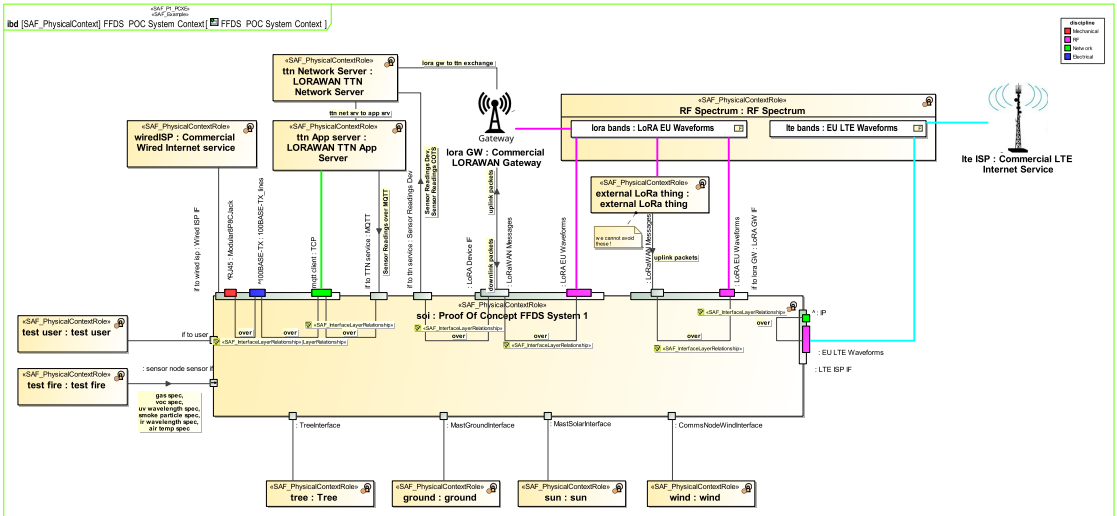
SAF User Documentation : P1_PCXE Physical Context Exchange Viewpoint

Domain	Aspect	Maturity
Physical	Context & Exchange	released

Example



#	Port Name	Port Type	Type Features	Connects to	Documentation
1	if to ext GW	LoRA Device IF	p1 : LoRA EU Waveforms p2 : LoRaWAN Messages	: 3-FFDS::FFDS_System::FFDS_PhysicalArchitecture::F lora GW : 3-FFDS::FFDS_System::FFDS_PhysicalArchit	
2	if to lora GW	LoRA GW IF	p1 : LoRA EU Waveforms p2 : LoRaWAN Messages	: 3-FFDS::FFDS_System::FFDS_PhysicalArchitecture::F external LoRa thing : 3-FFDS::FFDS_System::FFDS_Phy	
3	if to LTE ISP	LTE ISP IF	IP : IP p1 : EU LTE Waveforms		
4	if to ttn service	Sensor Readings Dev	uv : uv values voc : voc values	ttn Network Server : 3-FFDS::FFDS_System::FFDS_Phy	
5	if to TTN service	MQTT		ttn App server : 3-FFDS::FFDS_System::FFDS_Physical	
6	if to user			test user : 3-FFDS::FFDS_System::FFDS_PhysicalArchit	
7	if to wired isp	Wired ISP IF	100BASE-TX : 100BASE-TX_lines mqtt client : TCP RJ45 : Modular8P8CJack	ttn App server : 3-FFDS::FFDS_System::FFDS_Physical wiredISP : 3-FFDS::FFDS_System::FFDS_PhysicalArchi	
8	if to test fire	sensor node sensor if	in gas : gas spec in smoke : smoke particle spec in temp air : air temp spec in temp ir : ir wavelength spec in uv : uv wavelength spec in voc : voc spec	test fire : 3-FFDS::FFDS_System::FFDS_PhysicalArchite	
9	mount if of forest comms node	MastGroundInterface	electrical mechanical	ground : 3-FFDS::FFDS_System::FFDS_PhysicalArchite	
10	mount if of forest sensor node	TreeInterface		tree : 3-FFDS::FFDS_System::FFDS_PhysicalArchitectu	
11	solar if of forest comms node	MastSolarInterface		sun : 3-FFDS::FFDS_System::FFDS_PhysicalArchitectu	
12	wind if of forest comms node	CommsNodeWindInterface		wind : 3-FFDS::FFDS_System::FFDS_PhysicalArchitect	

Purpose

The Physical Context Exchange Viewpoint focuses on the identification of the physical interfaces with external entities and relevant documentation. It is used to capture interface design requirements, applicable standards, protocols and format specifications, that are agreed upon the interfaces.

Applicability

The Physical Context Exchange Viewpoint supports the "create system design" activity part of the "Design Definition Process" activities of the INCOSE SYSTEMS ENGINEERING HANDBOOK 2023 [§2.3.5.5] and contributes to the artifacts "System Design Description" and "System Interface Definition".

Furthermore, the viewpoint supports the "Interface Management" approach of the INCOSE SYSTEMS ENGINEERING HANDBOOK 2023 [§3.2.4].

Presentation

A) For each given context, an internal block diagram (IBD is used to identify the physical interfaces, the item flows, that are exchanged on that interfaces, and related documentation. Note: To understand the interfaces, a mapping of protocol layers may be depicted.

B) A tabular format providing a list of all the defined external interfaces and the applicable documentation

- context element kind (environment, external entity, physical user, etc.)
- context element role name
- port name and reference to port type
- reference to context element type

C) A tabular format listing the applicable standards, protocols and formats for the item flows exchanged via the identified interfaces.

Stakeholder

- Acquirer
- Customer
- Hardware Developer
- IV&V Engineer
- Mechanic Developer
- Safety Expert
- Security Expert
- Software Developer
- Supplier
- System Architect

Concern

- Which are the external physical entities the system interacts with in the given context?
- Which are the protocols for exchanging physical items on a specific interface?
- Which kind of physical items (energy, material, information, etc.) are exchanged between the system and external entities?

- Which kind of physical items (energy, material, information, etc.) are used on an interface of a physical architecture element?
- Which standards, protocols, and format specifications apply to a physical interface?

Profile Model Reference

The following Stereotypes / Model Elements are used in the Viewpoint:

- Attribute "realizingConnector" of InformationFlow referencing Connector
- Connector [UML_Standard_Profile]
- FlowProperty [SysML Profile]
- FlowProperty contained in SAF_PhysicalInterfaceDefinition
- FlowProperty typed by SAF_PhysicalExchangeType
- ItemFlow [SysML Profile]
- ItemFlow typed by SAF_PhysicalExchangeType
- ProxyPort [SysML Profile]
- ProxyPort typed by SAF_PhysicalInterfaceDefinition
- SAF_InterfaceLayerRelationship
- SAF_P1_PCXE
- SAF_PhysicalEnvironment
- SAF_PhysicalExchangeType
- SAF_PhysicalExternalSystem
- SAF_PhysicalInterfaceDefinition
- SAF_PhysicalSystem
- SAF_PhysicalUser

Input from other Viewpoints

Required Viewpoints

- Physical Context Definition Viewpoint

Recommended Viewpoints

none