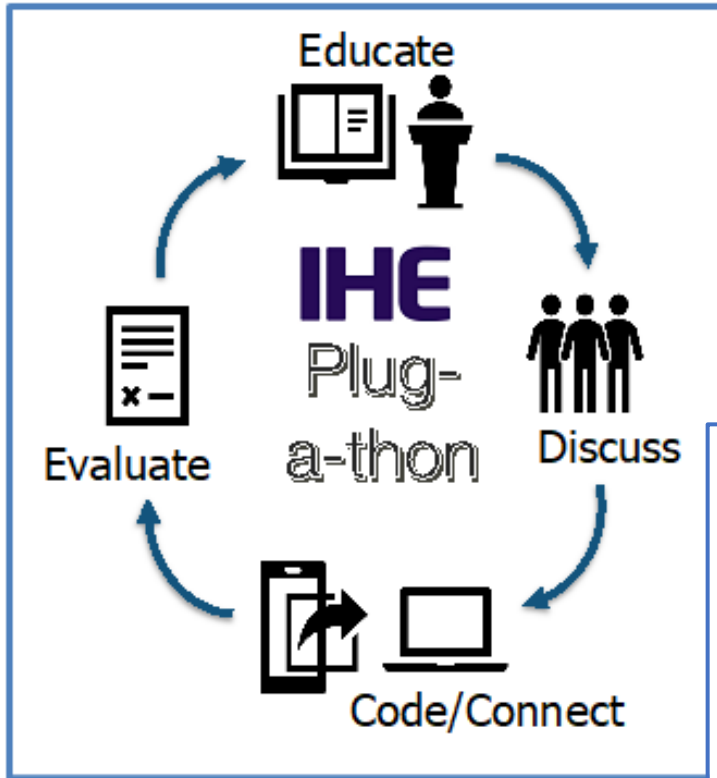
The needs of an implementation community are often both narrower than the set of possible applications that are covered by foundational / core standards, such as ISO/IEEE 11073 SDC, as well as broader in scope requiring additional standards to be integrated.

IHE Process Overview



Source: https://www.ihe.net/about_ihe/ihe_process/

IHE Plug-a-thon (PAT) Basics



IHE Testing Events – Pathway to CA & Certification!

IHE Plug-a-thons

- Rigor: Low
- Iterative testing process based on use cases
- Similar to Hackathon
- Standards and code in development
- Code will change on-site

IHE Connectionathons

- Rigor: Medium
- Structured, Peer-to-Peer testing
- Conformance
- Multiple standards
- Established standards
- Code might change on-site

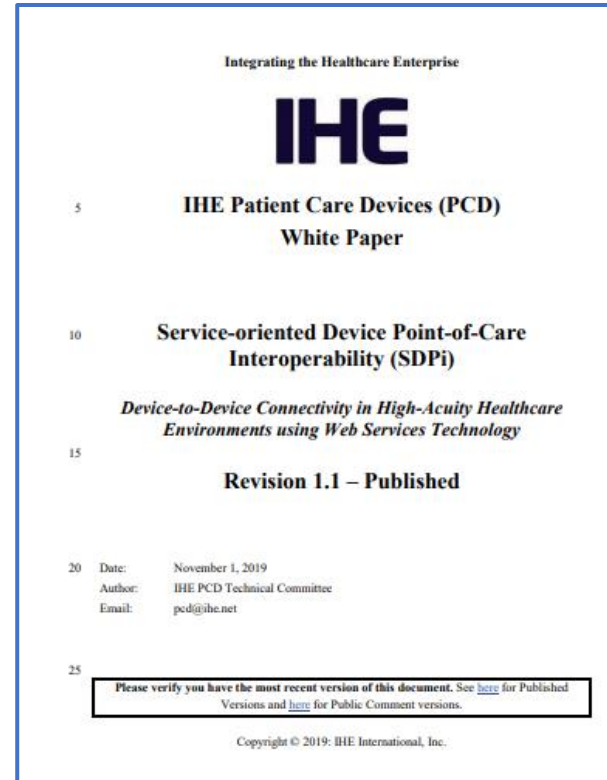
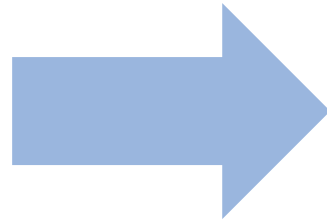
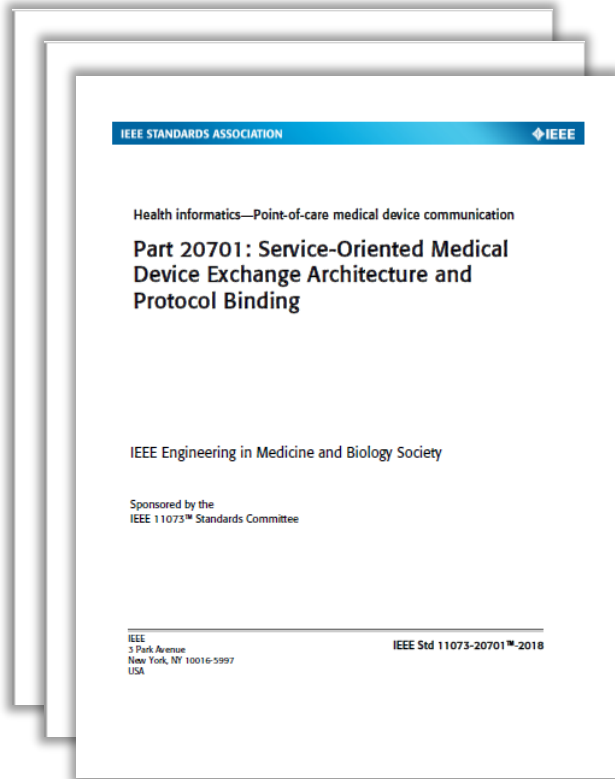
IHE Conformity Assessment

- Rigor: High
- Selected IHE Profiles in Final Text
- ISO accredited test labs
- Strict version controls of product & tools

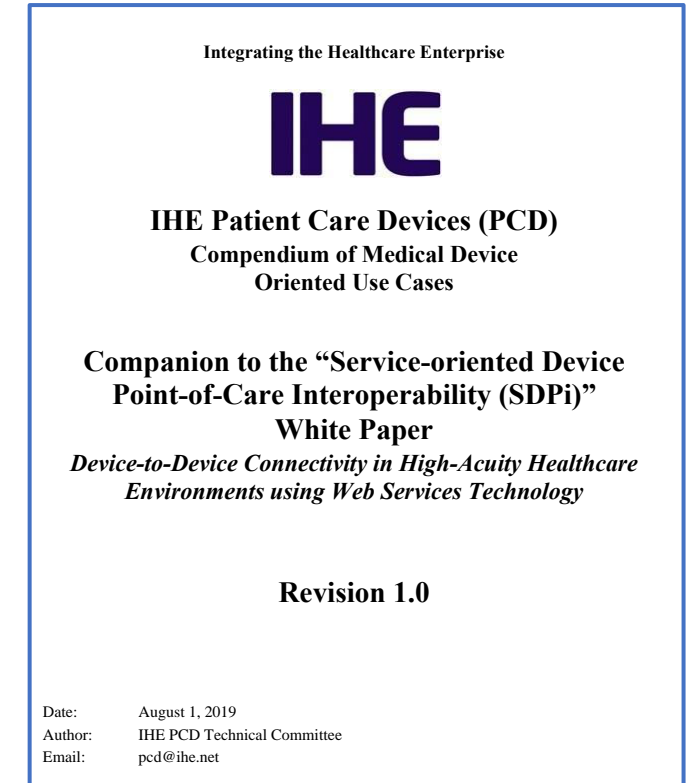
<Add a simple CAT overview slide / graphic>

- SDC / SDPi Distinctives ... SOA / DPI / PnT / SOMDA ...WS*
- Drives CA & Tooling challenges!

Orientation Tour: IHE TF & SDPi Profiles



https://www.ihe.net/uploadedFiles/Documents/PCD/IHE_PCD_WP_SDPI_Rv1-1_Pub_2019-11-01.pdf

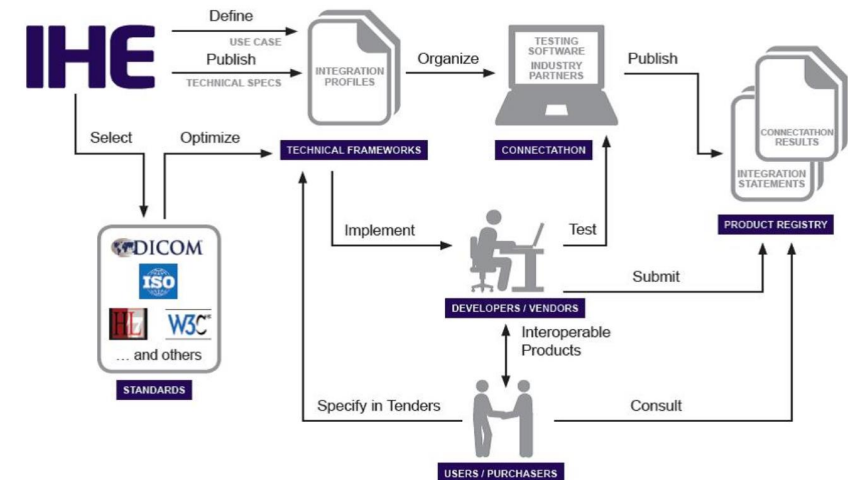


https://wiki.ihe.net/index.php/SDC@IHE_White_Paper

2019 SDPi paper established rationale and strategy for profiling ISO/IEEE 11073 SDC in IHE Technical Framework profile specifications.

<from Use Cases/Scenarios to Profiles to Test Scripts>

- Profiles constrained to test scripts (full circle – see IHE Process overview)
- Link to detail in SDPi profiles / supplement (from narrative to Gherkin)
- Drives profile requirement => test plan / test cases / scripts ...



Orientation Tour: IHE TF & SDPi Profiles

5 Structure of the IHE Technical Frameworks

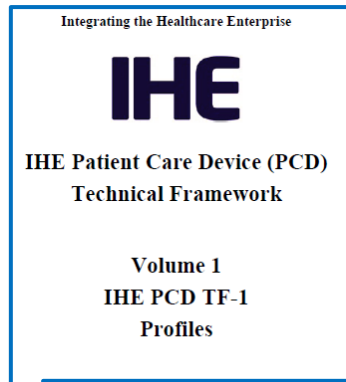
The IHE Technical Frameworks define specific use of established standards. They are updated annually and maintained regularly through the identification and correction of errata. The Technical Framework volumes are augmented by supplements and change proposal documents as described in [Section 8](#). The latest versions of Technical Framework documents are always available at [http://www.ihe.net/Technical Frameworks](http://www.ihe.net/Technical_Frameworks).

The Technical Framework for each domain consists of several volumes:

- Volume 1 provides high-level overviews of each profile, the use cases it addresses, the actors involved, and references to the Transactions and Content Modules used.
- Volume 2 provides detailed technical descriptions of each IHE Transaction.
- Volume 3 provides detailed technical descriptions of each IHE Content Module.
- Volume 4 describes National Extensions to the Technical Framework such as country-specific code sets or national patient privacy requirements.

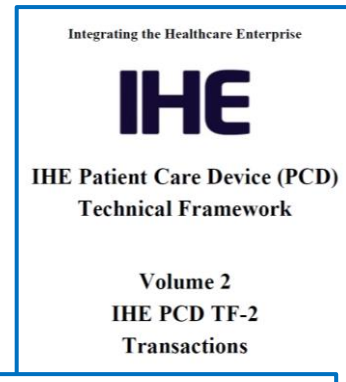
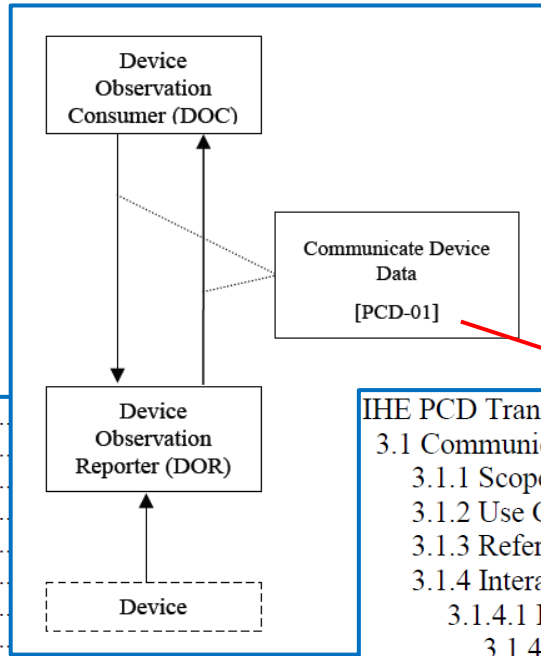
Source: https://www.ihe.net/uploadedFiles/Documents/Templates/IHE_TF_General_Introduction.pdf

Orientation Tour: Example – IHE DEC Profile



TF-1 Profile calls out TF-2 Transaction(s) – may add usage constraints

3 Device Enterprise Communication (DEC) Profile	
3.1 DEC Actors and Transactions	
3.1.1 Patient Demographics – Recommended Transactions	
3.2 DEC Profile Options	
3.3 DEC Overview	
3.3.1 Note on Patient Identification	
3.4 DEC Use Cases	
3.4.1 Standard Use Cases	
3.4.1.1 Case DEC-1: Communicate patient identified DEC data to EMR/EHR	16
3.4.1.2 Case DEC-2: Communicate validated periodic DEC data to EMR/EHR	16
3.4.2 Optional Use Cases for Automatic Patient Demographics Acquisition	17



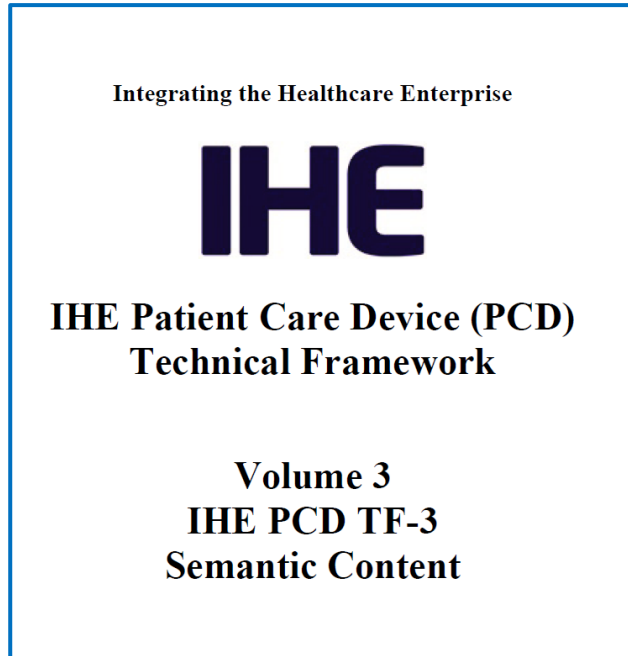
IHE PCD Transactions	12
3.1 Communicate PCD Data [PCD-01]	12
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3.1.2 Use Case Roles	12
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3.1.4.1.1 PCD-01 Communicate PCD Data (ORU^R01^ORU_R01) static definition	14
3.1.4.1.2 Trigger events	15
3.1.4.1.3 Message Semantics	16
3.1.4.1.4 Expected Actions	16
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TF-2 Common Transaction Message Elements are Specified Once in Appendices

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B.3 ERR – Error Segment	82
B.4 NTE - Notes and Comment Segment	84
B.5 PID - Patient Identification segment	86
B.5.1 PID Segment requirements for ACM Transaction PCD-04	93

NOTE: Only message profiling specifications included, relying on references to base message standards for all additional details.

Orientation Tour: Example – IHE DEC Profile



TF-3 Bindings only
generally referenced in
DEC profile & DEV-01
Transaction

General semantic
content profiling
specifications

Device Specializations –
Apply General to
Specific types

3	Overview of device semantic content profiling	10
3.1	General device content considerations.....	10
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3.1.2	Device semantics & controlled terminologies	12
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5	Reserved.....	26
6	Reserved.....	26
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7.1.2	Channel: Source.....	27
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7.2	Device: Ventilator.....	29
7.2.1	Containment tree.....	29
7.2.2	Channel: Ventilator.....	30
7.2.3	Channel: Airway Pressure	30
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7.3	Device: Physiologic Monitor	32
7.3.1	Containment tree.....	32

Orientation Tour: IHE TF & SDPi Profiles

Service-oriented Device Point-of-care Interoperability (SDPi)

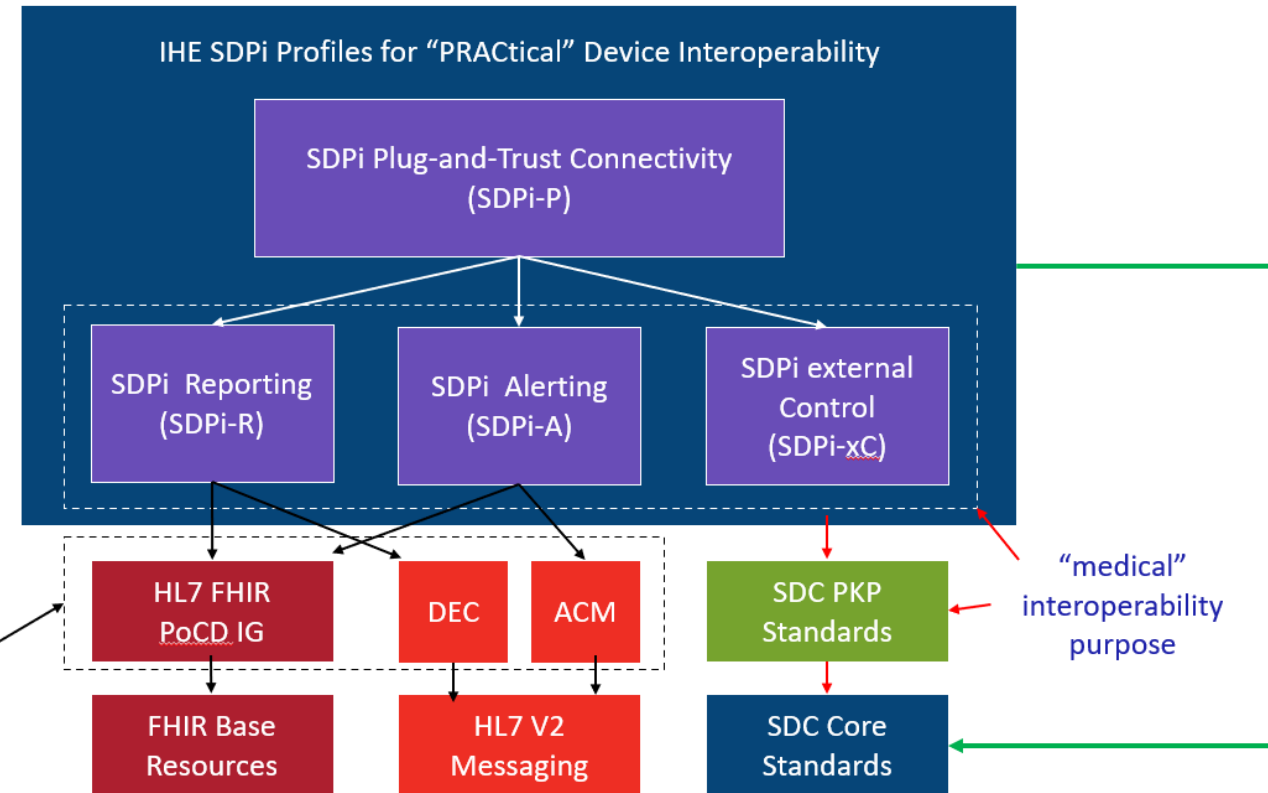
✓ Four profile specifications:

- SDPi-P for Plug-and-Trust Interoperability
- SDPi-R for Reporting Medical Information
- SDPi-A for Alerting
- SDPi-xC for External Controlling

✓ Three IHE DEV TF Volumes:

- TF-1 Profiles / use cases / actors / ...
- TF-2 Transactions / MDPWS messaging
- TF-3 BICEPS content modules / device specializations

IHE “Gateway”
Actors Defined



See draft SDPi Supplement Word Document for additional content detail & outline
(<https://github.com/IHE/sdpi-fhir/tree/master/SDPi%20%20Supplement/SDPi%20Rev%201.0>)

Orientation Tour: From Volume 1 to 2 to 3

SDPi TF Supplement Vol.1 Integration Profiles

SDPi-P Profile

Profile Actors & Transactions & Content Modules
Profile Actor Options
Profile Overview (Concepts & Use Cases)
SES Considerations

SDPi-Reporting Profile ...

SDPi-Alerting Profile ...

SDPi-xControl Profile ...

**M:N Profiles &
Transactions**

Appendix A: Requirements Management for Plug-n-Trust Interoperability

Appendix B: ISO/IEEE 11073 SDC Requirements Coverage

<including [ISO/IEEE 11073 SDC ICS tables](#)>

Appendix C: Device Point-of-care Interoperability Use Cases

<including [Gherkin detail & links to Compendium](#) etc.>

SDPi TF Supplement Vol.2 Transactions

DEV-23 Announce Network Presence

Scope
Actor Roles & **Referenced Standards**
Messages (*at BICEPS level w/ links to Appendix A*)
Protocol Requirements
SES Considerations

**MDPWS Message
Detail in Appendix**

DEV-24 Discover Network Participants

...

DEV-44 Invoke Medical Control Services

Appendix A: ISO/IEEE 11073 SDC / **MDPWS Message Specifications (Normative)**

SDC/BICEPS to SDC/MDPWS Message Specifications
Messages for BICEPS Discovery Model
<specific MDPWS message links>
<example exchanges & library calls>

See SDPi Supplement (1.0) document in the [IHE sdpi-fhir Github repository](#) for full details.

Orientation Tour: From Volume 1 to 2 to 3

SDPi TF Supplement Vol.1 Integration Profiles

SDPi-P Profile

- Profile Actors & Transactions & Content Modules
- Profile Actor Options
- Profile Overview (Concepts & Use Cases)
- SES Considerations

SDPi-Reporting Profile ...

SDPi TF Supplement Vol.2 Transactions

DEV-23 Announce Network Presence

- Scope
- Actor Roles & Referenced Standards
- Messages (*at BICEPS level w/ links to Appendix A*)
- Protocol Requirements
- SES Considerations

DEV-24 Discover Network Participants

...

SDPi TF Supplement Vol.3 Content Modules

DEV Semantic Content Modules

- General Device Content Considerations

...

SDC / BICEPS Semantic Content

DEV Specialization Content Modules

- Device: *Infusion Pump*

...

SDC / BICEPS Content Module

- Device: *Ventilator ...*

- Device: *Physiologic Monitor ...*

- Devices: *Surgery ... (new)*

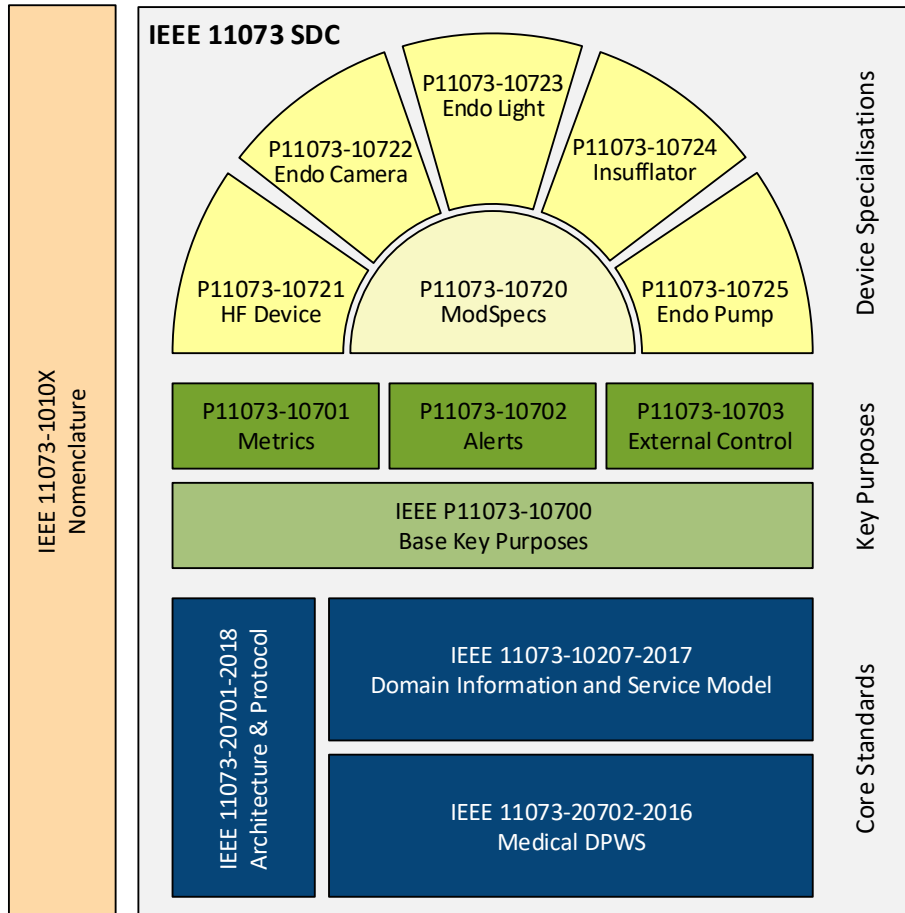
- Devices: *Anesthesia ... (new)*

- Devices: *Dialysis ... (new)*

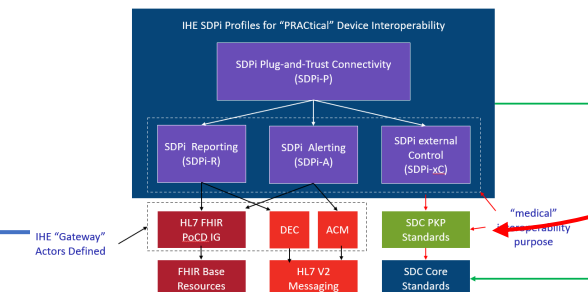
**Bindings –
General & Specific**

See SDPi Supplement (1.0) document in the [IHE sdpi-fhir Github repository](#) for full details.

Orientation Tour: From 11073 SDC to SDPi



- ✓ Initially, map to **TF-3 DEV Content Modules / Device Specializations**
 - ✓ Can include content **before** specializations published
 - ✓ Eventually, may inform IHE DEV Device-Specific Profiles
-
- ✓ Pre-publication, will reference in SDPi SES sections (TF-1, -2 & -3)
 - ✓ Post-publication, can fully integrate requirements into SDPi (incl. TF-1 Appendix B conformance)
 - ✓ NOTE: (4) profiles are aligned with these (4) key purposes
-
- ✓ SDC/BICEPS (-10207) Referenced in all (3) volumes (TF-1, -2 & -3)
 - ✓ SDC/SOMDA (-20701) Referenced in TF-1 & TF-2
 - ✓ SDC/MDPWS (-20702) Referenced primarily in TF-2 (esp. Apdx. A)



<add SES in SDPi TF slide here>

Orientation Tour: IHE Profile Actor Diagrams

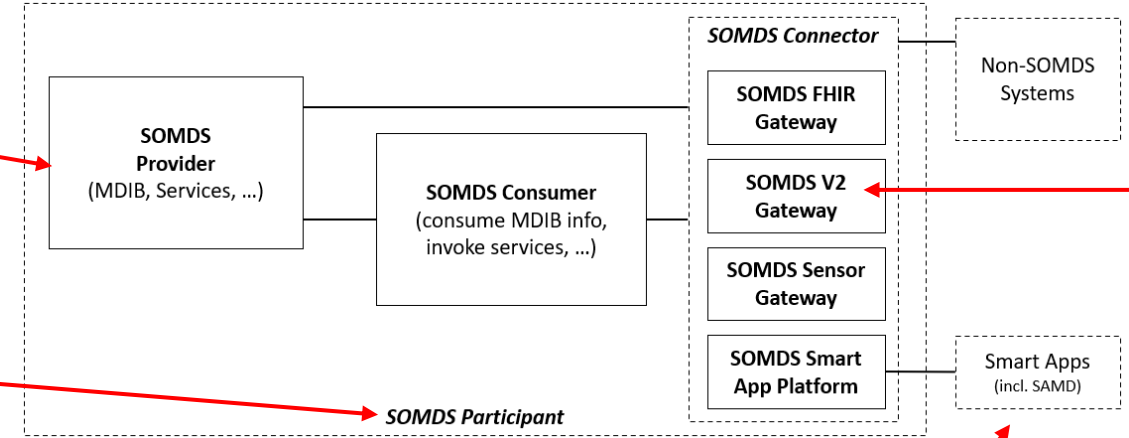
IHE Actor

“information systems or components of information systems that produce, manage, or act on health information”

IHE Abstract Actor

Specifies behavior that is shared across / inherited by a set of IHE Actors (*actor name in italics* & dotted line around concrete actors)

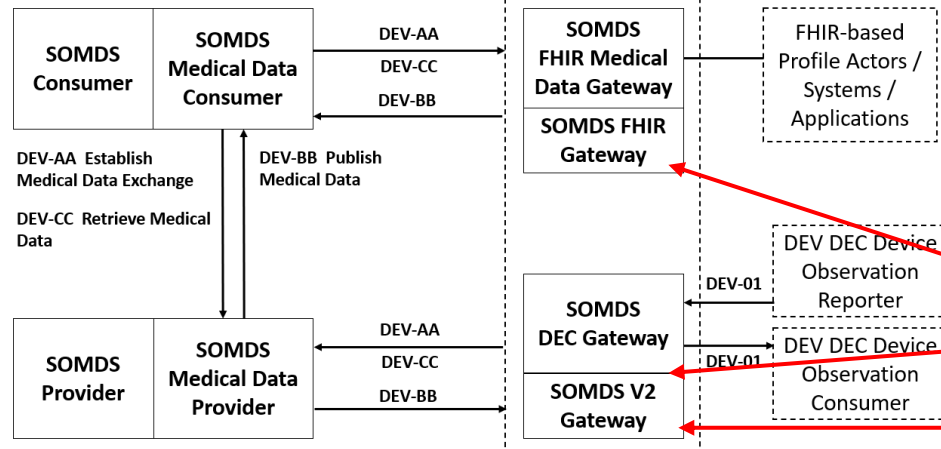
SDPi-P Actor Diagram



Profile “External” Actor

Indicates actors that are outside the scope of the profile but interact with profile actors (dotted box) Note: actor may be defined in other profiles

SDPi-A Actor Diagram

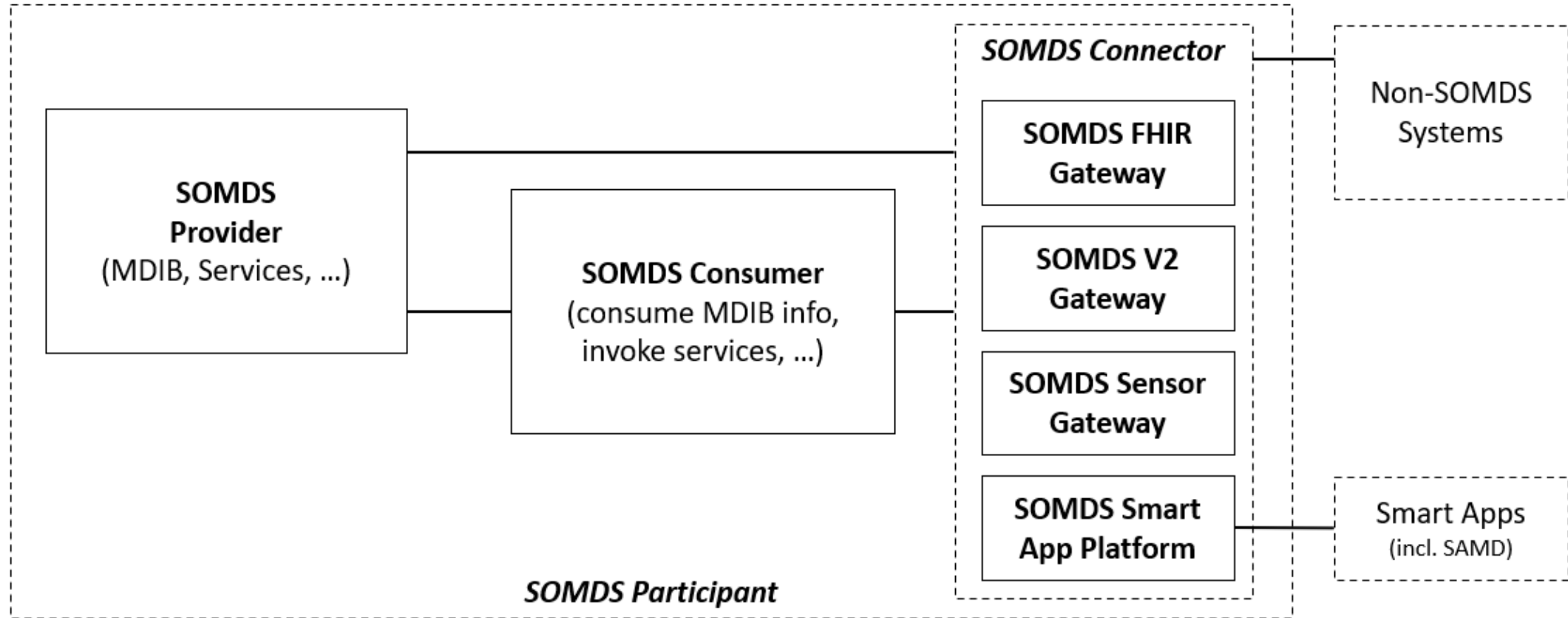


IHE Grouped Actor

Indicates actors that integrate with other actors to provide their functionality (two rectangles joined side-by-side)

Orientation Tour: SDPi-P (Plug-and-Trust)

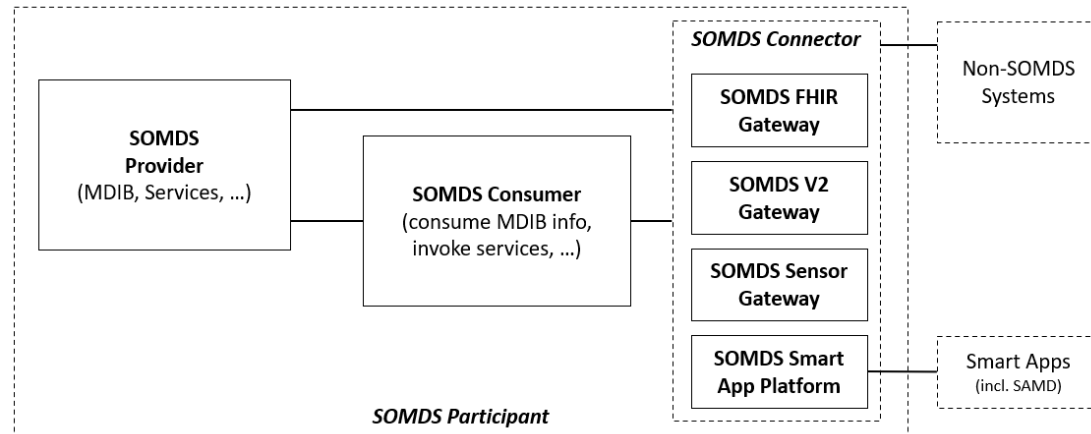
SDPi-P Actor Model



NOTE: **SOMDS Participant** actors may be devices, system applications, SAMD, “smart apps” ...

Orientation Tour: SDPi-P (Plug-and-Trust)

SDPi-P Actor Model



See SDPI Profile Option Specifications section for detail on each

SDPi-P Options (partial)

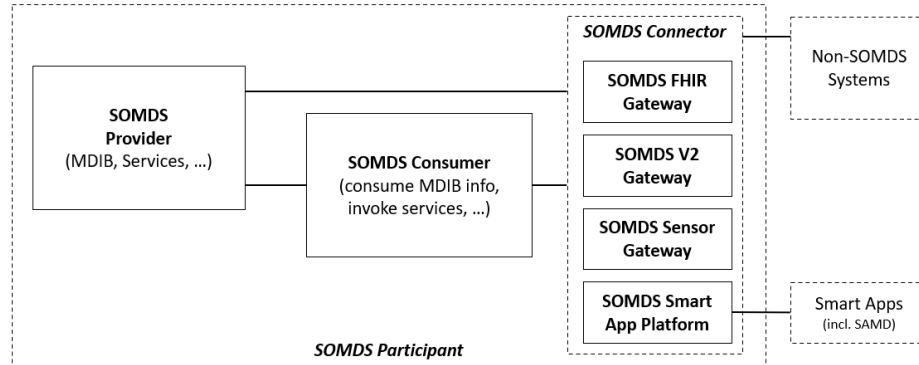
Table 10.2-1: SDPi-P – Actors and Options

Actor	Option Name	Reference
SOMDS Participant	No options defined	
SOMDS Provider (See Note 1)	Streaming Option [Editor's Note: Which can be waveform or other content; but is that in SDPi-R vs. here? And should we have a waveform option? What about SCO or polling mode type support options?]	DEV TF-1 10.2.1 Streaming Option
	Safe Data Transmission Option	DEV TF-1 10.2.2 Safe Data Transmission Option
	Compact Representation Option	DEV TF-1 10.2.3 Compact Representation Option
	Patient Context Management Option	DEV TF-1 10.2.4 Patient Context Management Option
	Archive Service Option	DEV TF-1 10.2.5 Archive Service Option
	Localization Service Option	DEV TF-1 10.2.6 Localization Service Option
	Ensemble Participation Option	DEV TF-1 10.2.7 Ensemble Participation Option
SOMDS Consumer (See Note 1)	Streaming Option	DEV TF-1 10.2.1 Streaming Option
	Safe Data Transmission Option	DEV TF-1 10.2.2 Safe Data Transmission Option
	Compact Representation Option	DEV TF-1 10.2.3 Compact Representation Option
	Patient Context Management Option	DEV TF-1 10.2.4 Patient Context Management Option

Current Proposed Options

Orientation Tour: SDPi-P (Plug-and-Trust)

SDPi-P Actor Model



SDPi-P Transactions

See SDPI Transaction Specifications section for detail on each

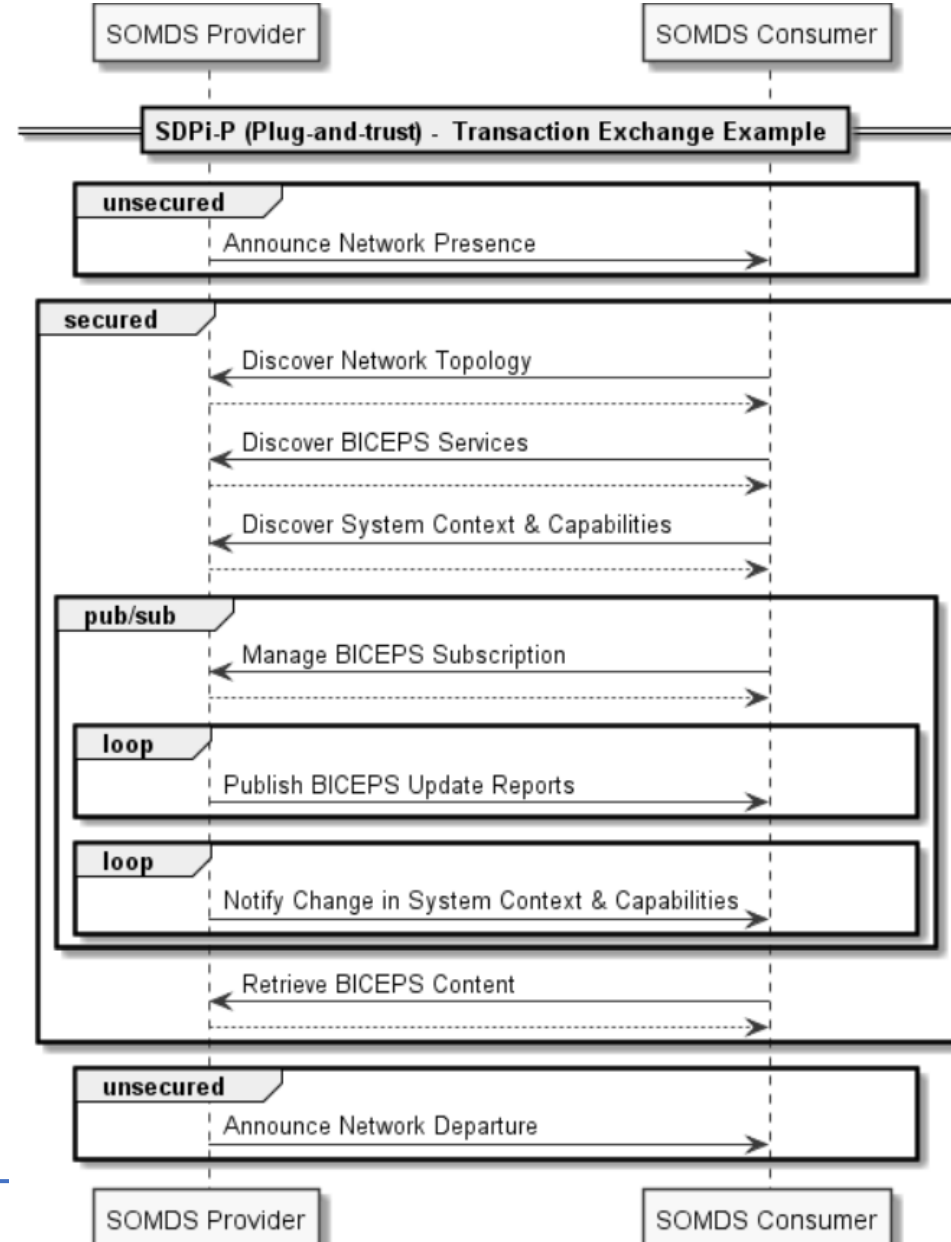
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Table 10.1-1: SDPi-P Profile - Actors and Transactions

Actors	Transactions	Initiator or Responder	Optionality	Reference
<i>SOMDS Participant</i>	[Editor's Note: TBD specific transactions / abstract actor!]			DEV TF-2:3.xvz
SOMDS Provider	Announce Network Presence	Initiator	R	DEV TF-2:3.23
	Discover Network Topology	Responder	R	DEV TF-2:3.24
	Discover BICEPS Services	Responder	R	DEV TF-2:3.25
	Discover System Context and Capabilities	Responder	R	DEV TF-2:3.26
	Manage BICEPS Subscription	Responder	R	DEV TF-2:3.27
	Notify Change in System Context and Capabilities	Initiator	O (See Note 1)	DEV TF-2:3.28
	Publish BICEPS Update Reports	Initiator	R	DEV TF-2:3.29
	Retrieve BICEPS Content	Responder	O	DEV TF-2:3.30
	Set Provider State	Responder	O	DEV TF-2:3.31
	Retrieve Archive Data	Responder	O	DEV TF-2:3.32
	Retrieve Localization Information	Responder	O	DEV TF-2:3.33
	Announce Network Departure	Initiator	R	DEV TF-2:3.34
SOMDS Consumer	Announce Network Presence	Consumer	O	DEV TF-2:3.23
	Discover Network Topology	Initiator	R	DEV TF-2:3.24
	Discover BICEPS Services	Initiator	R	DEV TF-2:3.25

Orientation Tour: SDPi-P (Plug-and-Trust)

Example of an SDPi-P transaction exchange ...



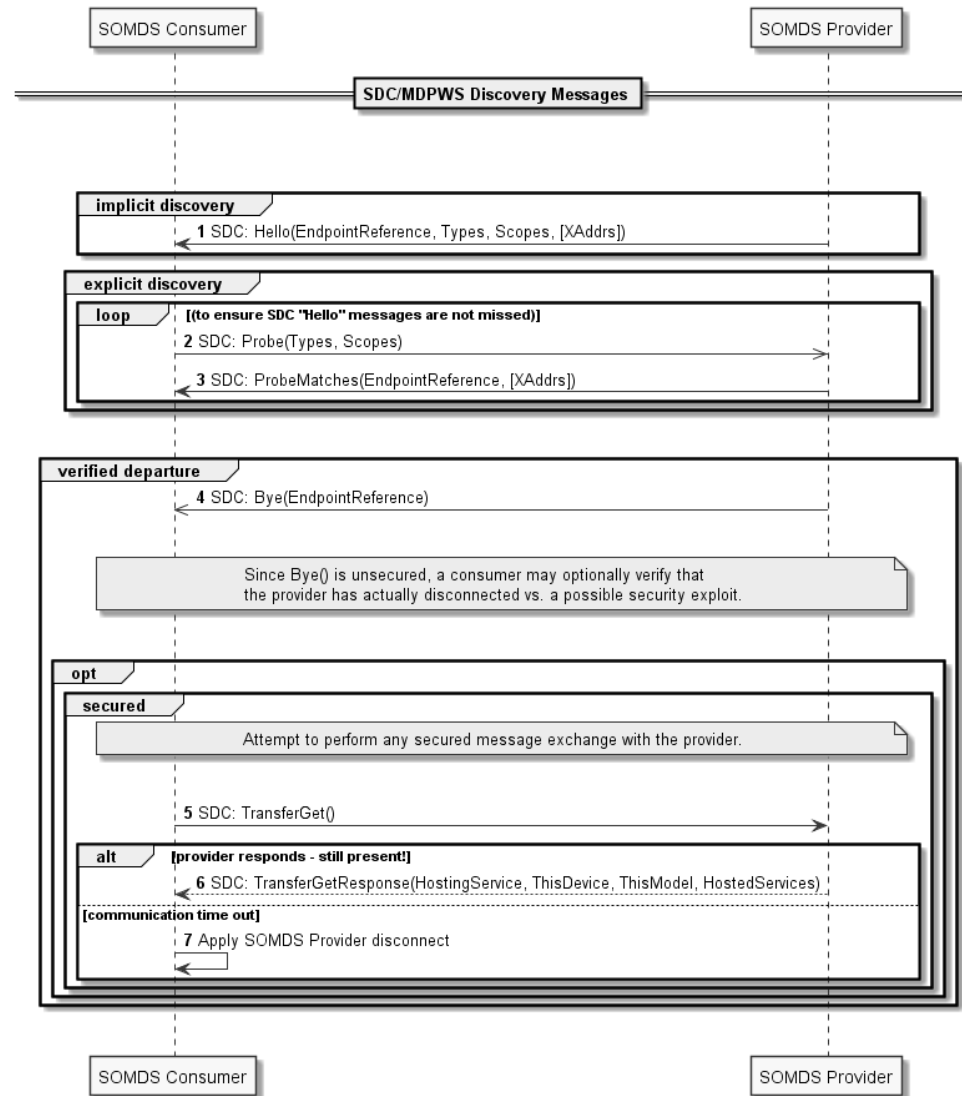
NOTE: Definition of “BICEPS” abstraction level for SDPi transactions.

For a full set of profile-specific MDPWS sequence exchanges, see:

<https://confluence.hl7.org/display/GP/SDPi+Technical+Framework+Models>

Orientation Tour: SDPi-P (Plug-and-Trust)

Example of an SDPi-P transaction MDPWS sequence

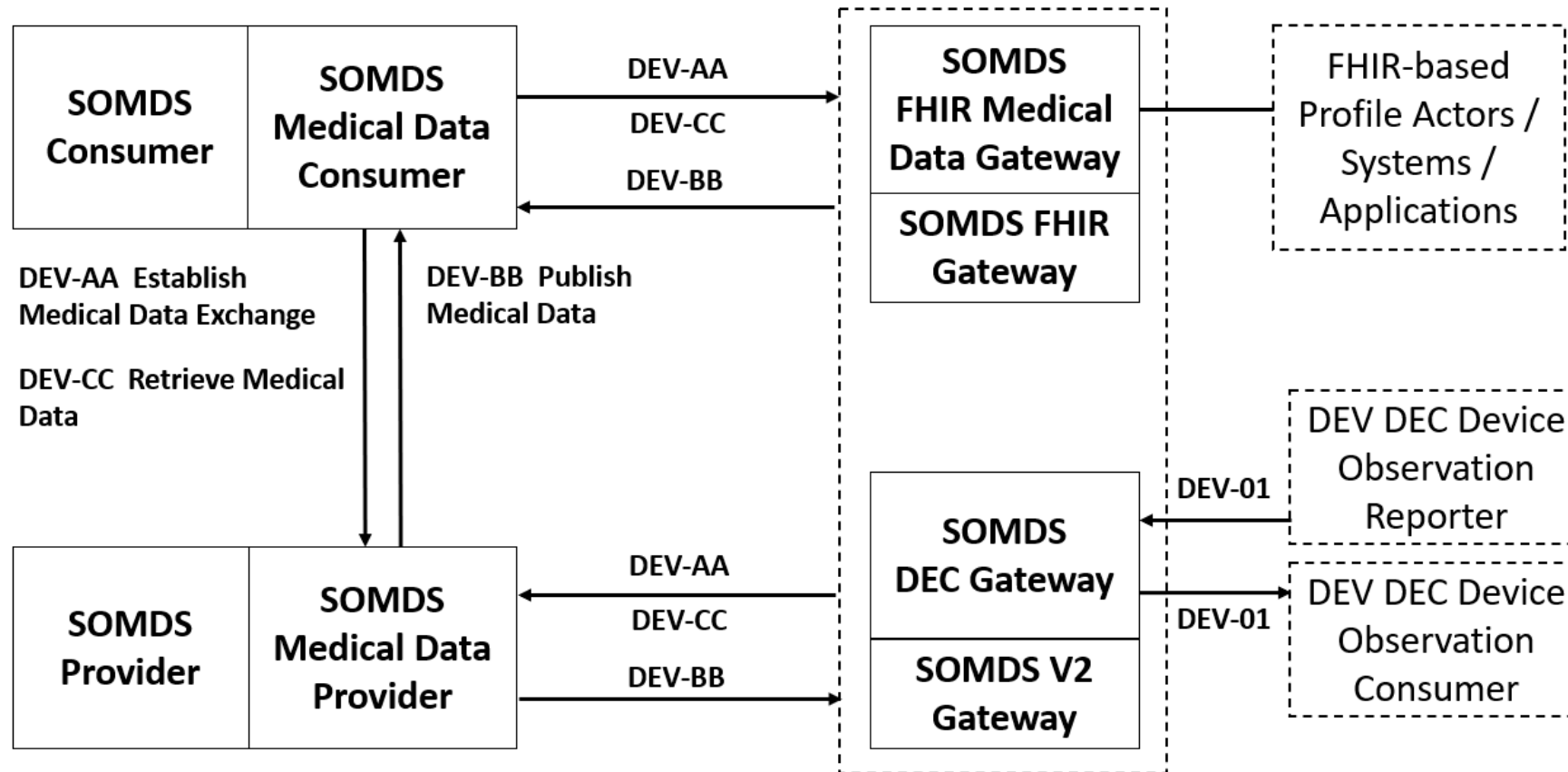


For a full set of profile-specific MDPWS sequence exchanges, see:

<https://confluence.hl7.org/display/GP/SDPi+Technical+Framework+Models>

Orientation Tour: SDPi-R (Reporting)

SDPi-R Actor Model

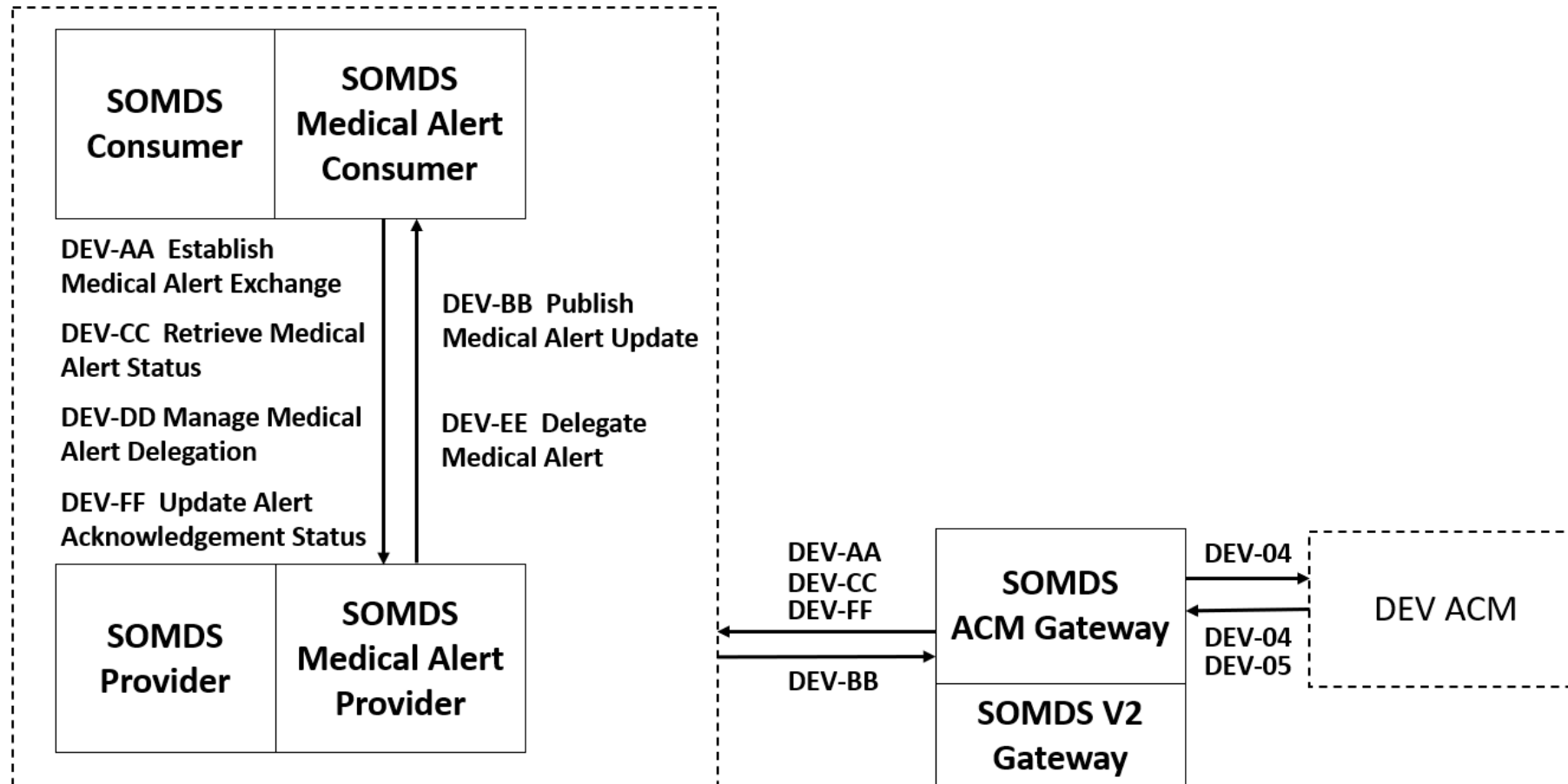


NOTE: Transactions are drawn to the dotted box around the gateways, indicating that they can be either Provider and / or Consumer SDPi-R actors

See SDPI Transaction Specifications section for detail on each

Orientation Tour: SDPi-A (Alerting)

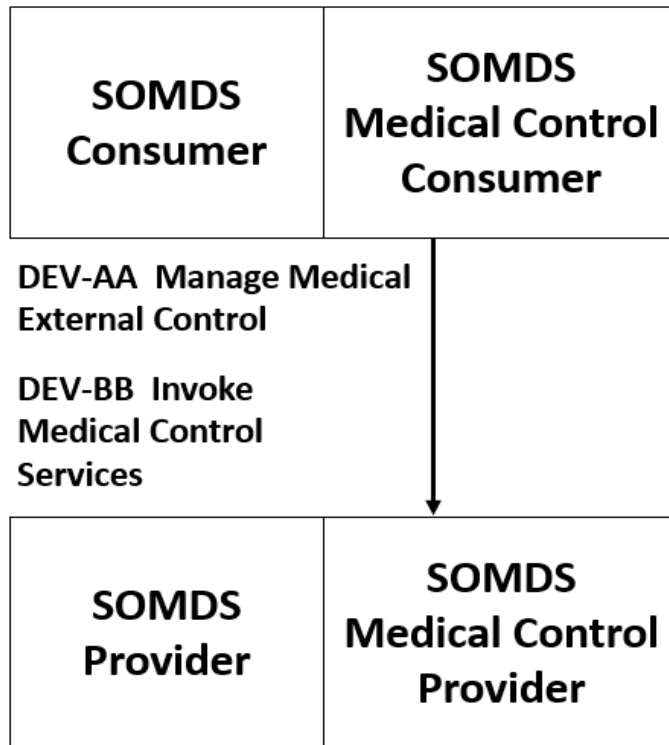
SDPi-A Actor Model



See SDPI Transaction Specifications section for detail on each

Orientation Tour: SDPi-xC (External Control)

SDPi-xC Actor Model



See SDPI Transaction
Specifications section for
detail on each

SDPi-P Option Specifications

SDPi-P Options: Streaming

2020.11.04

1. Secured waveforms in 1.0 (default) ... MDPWS out-of-the-box;
2. Consider unsecured UDP streaming for 1.x (upon request only)
3. OR as an alternative transport HTTP/2 gRPC in 1.x
4. ADD UML version of [THIS SDPi-R](#) & add to Appendix A Waveform Service section

Define related:

- transactions,
 - MDPWS sequences,
 - SOMDA Constraints,
 - Content Module Bindings
 - SDPi 1.0 or subsequent?
 - ...
- Transactions are the same as for SDPi-R -> only transport layer is different!
 - Out of scope for SDPi 1.0 – securing the waveform channel is extra-challenging; adds unnessecary complexity with questionable performance benefit

Table 10.2-1: SDPi-P – Actors and Options

Actor	Option Name	Reference
SOMDS Participant	No options defined	
SOMDS Provider (See Note 1)	Streaming Option [Editor's Note: Which can be waveform or other content; but is that in SDPi-R vs. here? And should we have a waveform option? What about SCO or polling mode type support options?]	DEV TF-1 10.2.1 Streaming Option
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SOMDS Consumer (See Note 1)	Streaming Option	DEV TF-1 10.2.1 Streaming Option
	Safe Data Transmission Option	DEV TF-1 10.2.2 Safe Data Transmission Option
	Compact Representation Option	DEV TF-1 10.2.3 Compact Representation Option
	Patient Context Management Option	DEV TF-1 10.2.4 Patient Context Management Option

SDPi-P Options: Safe Data Transmission

2020.11.04

1. Message Payload is the only difference ... & relies on XML;
2. @ gRPC – is fundamentally different & challenges (e.g., not using xpath)
3. Wait for -10703 for specific value proposition (incremental over baseline) +
4. May use this or alternative to current MDPWS (ambiguity)

Define related:

- transactions,
 - MDPWS sequences,
 - SOMDA Constraints,
 - Content Module Bindings
 - SDPi 1.0 or subsequent?
 - ...
- Transactions are the same except for the message payload
 - Out of scope for SDPi 1.0 unless a party claims need – safe data transmission is conceptually fuzzy and brittle. Would require very specific profiling

Table 10.2-1: SDPi-P – Actors and Options

Actor	Option Name	Reference
SOMDS Participant	No options defined	
SOMDS Provider (See Note 1)	Streaming Option [Editor's Note: Which can be waveform or other content; but is that in SDPi-R vs. here? And should we have a waveform option? What about SCO or polling mode type support options?]	DEV TF-1 10.2.1 Streaming Option
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	Compact Representation Option	DEV TF-1 10.2.3 Compact Representation Option
	Patient Context Management Option	DEV TF-1 10.2.4 Patient Context Management Option

SDPi-P Options: Compact Representation

2020.11.04

1. EXI is a “beast” of a spec; SDC libraries do not support – little market support either
2. HTTP/2 + gRPC would address out of the box
3. HTTP/1.1 ... good enough , but ...gzip for example FOR SDPi 1.0 for every transaction w/ option; in every transaction section
4. NOTE: Sequence of serialization & compression of message content varies per approach
5. NOTE: A key application need is for performance at scale – e.g., streaming 100’s of beds with 12 lead per bed
6. Consider whole SOMDS running in “compressed” mode
7. Add note to MDPWS Appendix A + as TBD @ EXI use; call out the HTTP/1.1 approach

Define related:

- transactions,
 - MDPWS sequences,
 - SOMDA Constraints,
 - Content Module Bindings
 - SDPi 1.0 or subsequent?
 - ...
- Transactions are the same except for the message serialization
 - There are no serious EXI implementations on the market; SDPi should recommend/require use of HTTP compression; which is not optimal but widely adopted

Table 10.2-1: SDPi-P – Actors and Options

Actor	Option Name	Reference
SOMDS Participant	No options defined	
SOMDS Provider (See Note 1)	Streaming Option [Editor's Note: Which can be waveform or other content; but is that in SDPi-R vs. here? And should we have a waveform option? What about SCO or polling mode type support options?]	DEV TF-1 10.2.1 Streaming Option
	Safe Data Transmission Option	DEV TF-1 10.2.2 Safe Data Transmission Option
	Compact Representation Option	DEV TF-1 10.2.3 Compact Representation Option
	Patient Context Management Option	DEV TF-1 10.2.4 Patient Context Management Option
	Archive Service Option	DEV TF-1 10.2.5 Archive Service Option
	Localization Service Option	DEV TF-1 10.2.6 Localization Service Option
	Ensemble Participation Option	DEV TF-1 10.2.7 Ensemble Participation Option
SOMDS Consumer (See Note 1)	Streaming Option	DEV TF-1 10.2.1 Streaming Option
	Safe Data Transmission Option	DEV TF-1 10.2.2 Safe Data Transmission Option
	Compact Representation Option	DEV TF-1 10.2.3 Compact Representation Option
	Patient Context Management Option	DEV TF-1 10.2.4 Patient Context Management Option

SDPi-P Options: Patient Context Management

2020.11.04

1. Defer (?) to SDPi 1.x – what is needed NOW vs. when connecting to enterprise applications
2. MUST do something in 1.0 to ensure safety of all exchanges – IOW what is IN this option vs. must be supported by the base SDPi-x profiles? In SDPi-P vs. -R / -A / -xC require it
3. What use cases NOW will rely on this? A Patient-Device Association Management Source of Truth within a System of Products / SOMDS implementation
4. What will be baked into the related PKP standards? – the preconditions are baked into the PKP, not how you can make sure the data is the needed Quality (e.g., reliability)

Define related:

- transactions,
 - MDPWS sequences,
 - SOMDA Constraints,
 - Content Module Bindings
 - SDPi 1.0 or subsequent?
 - ...
- I guess I need more *context* here (hihi). Let's talk about that on Wednesday

Table 10.2-1: SDPi-P – Actors and Options

Actor	Option Name	Reference
SOMDS Participant	No options defined	
SOMDS Provider (See Note 1)	Streaming Option [Editor's Note: Which can be waveform or other content; but is that in SDPi-R vs. here? And should we have a waveform option? What about SCO or polling mode type support options?]	DEV TF-1 10.2.1 Streaming Option
	Safe Data Transmission Option	DEV TF-1 10.2.2 Safe Data Transmission Option
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	Ensemble Participation Option	DEV TF-1 10.2.7 Ensemble Participation Option
SOMDS Consumer (See Note 1)	Streaming Option	DEV TF-1 10.2.1 Streaming Option
	Safe Data Transmission Option	DEV TF-1 10.2.2 Safe Data Transmission Option
	Compact Representation Option	DEV TF-1 10.2.3 Compact Representation Option
	Patient Context Management Option	DEV TF-1 10.2.4 Patient Context Management Option

SDPi-P Options: Archive Service

2020.11.04

1. No real experience / use case that drives the message exchanges ...
2. Therefore, no way to VALIDATE that what is supported is sufficient
3. Supports 5-10 minutes / **off-line period** for “backfilling” ... network connection loss only – no Provider restart etc.
4. Not 100+ hours of full disclosure ... this would require a different persistence layer & ...
5. Relationship with (MDIRA/ICE) DataLogger Actor specification?
6. SDPi 1.0 will be narrow Provider off-line backfilling & SDPi 1.x / MDIRA for Full-Disclosure of a forensics data logging capability TBD

Define related:

- transactions,
 - MDPWS sequences,
 - SOMDA Constraints,
 - Content Module Bindings
 - SDPi 1.0 or subsequent?
 - ...
- I can prepare best-practice sequences;
nevertheless the Archive Service as specified in
BICEPS does not cover all variations of archival
access – backfilling yes, full closure no

Table 10.2-1: SDPi-P – Actors and Options

Actor	Option Name	Reference
SOMDS Participant	No options defined	
SOMDS Provider (See Note 1)	Streaming Option <i>[Editor's Note: Which can be waveform or other content; but is that in SDPi-R vs. here? And should we have a waveform option? What about SCO or polling mode type support options?]</i>	DEV TF-1 10.2.1 Streaming Option
	Safe Data Transmission Option	DEV TF-1 10.2.2 Safe Data Transmission Option
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SOMDS Consumer (See Note 1)	Streaming Option	DEV TF-1 10.2.1 Streaming Option
	Safe Data Transmission Option	DEV TF-1 10.2.2 Safe Data Transmission Option
	Compact Representation Option	DEV TF-1 10.2.3 Compact Representation Option
	Patient Context Management Option	DEV TF-1 10.2.4 Patient Context Management Option

SDPi-P Options: Localization Service

Define related:

- transactions,
- MDPWS sequences,
- SOMDA Constraints,
- Content Module Bindings
- SDPi 1.0 or subsequent?
- ...

- I can prepare best-practice sequences by inspecting our productive implementation

2020.11.04

1. Change option name to Language Service
2. Use in SDPi 1.0
3. NOTE: different from LocationContext support
4. Example message content is the interesting part!

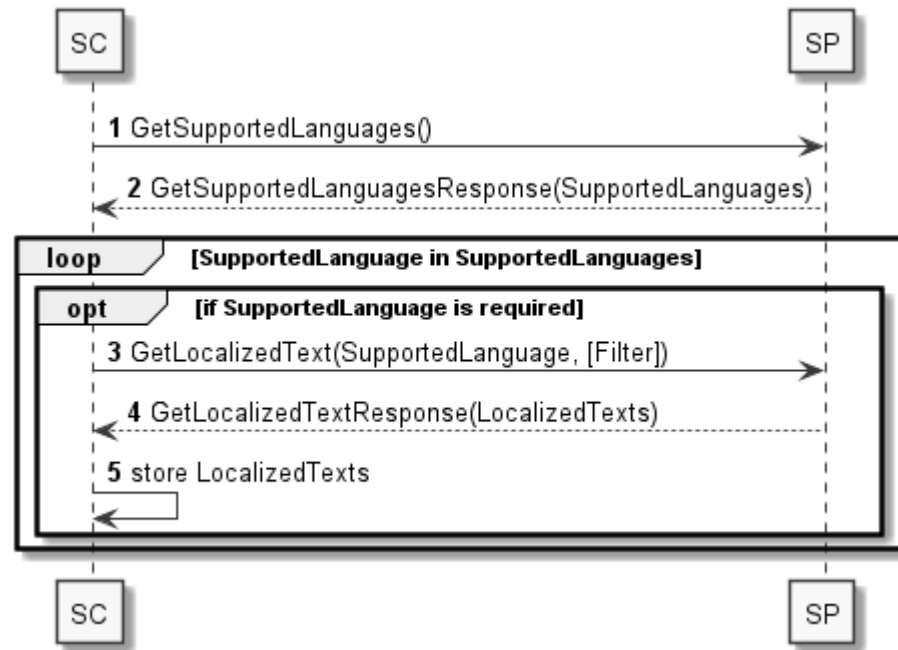


Table 10.2-1: SDPi-P – Actors and Options

Actor	Option Name	Reference
SOMDS Participant	No options defined	
SOMDS Provider (See Note 1)	Streaming Option [Editor's Note: Which can be waveform or other content; but is that in SDPi-R vs. here? And should we have a waveform option? What about SCO or polling mode type support options?]	DEV TF-1 10.2.1 Streaming Option
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	Ensemble Participation Option	DEV TF-1 10.2.7 Ensemble Participation Option
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	Safe Data Transmission Option	DEV TF-1 10.2.2 Safe Data Transmission Option
	Compact Representation Option	DEV TF-1 10.2.3 Compact Representation Option
	Patient Context Management Option	DEV TF-1 10.2.4 Patient Context Management Option

SDPi-P Options: Ensemble Participation

2020.11.04

1. Need to establish INITIAL base use cases for SDPi 1.0 ...
2. This is closely related to the SFC definition / management
3. Identify basic use of SystemContext objects for this use
4. Basic “fixed” workplace ... establish base sequence / approach w/ constraints
5. NOTE: SES & clinical workflow / personnel “understanding” is key
6. TBD use of mobile devices or multi-patient (spot check) devices, etc.
7. Related to Patient-Device Association (Patient Context) Option
8. Advanced could factor in:
 - Mobile devices
 - Patient centric devices (e.g., blood gas measurement or telemetry)
 - CLC actors
 - ...

Define related:

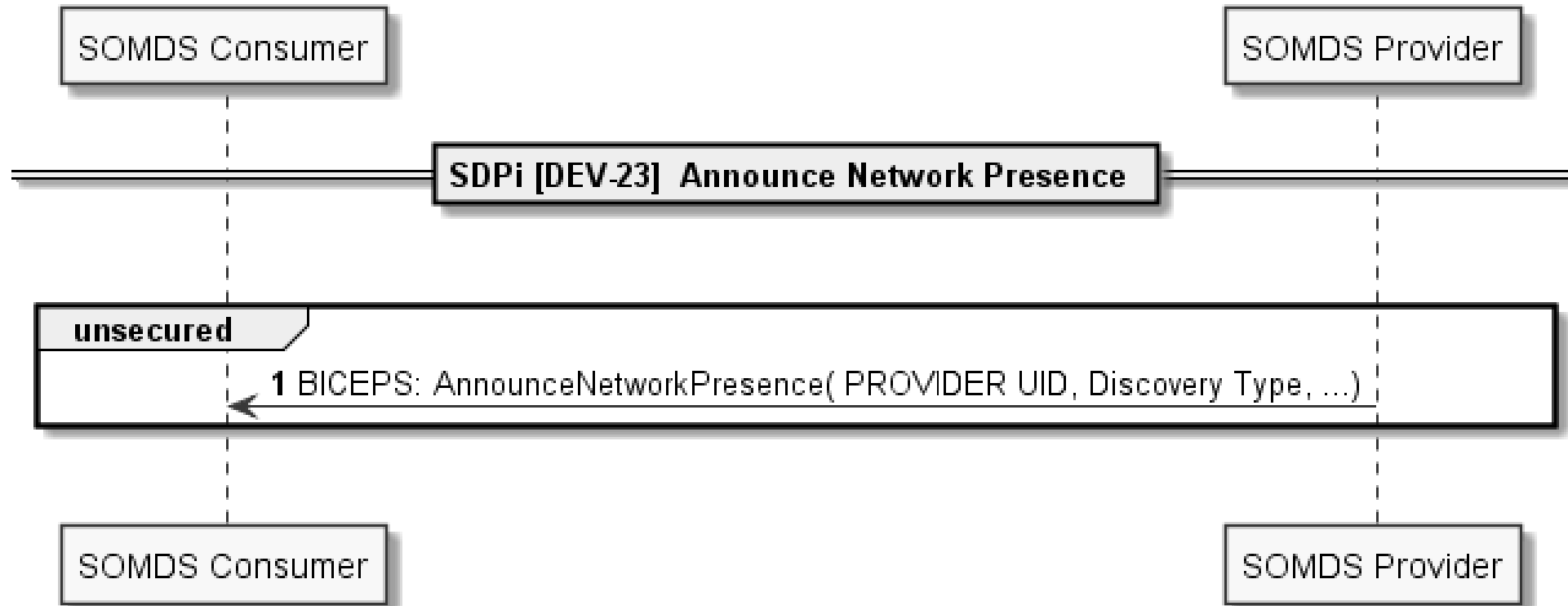
- transactions,
 - MDPWS sequences,
 - SOMDA Constraints,
 - Content Module Bindings
 - SDPi 1.0 or subsequent?
 - ...
- This is a hard nut to crack – we’ll have general rules in PKP, but the magic happens beyond that ruleset.
 - We don’t have any experiences right now, just some learnings from Dräger’s CAP leveraging the location context... much room for development here

Table 10.2-1: SDPi-P – Actors and Options

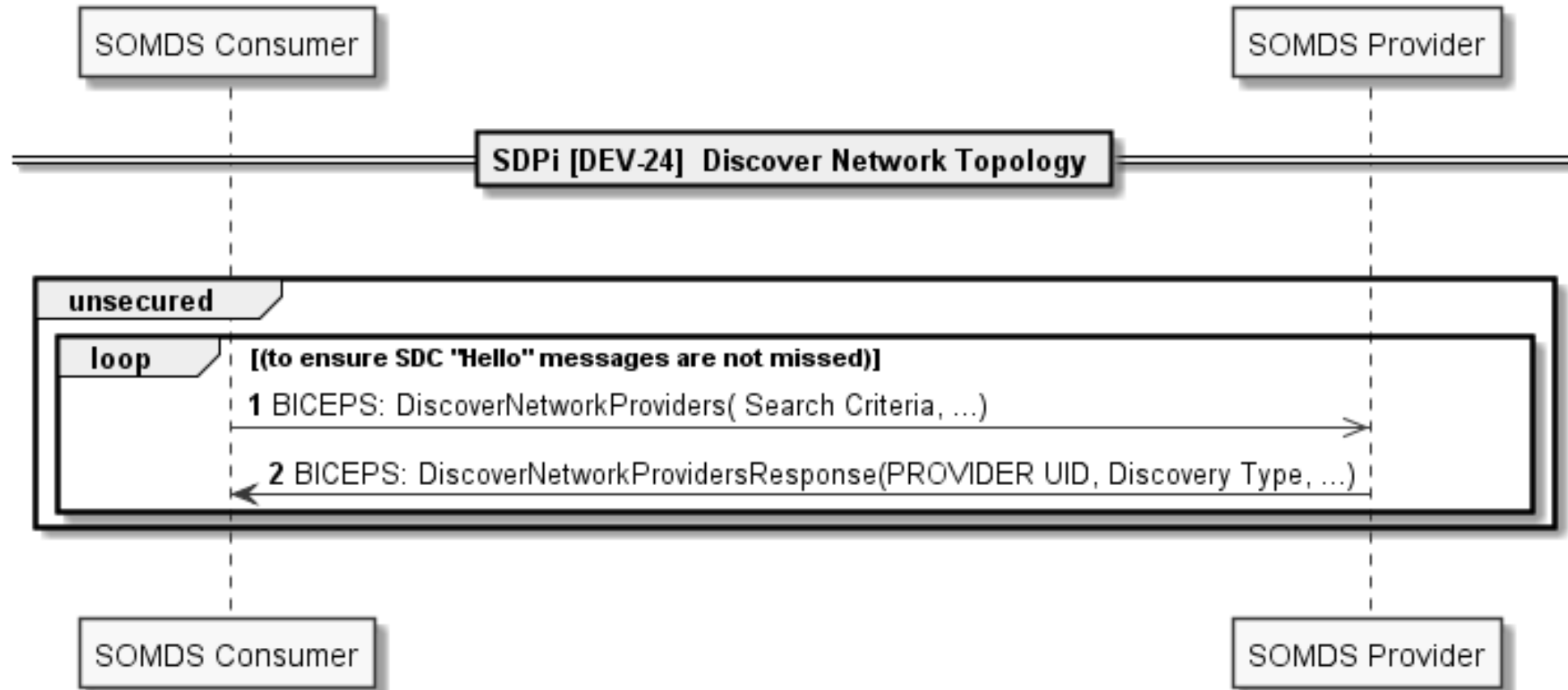
Actor	Option Name	Reference
SOMDS Participant	No options defined	
SOMDS Provider (See Note 1)	Streaming Option [Editor’s Note: Which can be waveform or other content; but is that in SDPi-R vs. here? And should we have a waveform option? What about SCO or polling mode type support options?]	DEV TF-1 10.2.1 Streaming Option
	Safe Data Transmission Option	DEV TF-1 10.2.2 Safe Data Transmission Option
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	Compact Representation Option	DEV TF-1 10.2.3 Compact Representation Option
	Patient Context Management Option	DEV TF-1 10.2.4 Patient Context Management Option

SDPi TF-2 Transactions & MDPWS Messaging

SDPi TF-2: DEV-23



SDPi TF-2: DEV-24

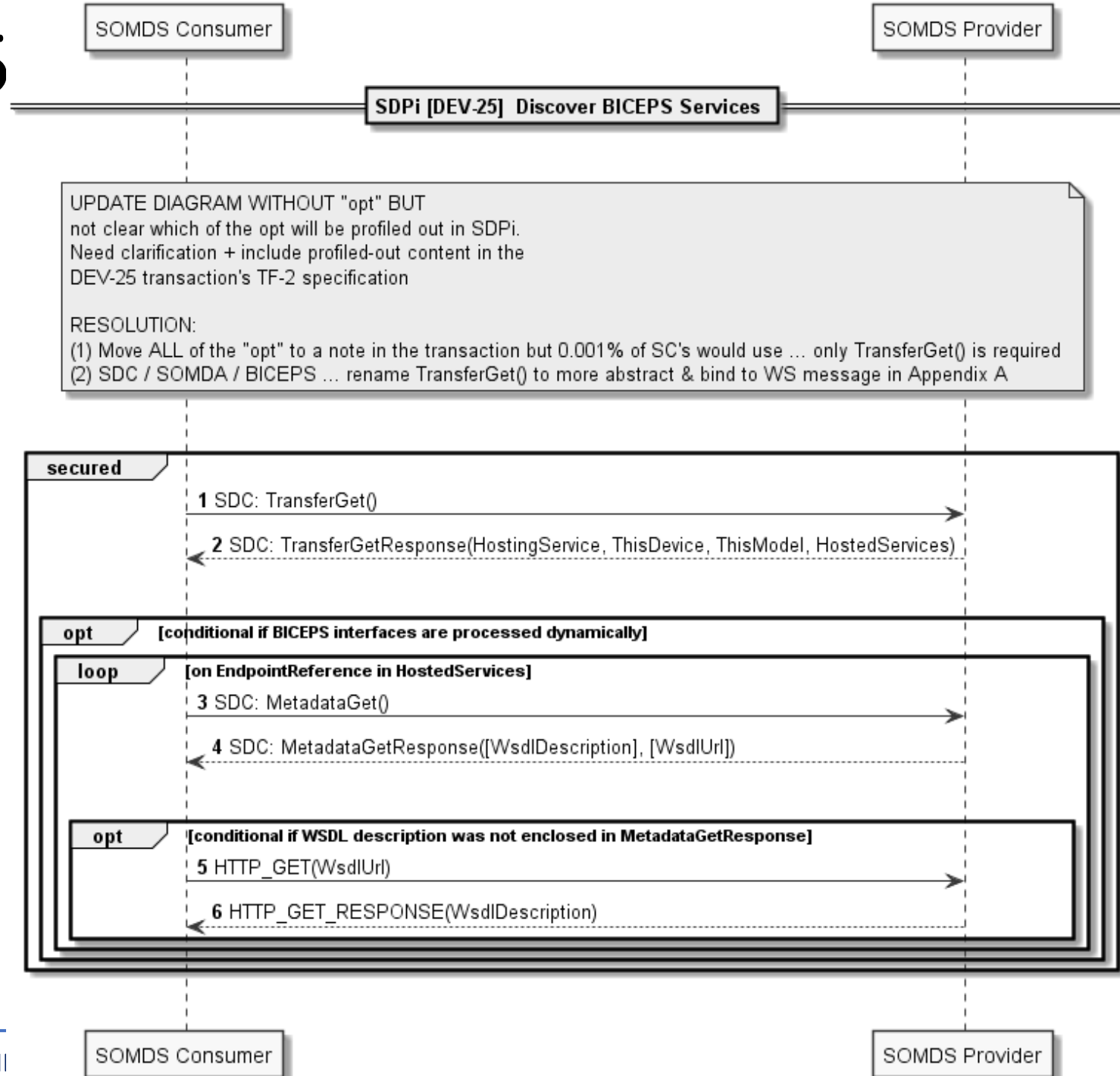


SDPi TF-2: DEV-25

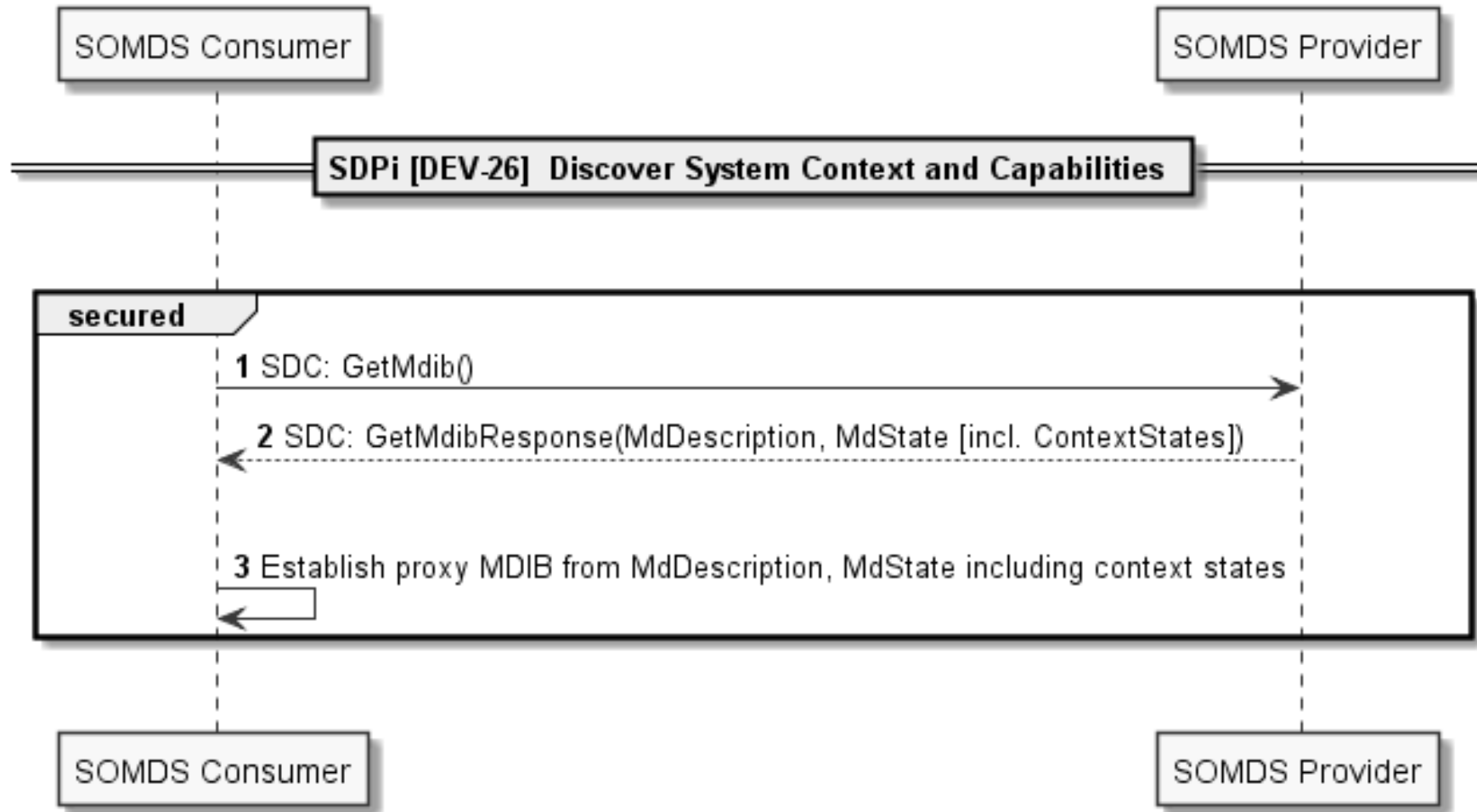
- Both opts are unnecessary if the BICEPS interface is known a-priori – which it is partially → we might need some additional profiling to unambiguously determining BICEPS service actions. I'll double-check that
- Only highly dynamic implementations would require to resolve hosted services and WSDLs – unlikely for medical devices

2020.11.04

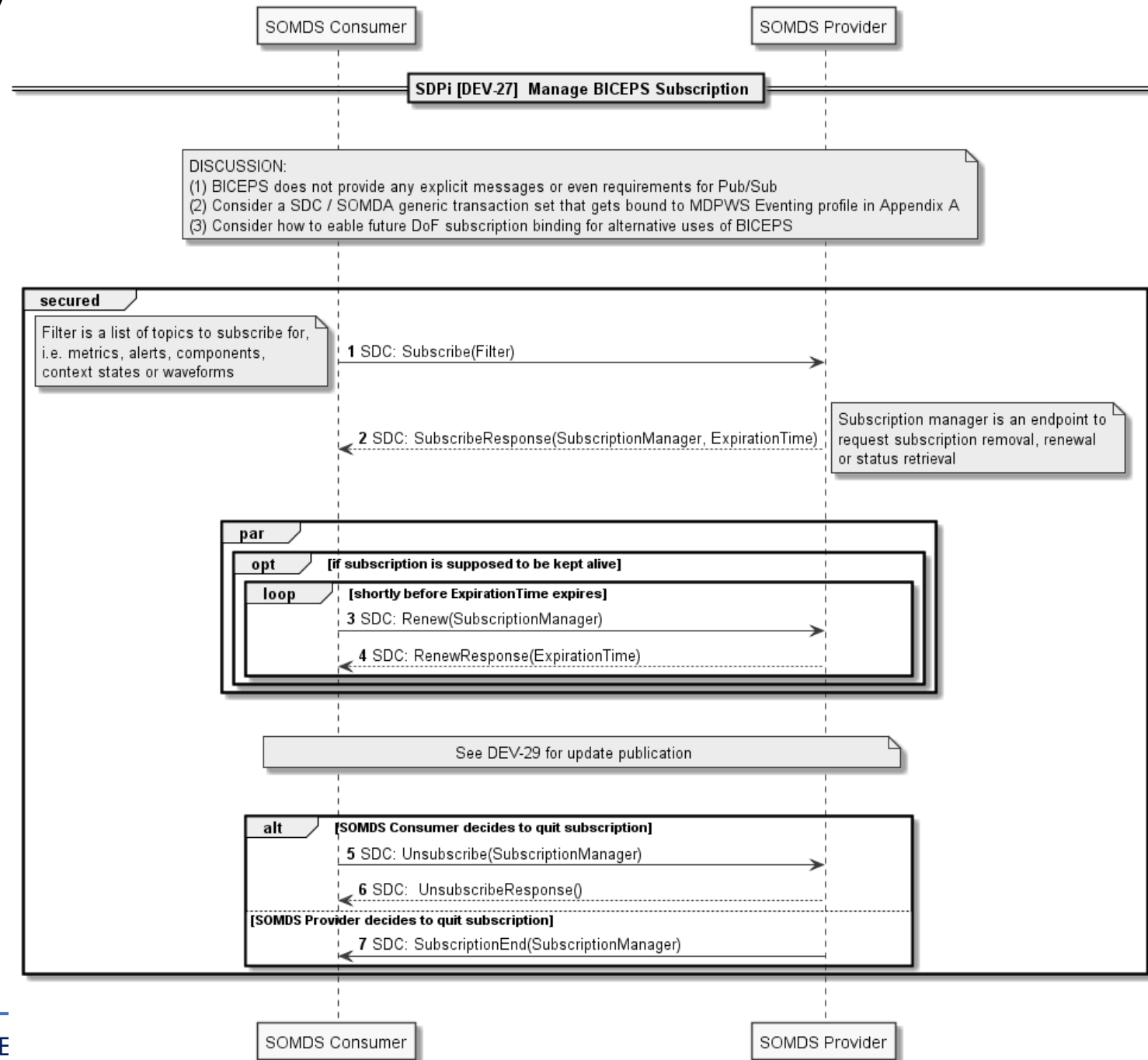
1. For SDPi: Normatively reference WSDL file from <XYZ> (e.g., IHE Github IO?) ADD to repo etc.
2. Make WSDL file mandatory for all SDPi Providers
3. ACTION: David G. will update WSDL to remove optionality & ambiguity – cleaner & nicer 😊
4. Include note & future option (???) for retrieving WSDL for each service IF Provider & services are new.



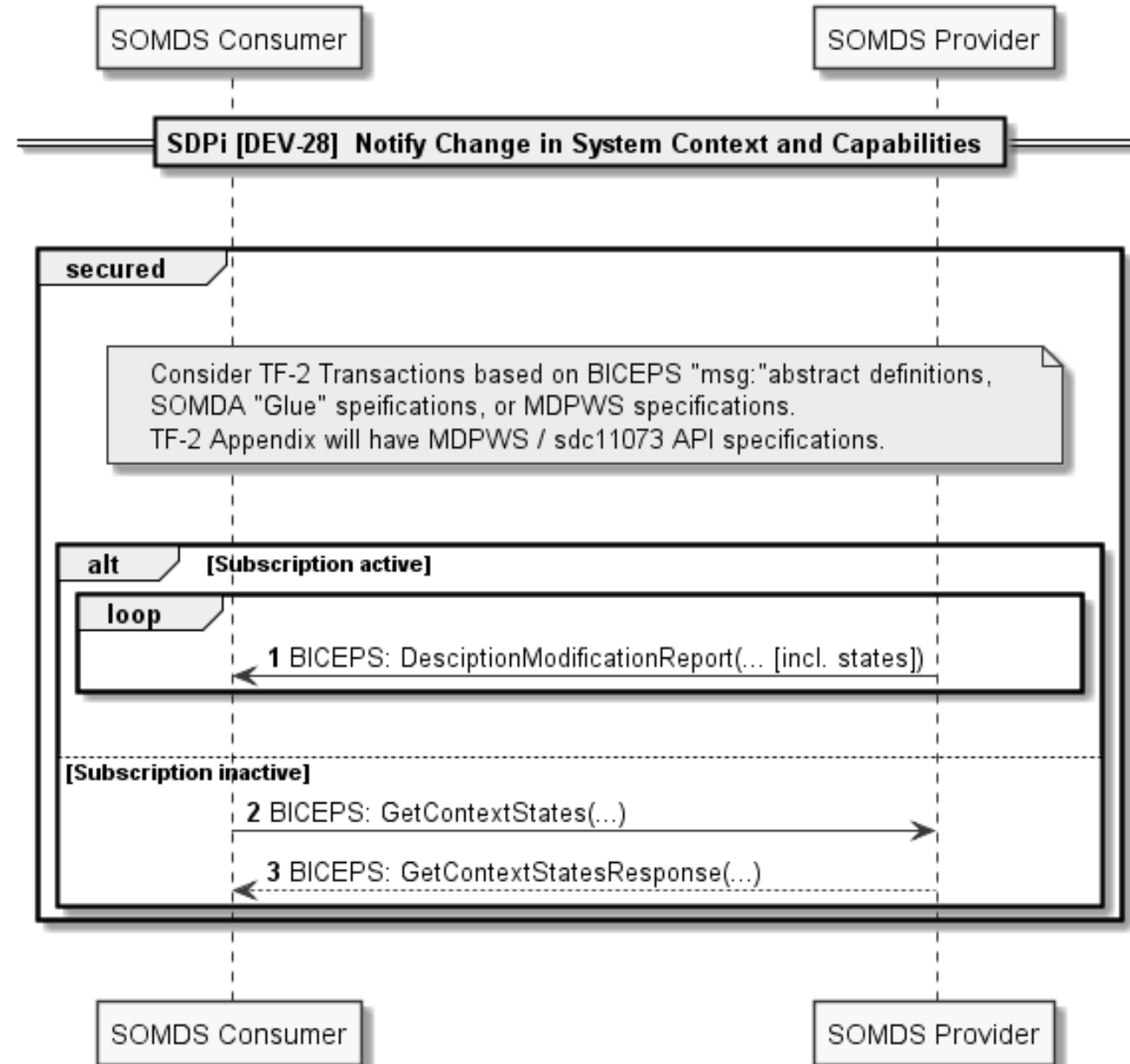
SDPi TF-2: DEV-26



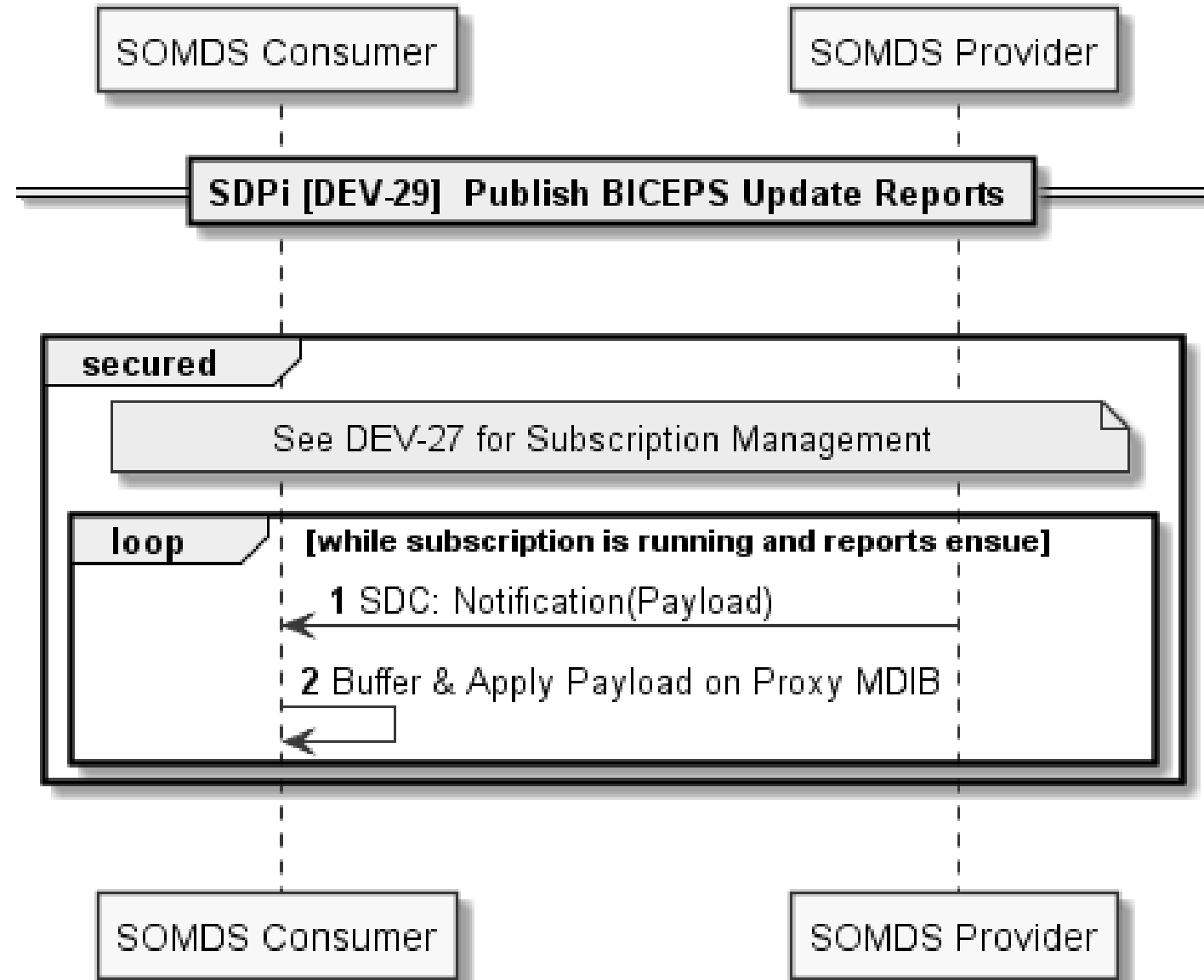
SDPi TF-2: DEV-27



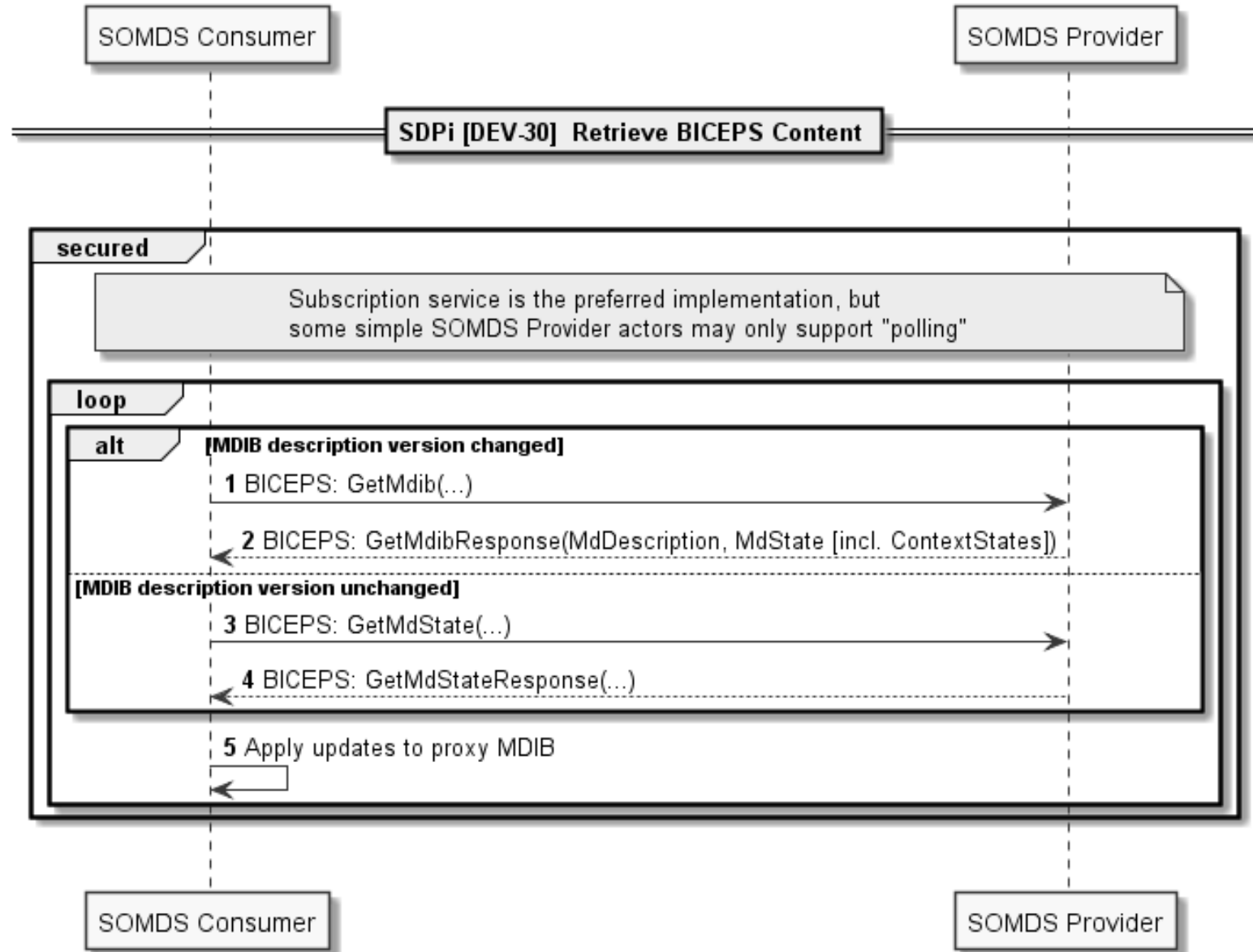
SDPi TF-2: DEV-28



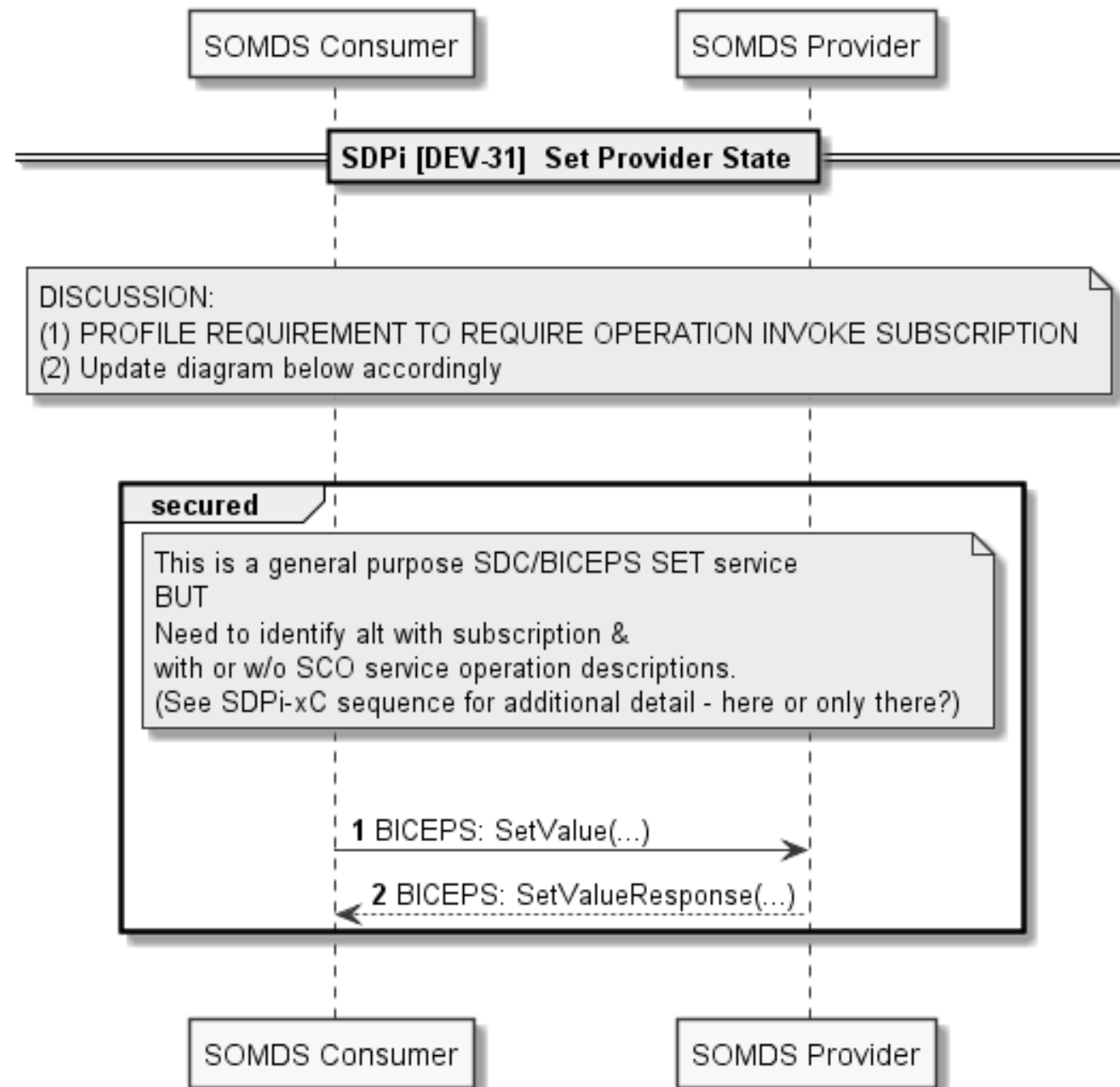
SDPi TF-2: DEV-29



SDPi TF-2: DEV-30



SDPi TF-2: DEV-31

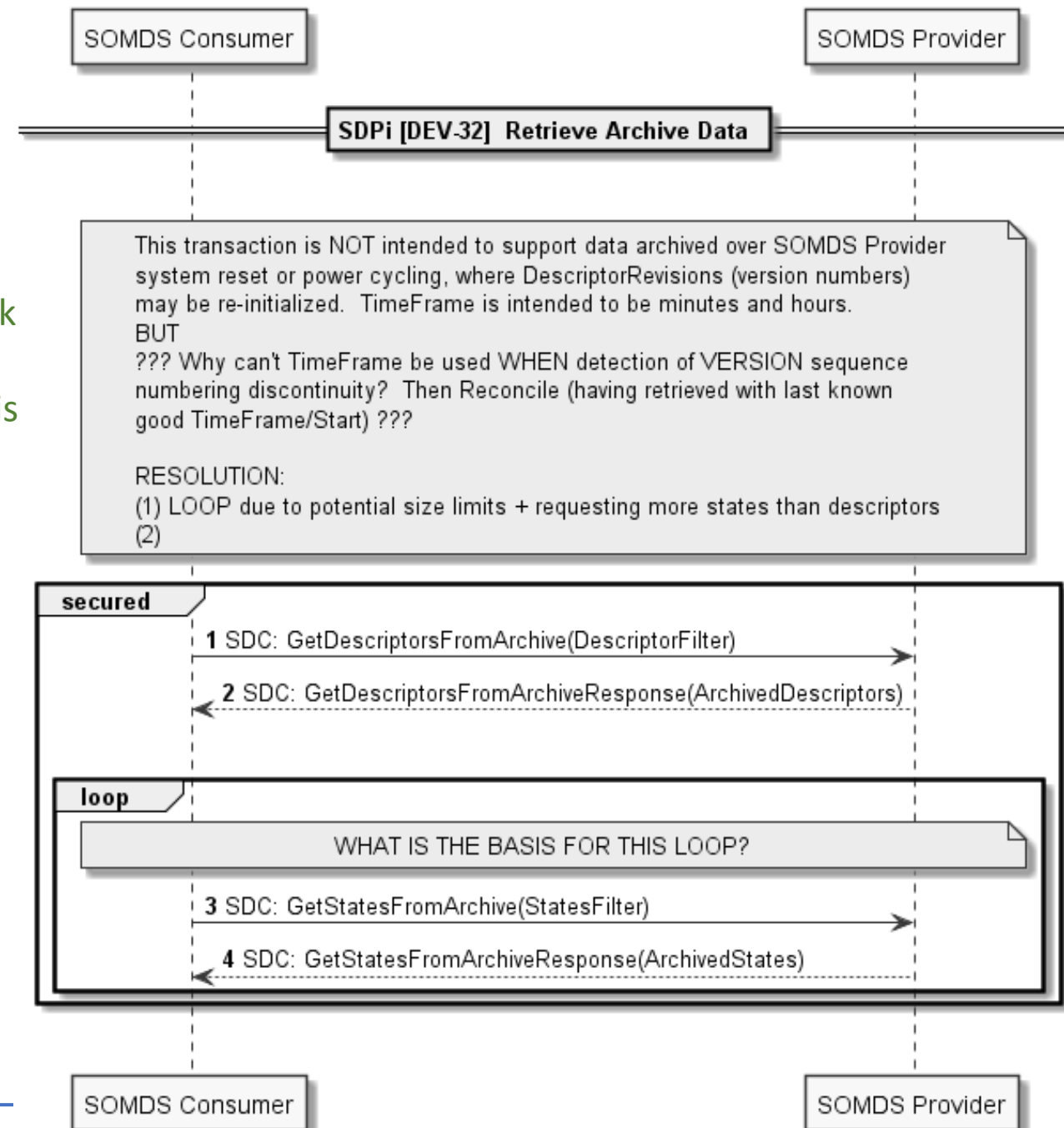


SDPi TF-2: DEV-32

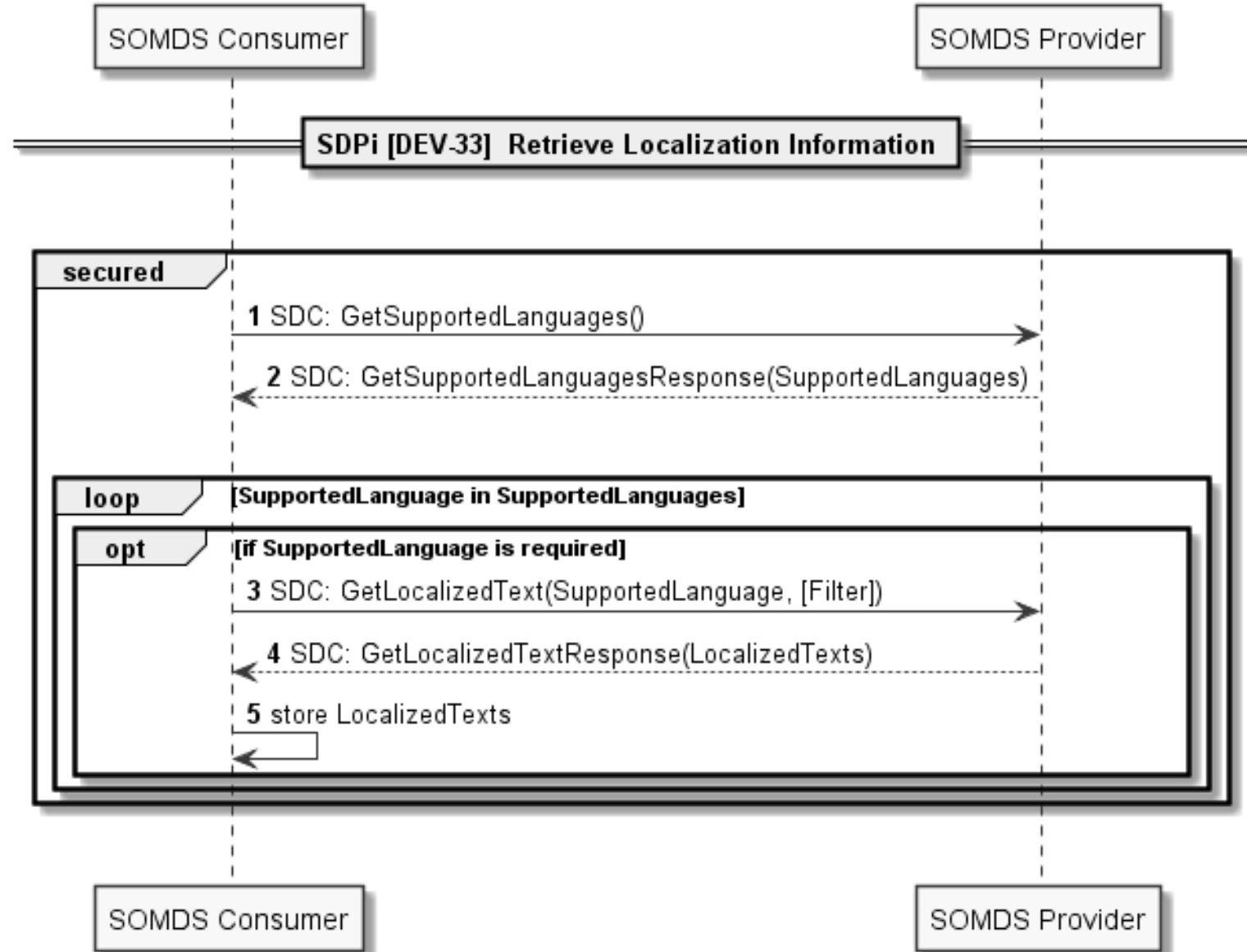
- The loop is based on try-and-error – one could request „nested intervals“ (is that the right term, I only know the German one... and the translators suck sometimes).
- The whole ArchiveService – as already mentioned – is wonky and insufficient. Hard to profile, but partially better with HTTP/2

2020.11.04

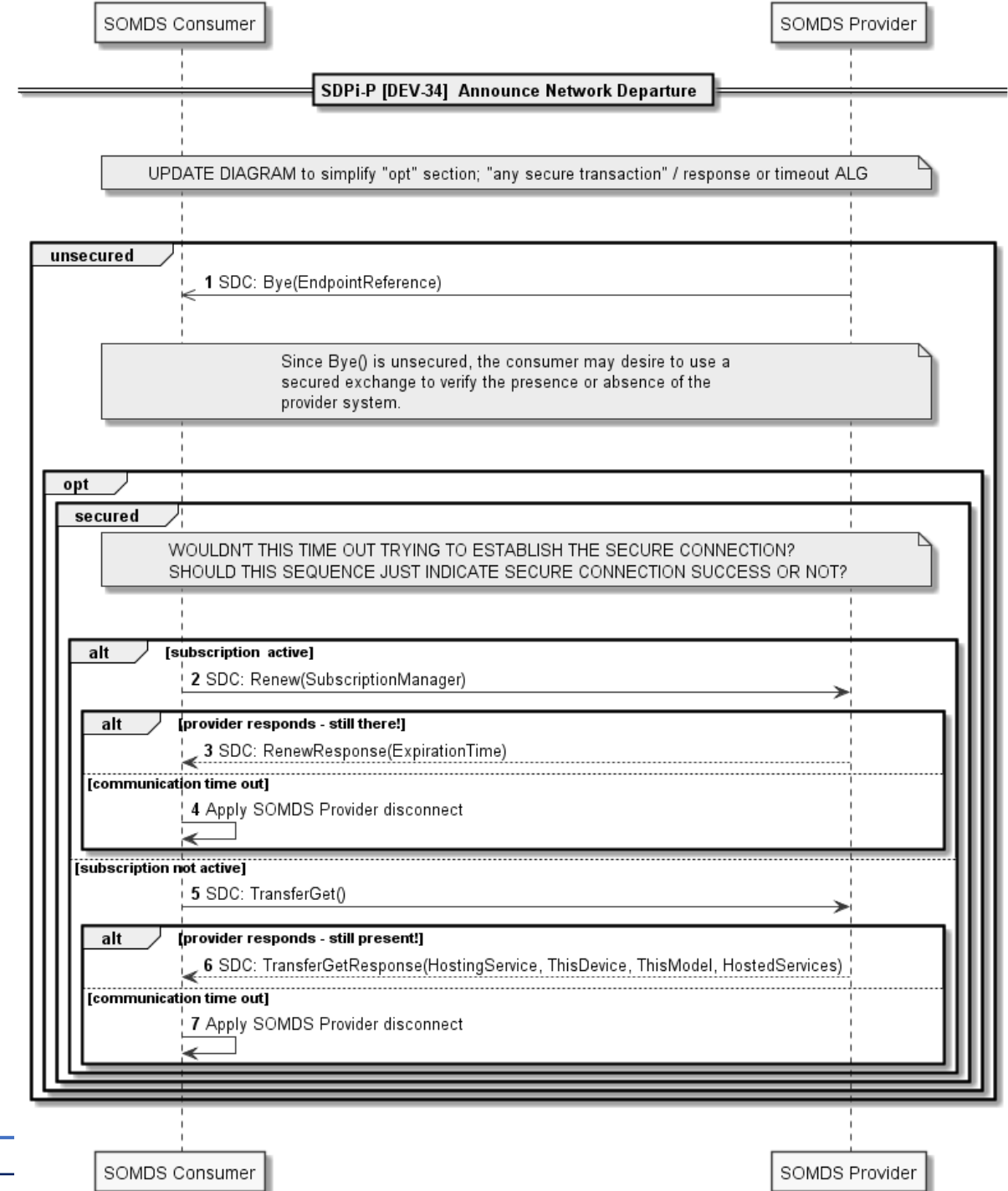
1. Sync with the earlier *Option slide context & constraints*
2. Descriptors will have time frame (e.g., 4 hours) ...
3. States may be overrun by high frequency data
4. Strategy: Approximation by try/fail/try again @ ½ size
5. Challenge is staying under the 4MB limit ...
6. No support now for a “stream” of archive data – only request / response and need to approximate in REAL TIME optimal data frame size.
7. NOTE: At HTTP/2 provides simple stream for bi-directional exchange
8. Archive 2.0 service may address / or alternative transport etc.



SDPi TF-2: DEV-33

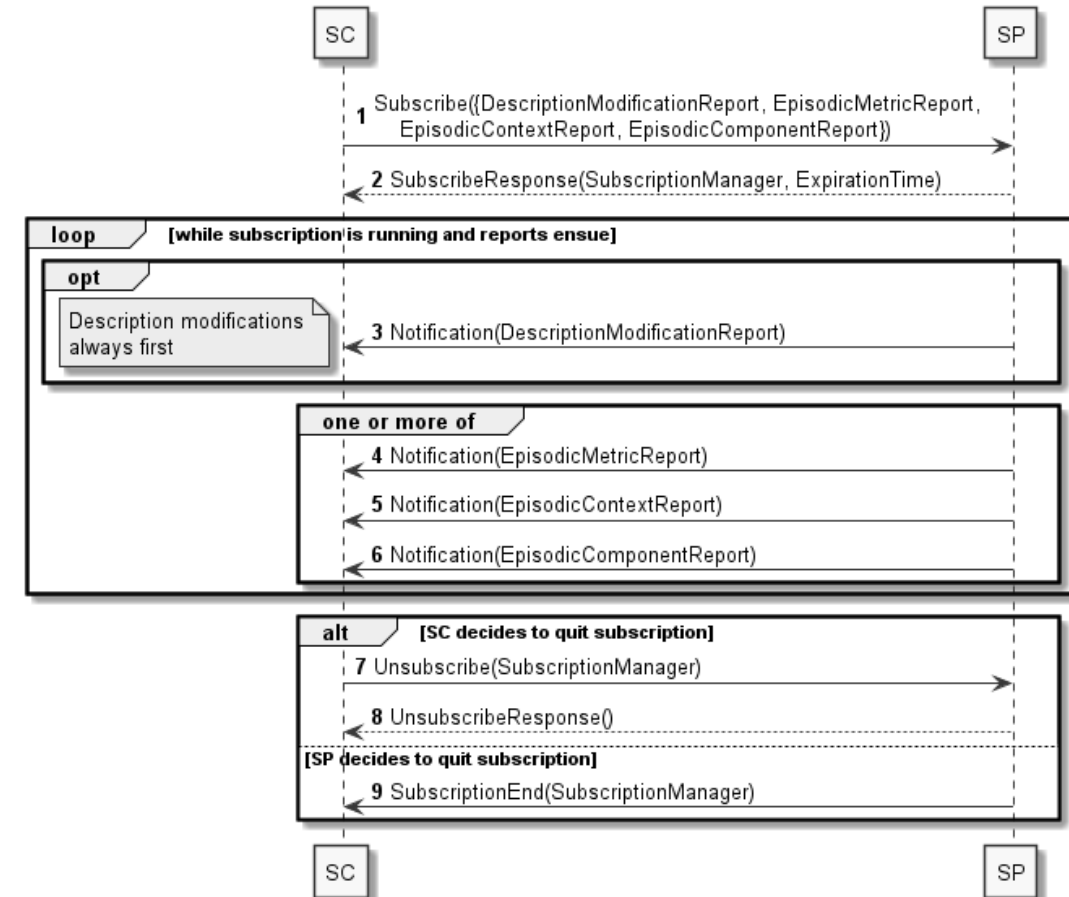


SDPi TF-2: DEV-34



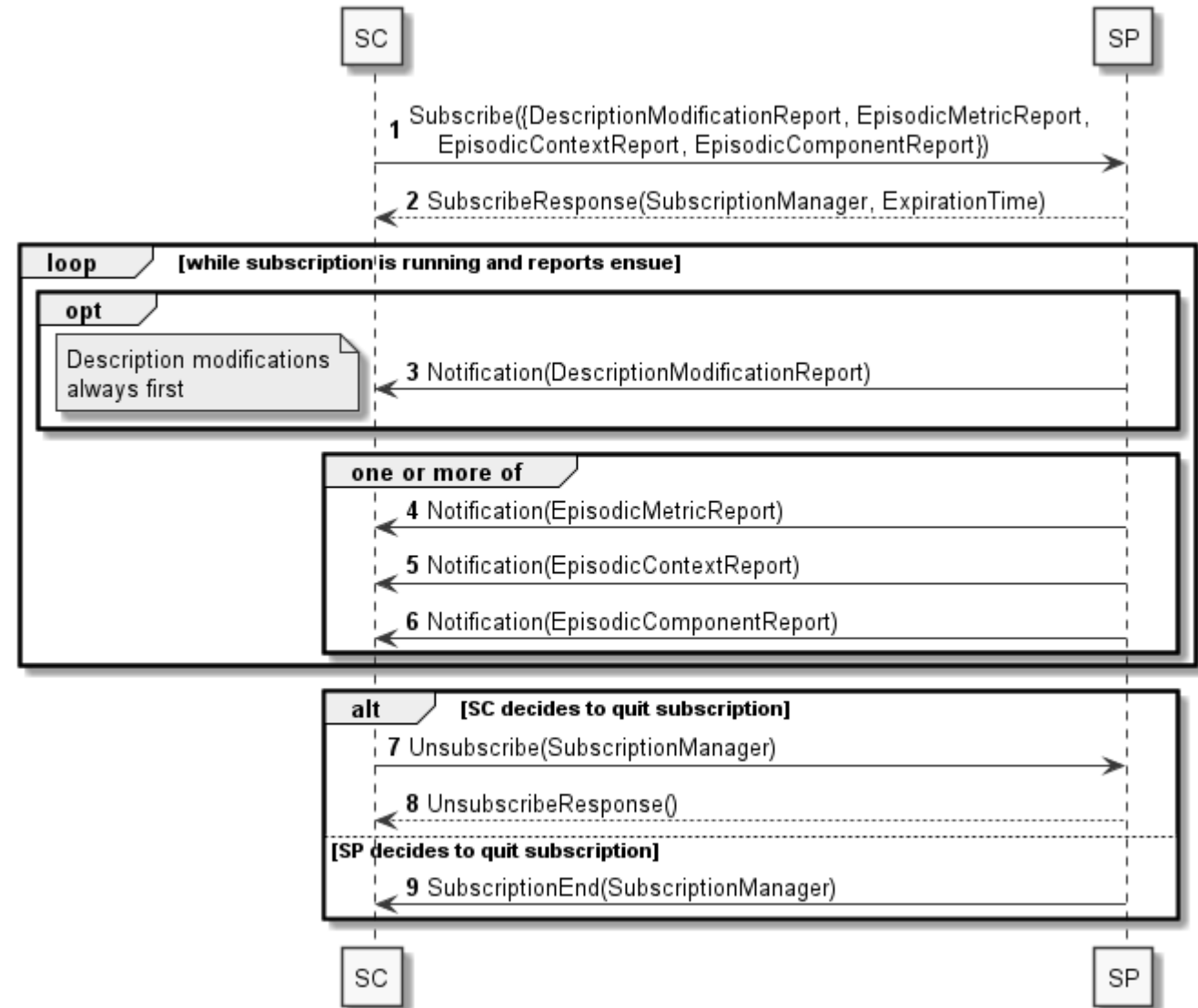
SDPi TF-2: DEV-35

3.35 Establish Medical Data Exchange [DEV-35]



SDPi TF-2: DEV-36

3.36 Publish Medical Data [DEV-36]



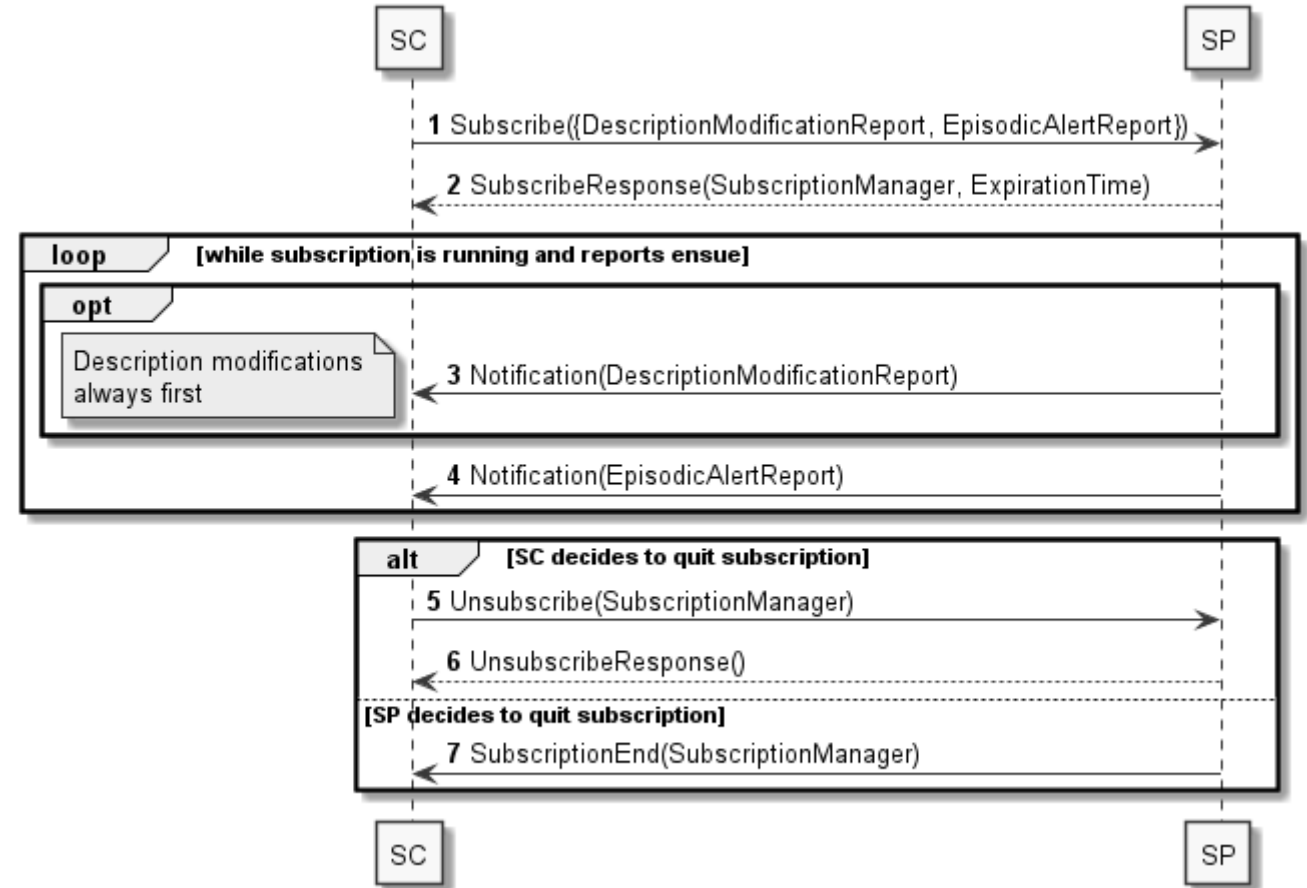
SDPi TF-2: DEV-37

3.37 Retrieve Medical Data [DEV-37]

Note this is a polled retrieve vs. pub/sub eventing

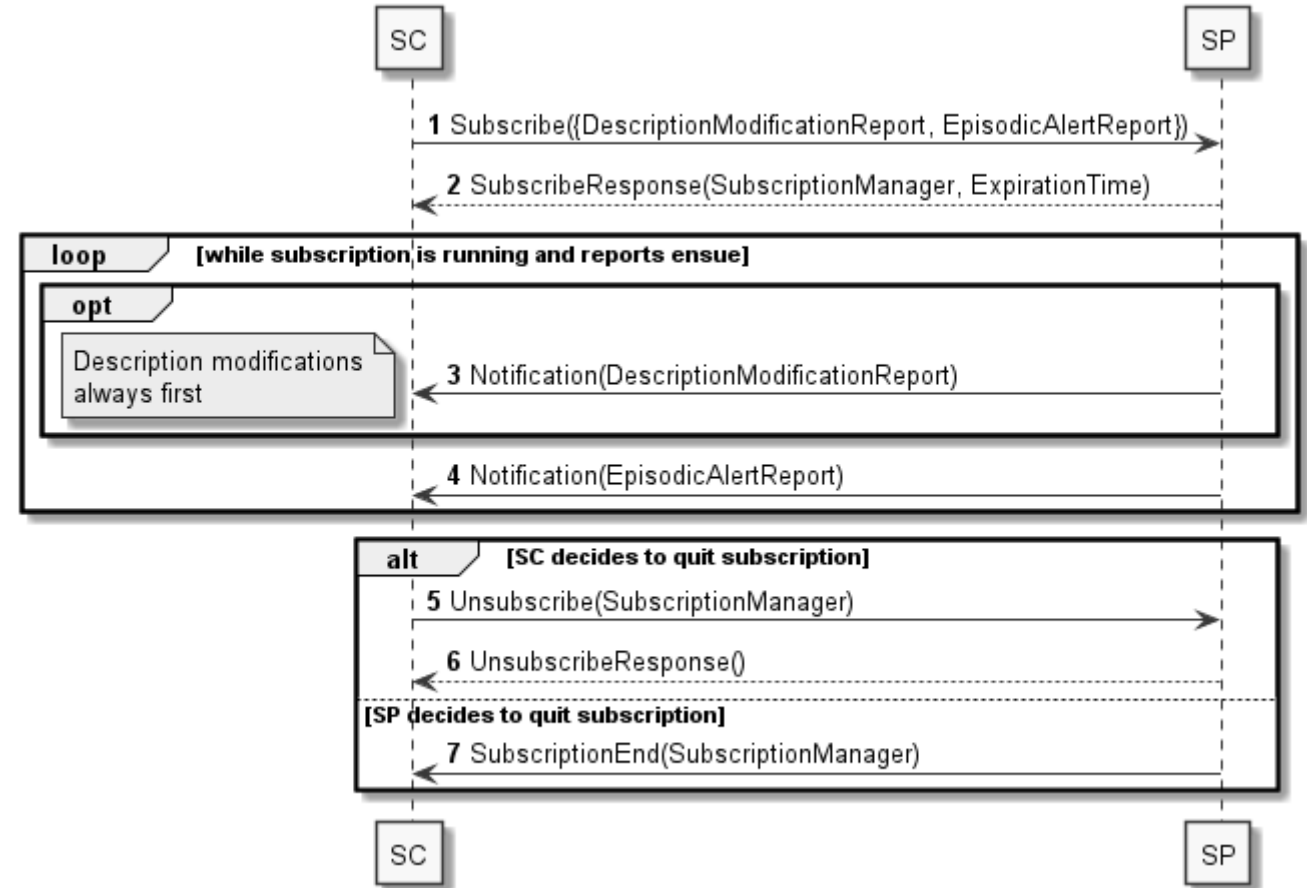
SDPi TF-2: DEV-38

3.38 Establish Medical Alert Exchange [DEV-38]



SDPi TF-2: DEV-39

3.39 Publish Medical Alert Update [DEV-39]

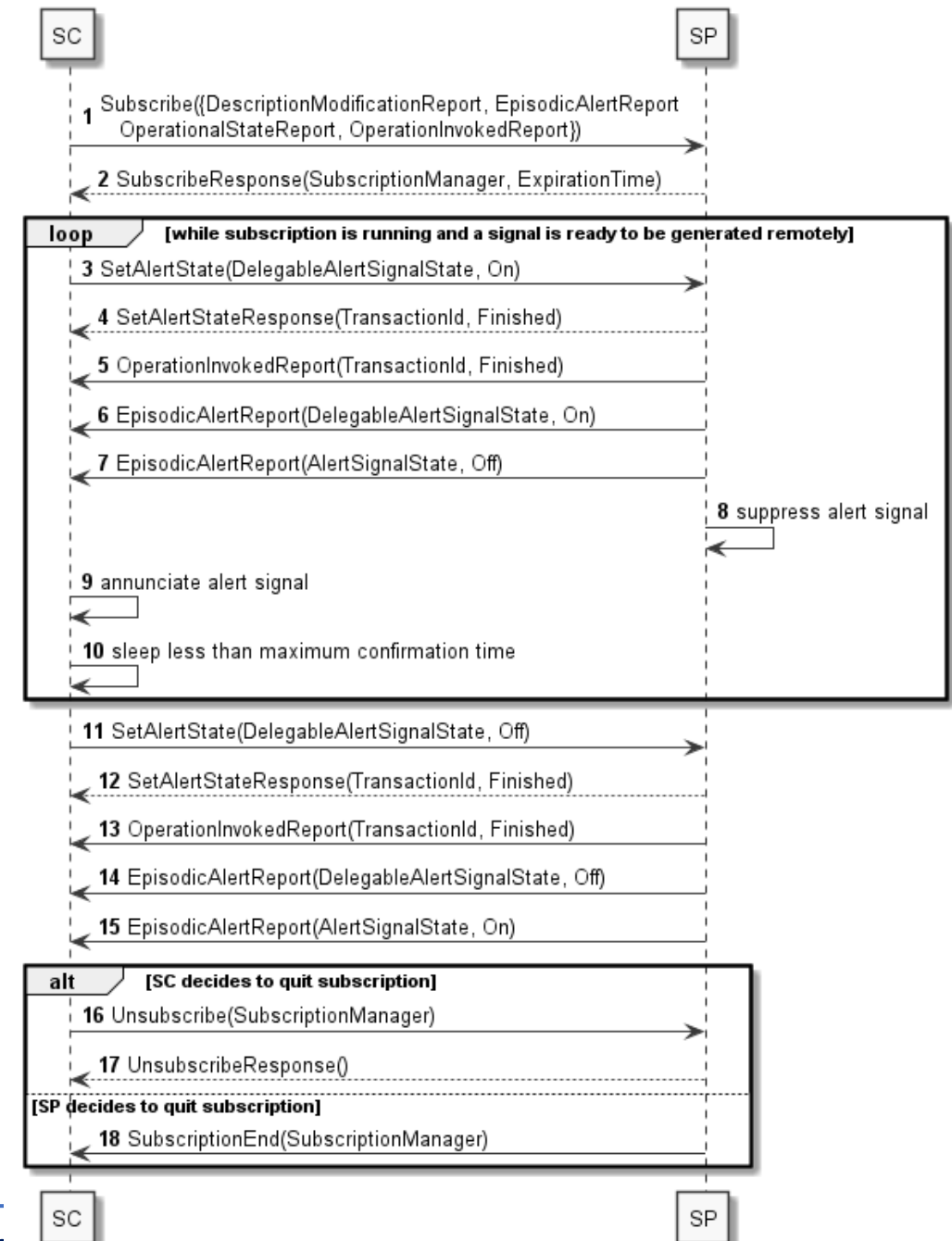


SDPi TF-2: DEV-40

3.40 Retrieve Medical Alert Status [DEV-40]

SDPi TF-2: DEV-41

3.41 Manage Medical Alert Delegation [DEV-41]



SDPi TF-2: DEV-42

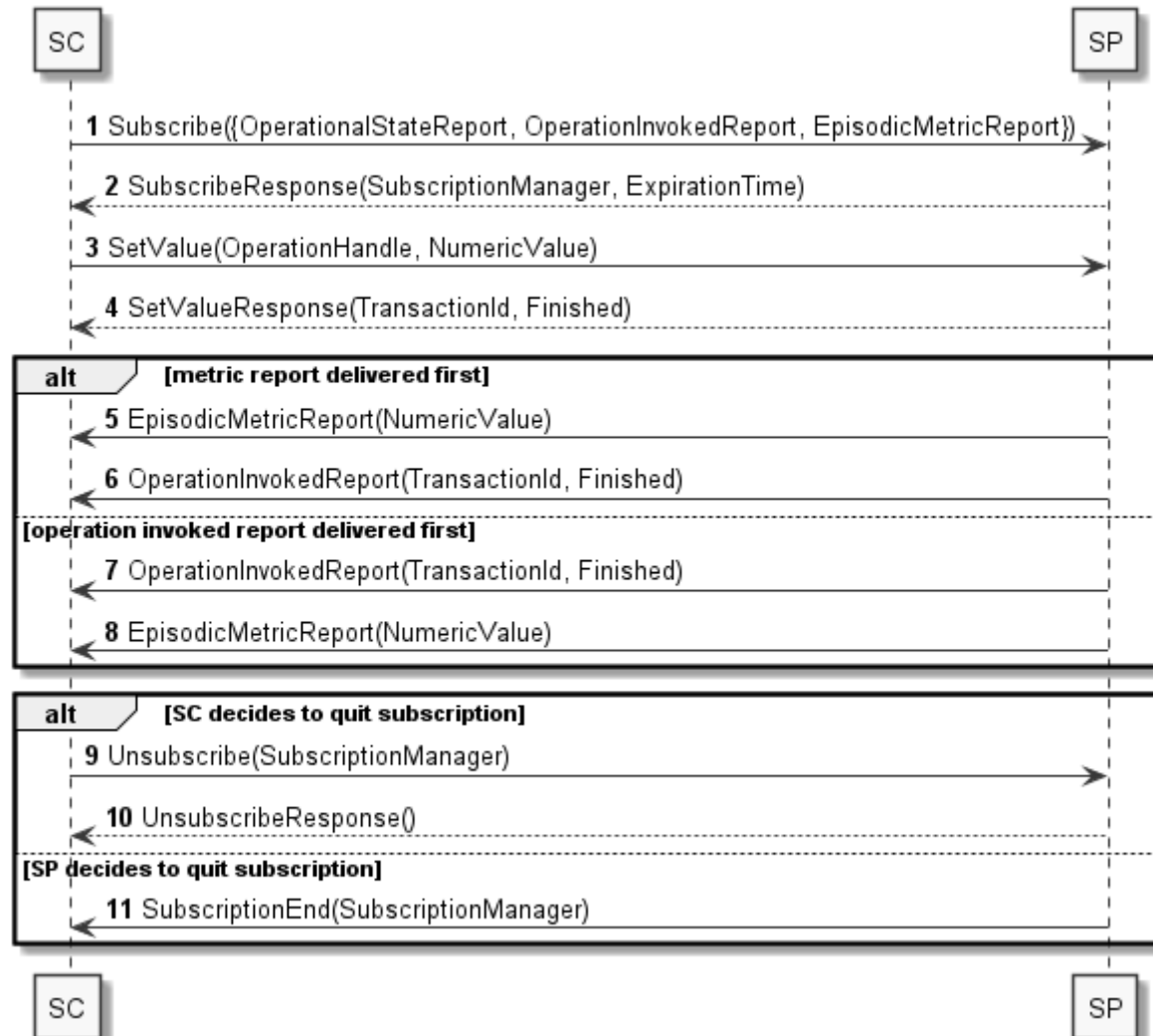
3.42 Delegate Medical Alert [DEV-42]

SDPi TF-2: DEV-43

3.43 Update Alert Acknowledgement Status [DEV-43]

SDPi TF-2: DEV-44

3.44 Manage Medical External Control [DEV-44]



SDPi TF-2: DEV-45

3.45 Invoke Medical Control Services [DEV-45]

SDPi TF-3 SDC/BICEPS Content Modules & Specializations

SDPi TF-3: SDC/BICEPS Content Modules - General

Topics to be covered in the General BICEPS semantic profiling section:

1. Link to TF-1 SDPi-P Content Modules & same for other profiles?
2. Extension model
3. General (all device specializations)
4. SDPi 1.0 or subsequent?
5. ... (see subsections in outline)

SDPi TF-3: SDC/BICEPS – Infusion Pumps

Topics to be covered in the BICEPS infusion pump profile section

SDPi TF-3: SDC/BICEPS – Physiologic Monitor

Topics to be covered in the BICEPS physiologic monitor
profile section

SDPi TF-3: SDC/BICEPS – Ventilator

Topics to be covered in the BICEPS ventilator profile section

SDPi TF-3: SDC/BICEPS – Surgery Devices

Topics to be covered in the BICEPS surgery devices
profile section

Additional Information

Real-world Narrative: Isolation ICU

Pandemic Patients in an Isolation ICU – EUA Remote Control Narrative

In dealing with severely infectious patients, healthcare workers (HCWs) are at a significantly greater risk of infection than the overall population due to their frequency and time in contact with the infected patients. The HCWs will enter the patient room to administer care to the patient and manage the therapeutic equipment. This management of the patient's therapy may require frequent device adjustments which may be delayed due to the need for the HCWs to protect themselves by donning PPE prior to entering the patient room and doffing the PPE upon leaving. This donning and doffing processes can exceed 15 minutes depending on the specific PPEs used. A recent study (Suen, 2018) reported times of 7 minutes for donning and 10 minutes for doffing, with the doffing process providing the opportunity for "considerable" self-contamination.

Infectious diseases confer a synergistic burden on and risk to the patient due to the requirements for isolating the patient (Abad et al., 2010) including poorer care and impaired coordination of care, (Mehrotra et al., 2013), significantly fewer HCW and family visits (relative to patients not on precautions) (Morgan et al., 2013), increased rate of adverse events (Stelfox et al., 2003) and increased depression (compared to other inpatients). (Day et al., 2011). The use of remote control and monitoring can be used to eliminate some treatment delays, reduce the infection risk to the HCW, and help preserve the limited supplies of PPE and improve patient care.

Critically ill patients with an infectious disease will often require monitoring with physiologic monitors and therapeutic support with ventilators and infusion pumps. As previously explained, entering the room to view parameters or adjust any settings can require 15 minutes for something that may take less than 1 minute. Medical devices that support open interoperability technology can provide remote access to view parameters and adjust settings thereby increasing efficiency, saving the costs of the PPE and most importantly increasing the safety of the HCW.

Source: Adapted from AAMI CR Proposal: "Emergency Use Guidance for Remote Control of Medical Devices"

Real-world Narrative: Isolation ICU

Pandemic Patients in an Isolation ICU – Scenarios?

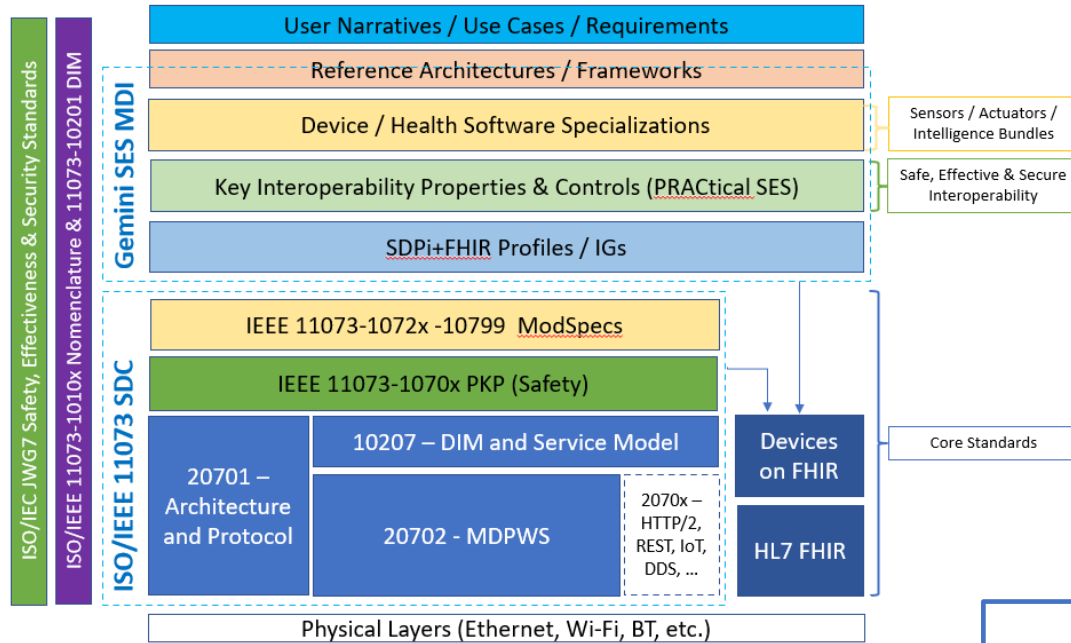
For the purposes of this PAT, what scenarios are of greatest interest?

1. Participant Discovery / Security / Service Exchange?
2. Patient / Participant Association (Patient & Location & Workflow context establishment)?
3. Alert delegation / Alert Limit Adjustment / Alert confirmation / Silence ... ?
4. Which devices, systems, applications? Monitors, vents, pumps, central ... others?
5. Integration with EHR or other system?
6. Use of IHE-based FHIR profiles for integration with non-SDPi / non-SDC SOMDS systems?
7. ...

Other Use Cases / Scenarios? (e.g., surgery focused)

Hanging Gardens: *After SDPi 1.0 ...*

NOTE: *Profile Titles are notional – hopefully useful too!*



Devices-In-Care (PDP) Profile

Device Specialization Profile

Surgery PoC Profile

ICU PoC Profile

MDIRA ICE Profile

SOMDS@home Profile

IHE (Official) Profile Types:

Transport, Content, Workflow
Or a combination of all (3)

Other types?

Architecture (SOA, MDIRA, SDC,?)
Single domain / multi-domain?

