

Covers NGTP 2.0



# NGTP in a nutshell



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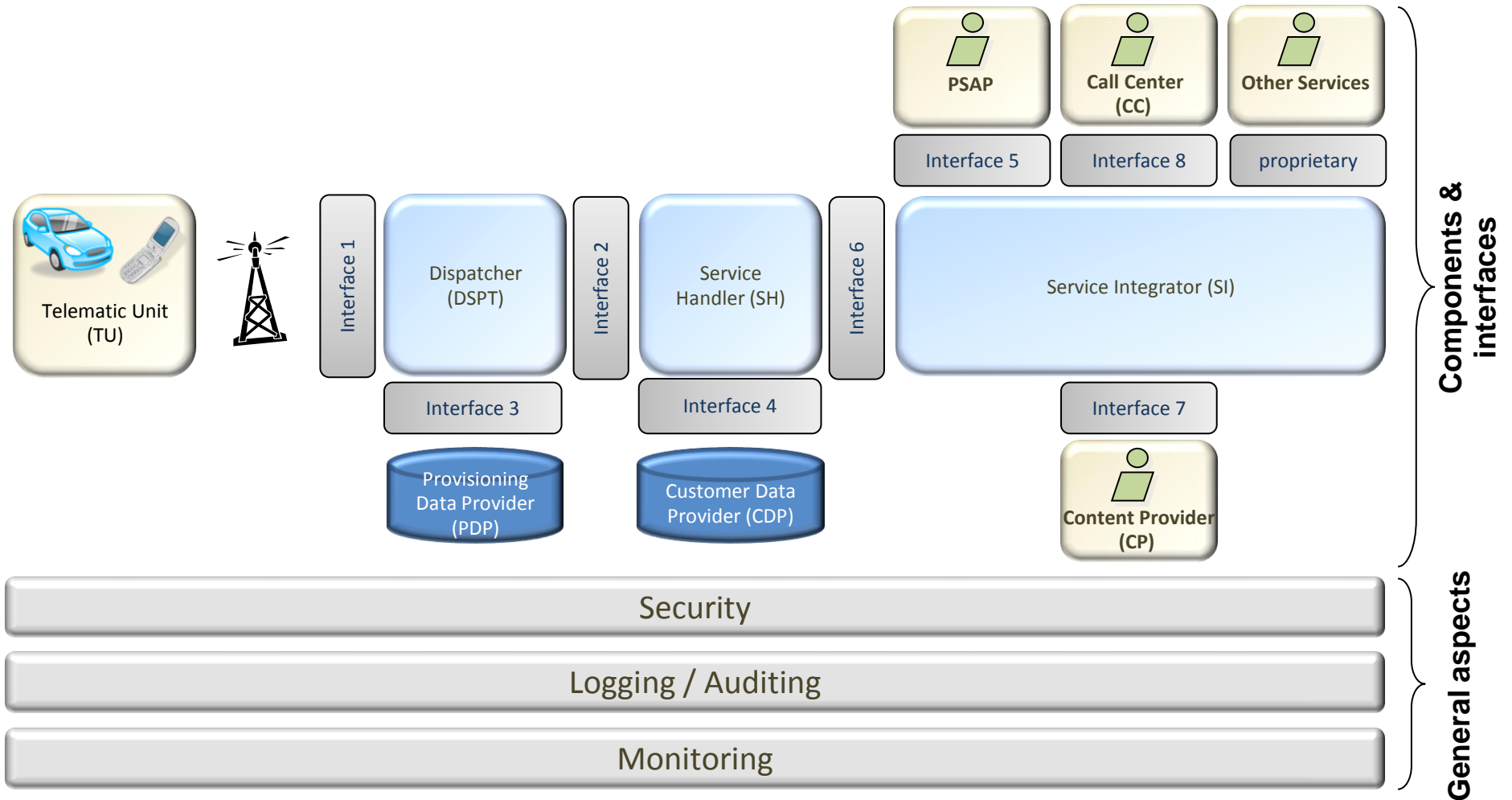
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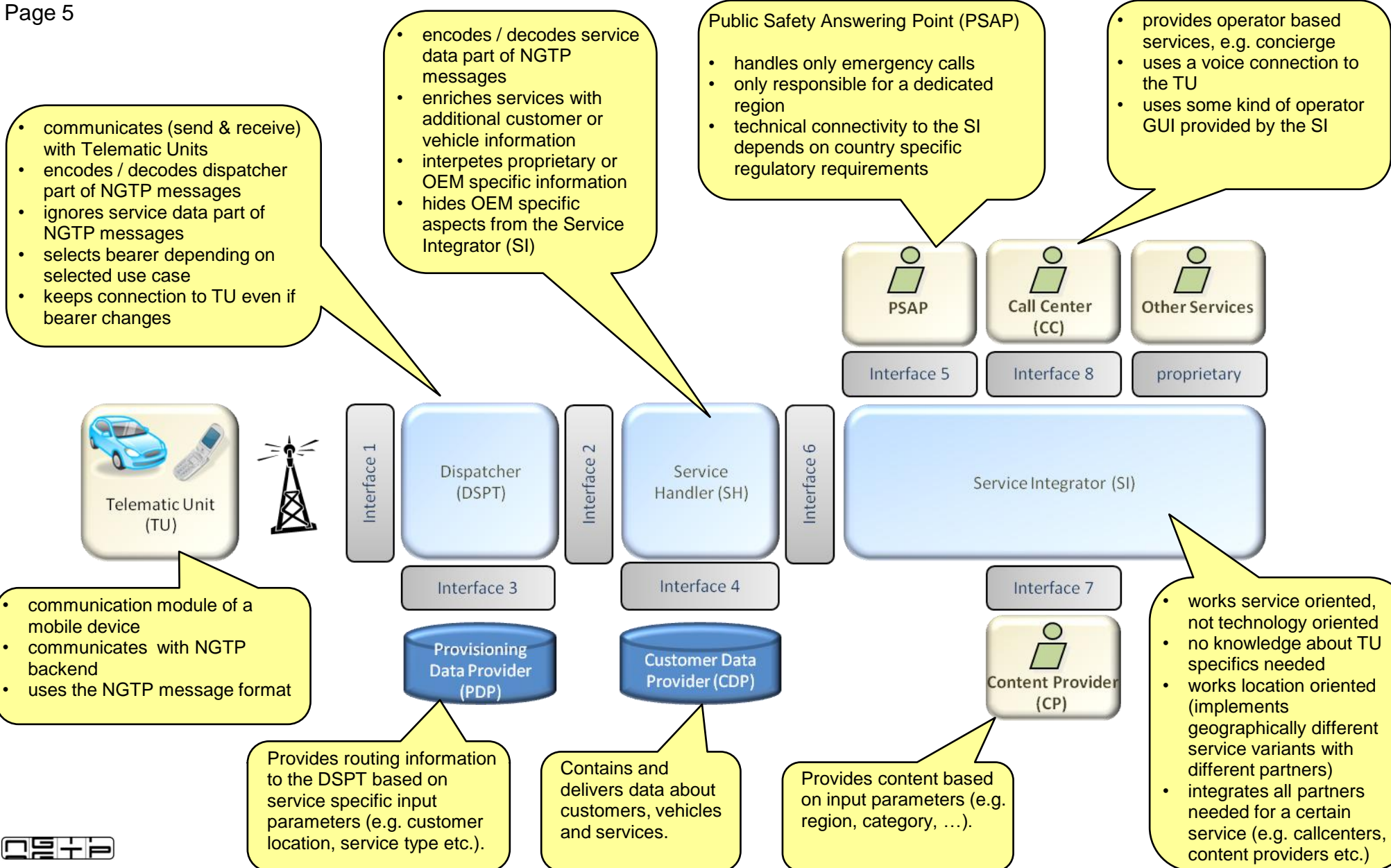
# 1. About NGTP

- NGTP stands for **N**ext **G**eneration **T**elematics **P**atterns
- NGTP provides distributed offboard architecture patterns for building flexible, scalable and cost efficient telematic backend systems
- NGTP provides an interface specification for the offboard elements of the architecture on a non-technical, semantic level
- NGTP is published under a Creative Commons licence
- NGTP provides a sample protocol implementation
- The actual Release NGTP 2.0 provides the Basic-Pattern in a building block oriented view

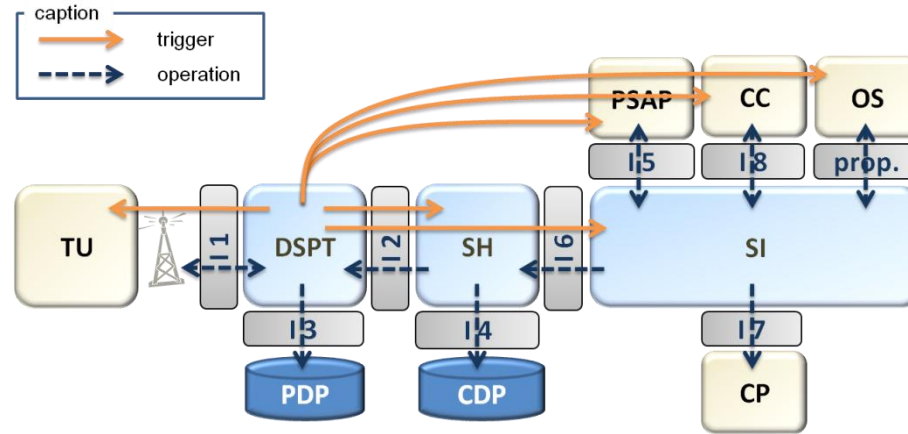
# 1. The NGTP Basic-Pattern



# 2. NGTP Basic-Pattern: Components



### 3. NGTP Basic-Pattern: Communication concept

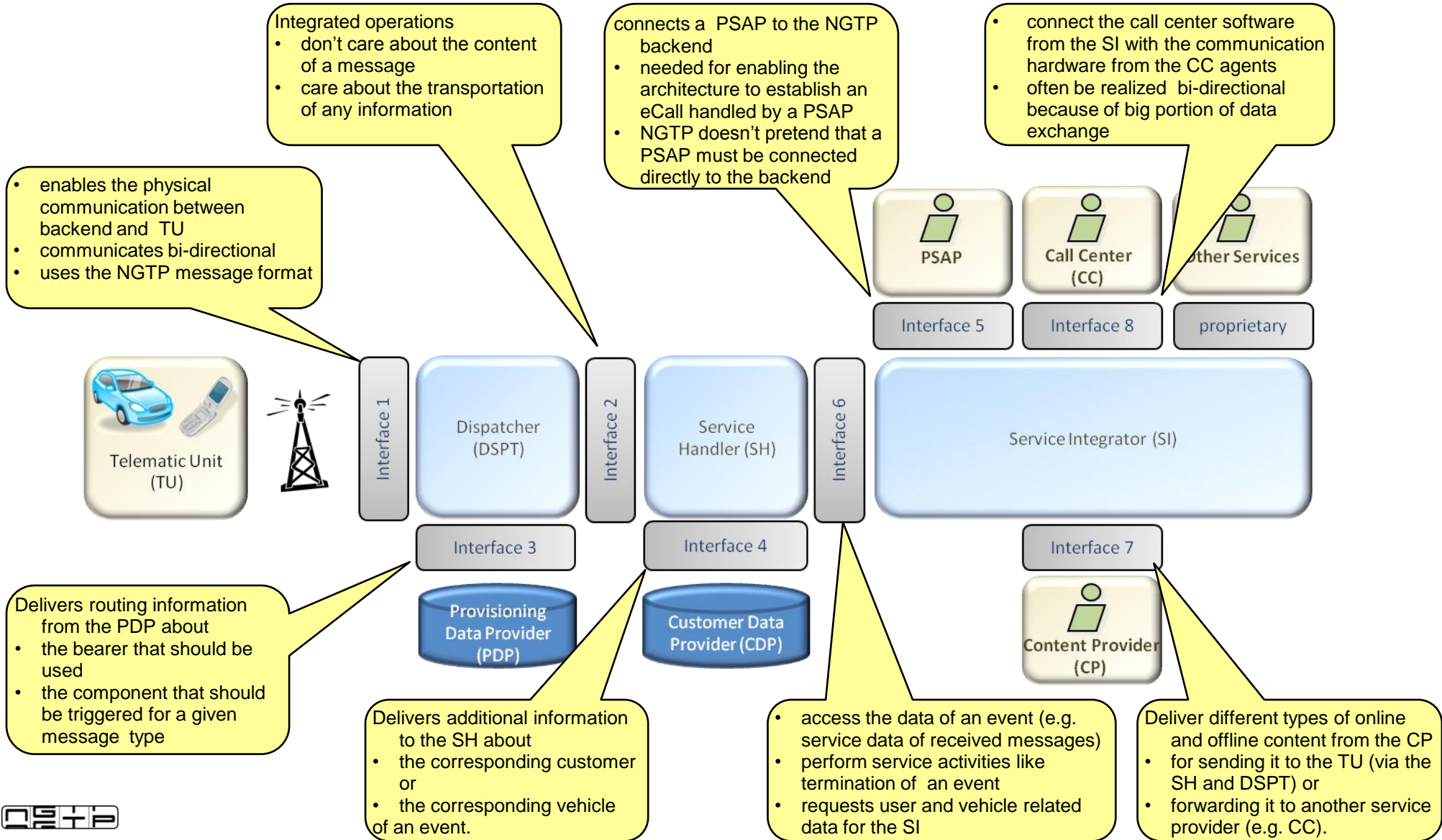


- all activities of a use case are bundled in a so called *NGTP Event*, which is identified by a worldwide unique ID (eventID)
- NGTP distinguishes between triggers and operations: Triggers do only provide the eventID to a component (in case of new or updated events), whereas operations allow to send/retrieve the data of an event
- all interfaces (except interface 1 and 8) work uni-directional via operations

These principles ...

- enable a stateless communication and reduce implementation complexity
- enable the receiver of a trigger to decide if and when it wants to retrieve the new information
- increases backend flexibility regarding scaling

# 4. NGTP Basic-Pattern: Interfaces



# 4. NGTP Basic-Pattern: Interfaces

## Example: Excerpt of the interface 2 operations

### Typical predefined operations from NGTP interfaces (extract)

<b>writeEventLog()</b>	Write a note to the event log e.g. for auditing purposes.
<b>getEventData()</b>	Retrieve the data of one specific event.
<b>sendTrigger()</b>	Instruct the dispatcher to send a trigger to the vehicle that informs it about available service information from the backend.
<b>send()</b>	Instruct the dispatcher to send the given information / service data into the vehicle.
<b>terminateEvent()</b>	Terminate an active event.
<b>rerouteEvent()</b>	Change the type of an event e. g. from an eCall to an information call and reroute the voice call (to another Call Centre) according to the new event type.



## 5. NGTP Basic-Pattern: Message format

A NGTP message contains 5 parts:

1. Message header (processed by the DSPT)
2. Dispatcher data (encoded/decoded by the DSPT)
3. Dispatcher signature
4. Service data = message content (encoded/decoded by the Service Handler)
5. Message signature

NGTP specifies:

- The basic structure of the messages
- The complete message header
- The mandatory attributes of the Dispatcher data
- The placeholder for the security features (e.g. signatures)

NGTP does not specify:

- A fixed set of service types (only examples are given)
- The service data section itself (only examples are given)
- The security algorithms to use (only examples are given)

# 5. NGTP Basic-Pattern: Message format

Msg-Part	Field	Byte	M/O	Short description / example
NGTP Message Header	ProtocolVersion	1	M	4 bit major, 4 bit minor
	SecurityContext	2	M	Keys and Security algorithms
	NGTPHeaderLength	1	M	includes the first 5 NGTP MessageHeader bytes and the NGTPDispatcherData part
	NGTPHeaderEncoding	1	M	0=ASN.1 PER aligned, 1=ASN.1 PER unaligned, 2=ASN.1 XML, 4 bit encoding version
NGTPDispatcherData (encoded)	ServiceType		M	NGTP DSPT-Control=0, E-Call=1, ...
	VIN / DriveID		M	17 characters
	EventCreationTime		M	INT seconds since 2000
	BackendEventID		O	EventID only for BE and therefore optional
	DSPTMessageType		M	0=Error, 1=CRQM, 2=UpServiceData... ,MonitoringRequest=255
	MessageCounter		M	(DownlinkCounter 1, Uplinkcounter 1)
	DSPT ACK-Required		M	Boolean
	StatelessNGTPMessage		M	Boolean
	CRQM-Request		M	Boolean
	BasicPosition		M	# (lat,long)
	NetworkInfo		O	# MCC, MNC
	SimInfo		O	# MCC, MNC
	HMI-Language		O	INT (0=German, 1=English, 2=French, 3=Chinese...)
	ICC-ID		O	# padding at the end with zeros
ServiceDataMessageLength		M	NGTPServiceData + NGTPSignature (1-3 Byte "LengthLength" encoding acc. to ITU X 609 for ASN.1 coding, equiv. ISO/IEC 8825.1:2003);	
ServiceDataEncoding		M	4 bit encoding type 0=ASN.1 PER aligned, 1=ASN.1 PER unaligned, 2=ASN.1 XML, 4 bit encoding version (for example 0x11 = V1.1)	
ServiceDataProtocolVersion		M	8 bit major, 8 bit minor (for example 0x0100 = V1.0)	
Sig	NGTPDispatcherSignature		O	Signature for NGTPDispatcherData +NGTPMessageHeader
NGTPServiceData (encoded)	NGTP ServiceData	var.	M	
Sig	NGTPMessageSignature		O	Signature for the complete NGTPMessage (NGTPMessageHeader + NGTPDispatcherData + NGTPDispatcherSignature + NGTPServiceData)

Corresponding message part

Field size [byte]

Field description, examples, possible values

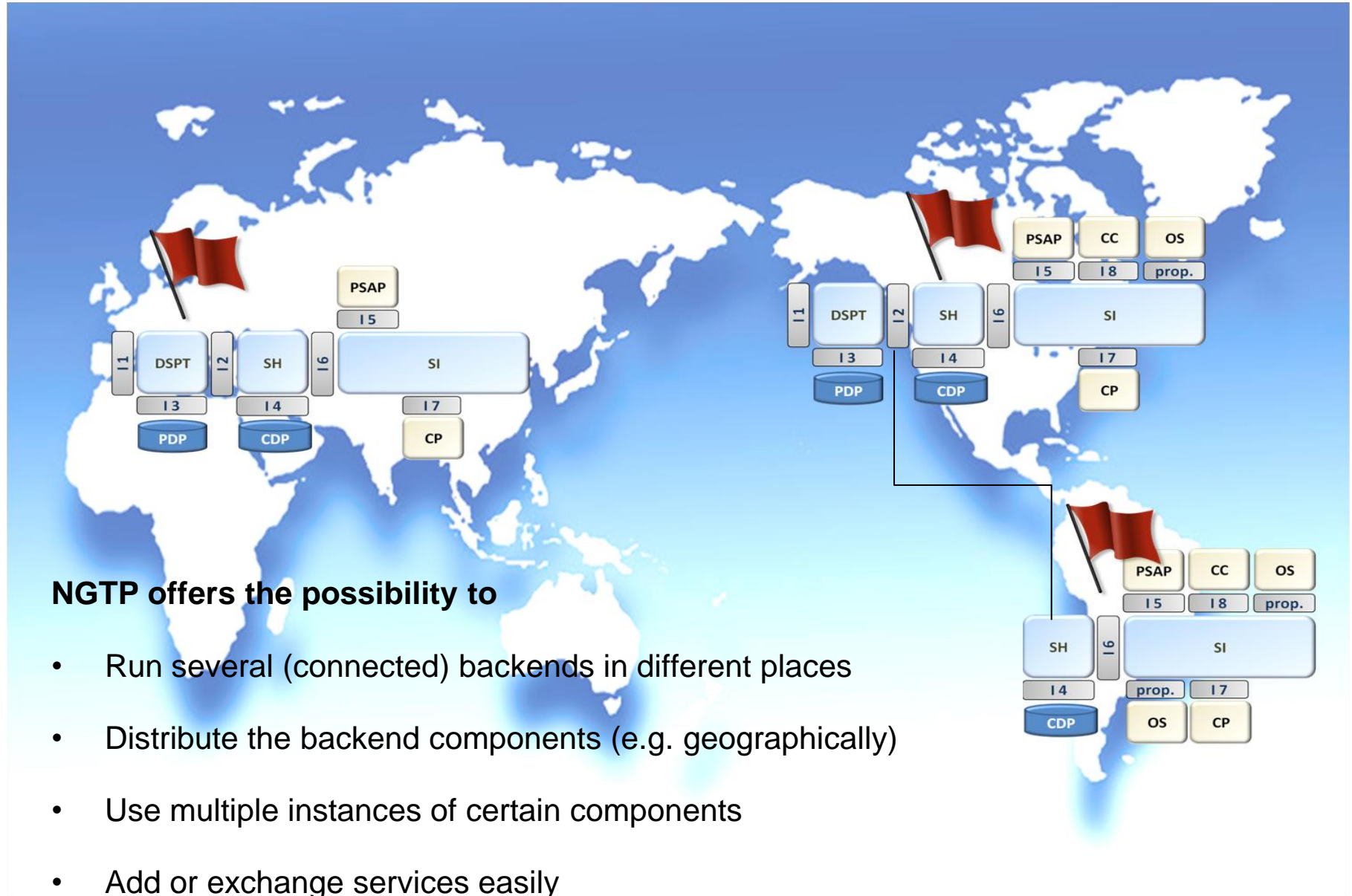
Field / parameter

Mandatory or Optional field

Assembly of a NGTP message

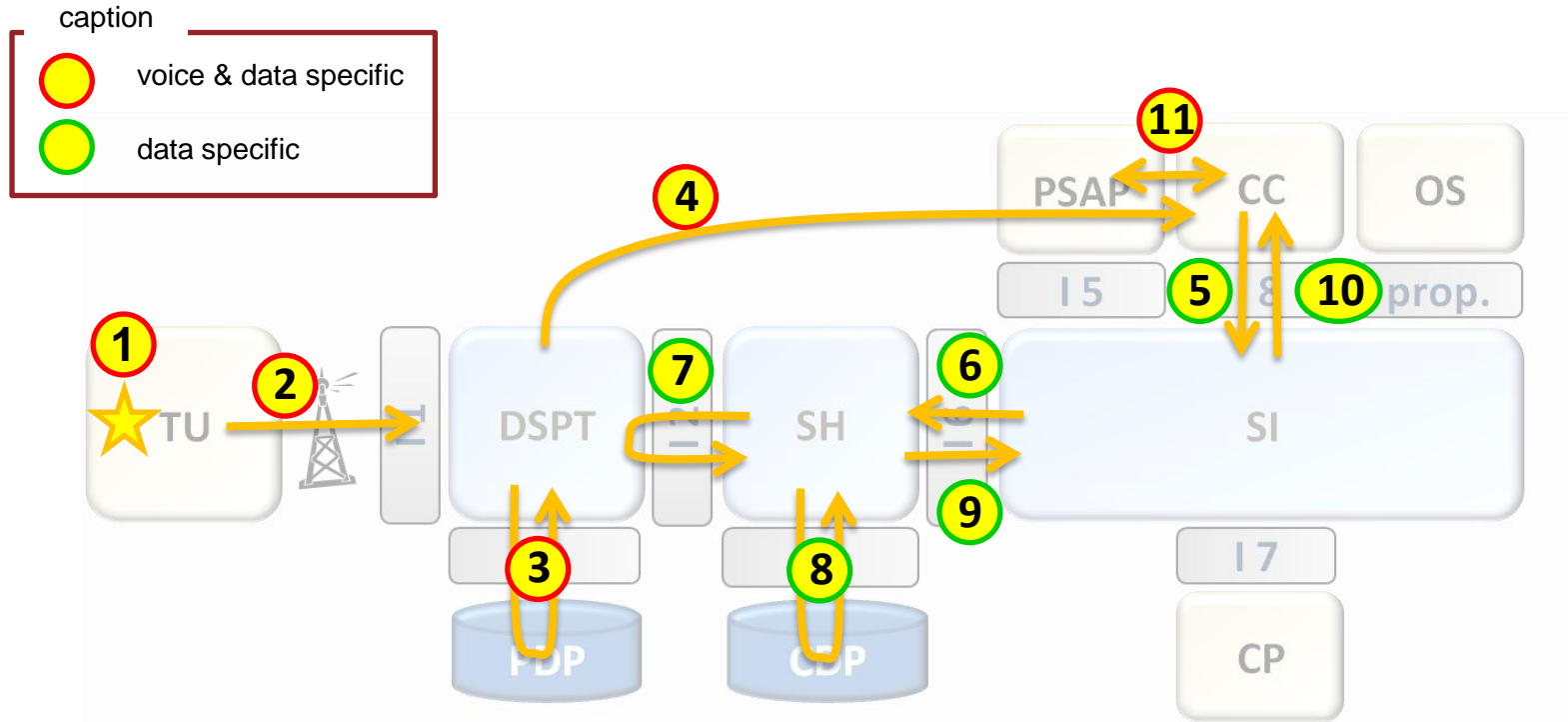


## 6. Flexibility and scalability



# 7. NGTP Basic-Pattern: Examples

## a) Establishing an emergency call (eCall)



The flow of the voice and/or data call is just one of many possible solutions. The final design depends on several aspects like country specific regulations for eCalls. The shown example has the advantage, that not all possible PSAPs must have an interface to the NGTP backend and the CC can verify if the call is really an emergency call or not.

This example only shows the establishing of an eCall, not the handling and the termination.

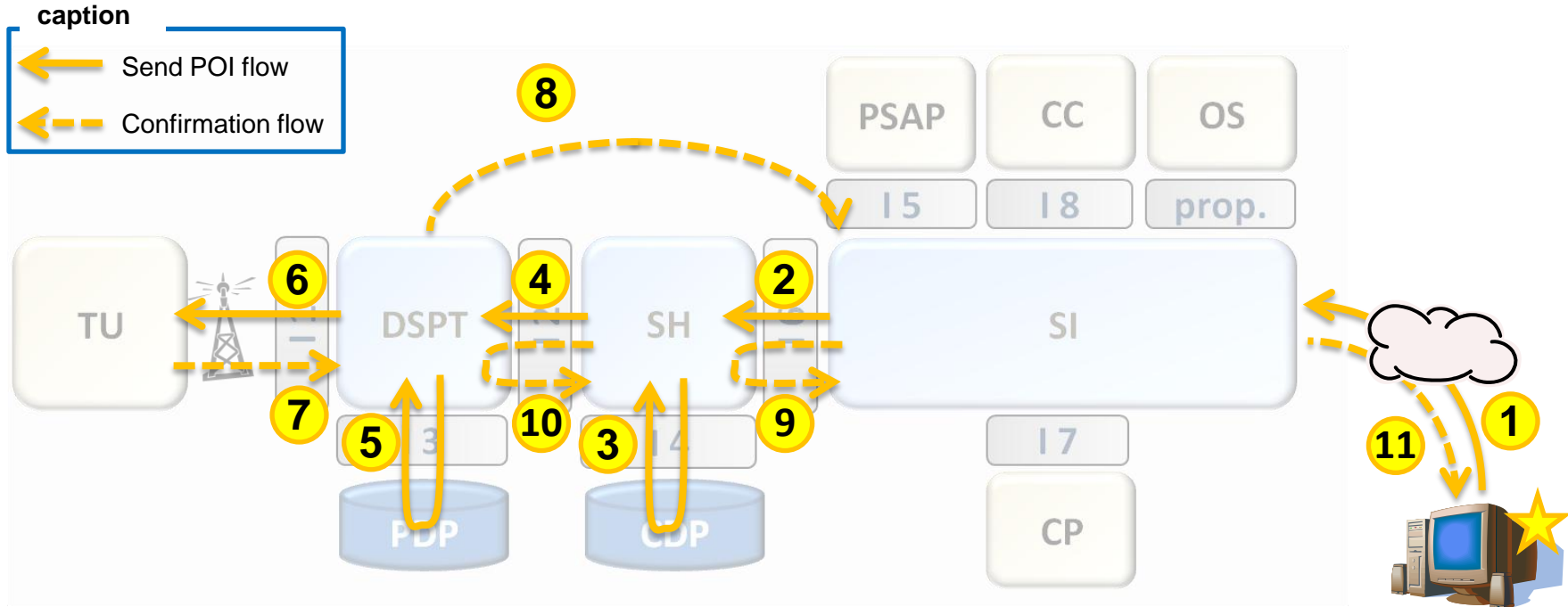
# 7. NGTP Basic-Pattern: Examples

## a) Establishing an emergency call (eCall)

Step	Description	Step	Description
1	An emergency call was initiated at the mobile device. This could happen automatically e.g. by accident sensors in the car or manually through activation by the driver or another occupant.	7	The SH fetches the new information from the DSPT and decodes them
2	The telematics unit sends a NGTP message to the Dispatcher and establishes an emergency voice call	8	The SH enriches the event data with additional information from the CDP
3	The Dispatcher retrieves the new message, decodes the message header, creates an internal EventID and queries the PDP how to handle the new message. The PDP instructs the Dispatcher to trigger the Call Center	9	The SH answers the request from the SI (step 6) with the available information
4	The Dispatcher sends a new event trigger with the new eventID to the call center, to inform it about the new emergency call. The call center accepts the call.	10	The SI answers the request from the CC (step 5) with the available information
5	The CC requests the new / additional information about the event from the SI	11	The CC handles the additional information. After ensuring that it is a real case of emergency, the CC involves the corresponding PSAP and sends it the MSD (Minimum Set of Data)
6	The SI „forwards“ the request for the new information to the SH		

# 7. NGTP Basic-Pattern: Examples

## b) Send Point of interest (POI) to the TU



As the eCall example, the data flow of sending a POI and confirming it, is just one of many possible solutions. One question cares about the main event for the confirmation. Should the backend wait for a feedback from the TU or is it enough to receive the POI from the user? Or does the user really need a feedback about the shipment of the POI?

# 7. NGTP Basic-Pattern: Examples

## b) Send Point of interest (POI) to the TU

Step	Description (send POI)	Step	Description (confirm POI shipment)
1	A user selects a POI, e. g. in a web application like Google maps, enters a receiver address and orders to post it	7	The TU confirms the receipt of the message with the POI
2	The SI converts the POI to a common format (optional) and forwards the POI and address to the SH	8	The Dispatcher sends an event update trigger to the TSP to inform it about a new message status (message sent to TU)
3	The SH checks if the user has sufficient privileges for sending a POI and fetches the technical address from the CDP	9	The SI requests the new event data from the SH
4	The SH encodes the messagedata and instructs the Dispatcher to send the POI to the given technical address	10	The SH requests the new event data from the Dispatcher and receives the new message status => answering step 9
5	The Dispatcher queries the PDP, how the data should be send and creates the corresponding NGTP message	11	The SI sends the status of sending the POI to the vehicle back to the user
6	The Dispatcher sends the message, according to the information from the PDP, to the TU.		

# 8. Getting started

**The following steps are recommended in order to implement an NGTP based telematics platform**

**a) Definition of the business requirements**

- Clarification which services (E-Call, I-Call, RemoteServices ...) are to be offered?
- Definition of the countries where the services should be available (=> are there any regional specific regulatory requirements that must be mentioned?)
- Which TUs should communicate with the backend?
- Who is allowed to use a service and what about charging?
- ...

**b) Technical preconditions**

- Which communication channels are used by the TUs (Voice, SMS, IP, HTTP...)?
- Which bearers can be used to trigger the TU's (Voice, SMS, IP ...)?
- Are there any requirements concerning hosting (Legal restrictions or existing datacenters)?
- ...

**c) Partnering**

- Which NGTP components are developed by which partners?
- Which NGTP components are operated/hosted by which partners (in which country)?
- Which partner cares about the bearers?
- ...



# 8. Getting started

## d) Technical specifications and cross-cutting aspects:

- Bearer selection
- Selection of NGTP protocol version and encoding
- Specification of interface technology (webservices, MQS, Corba, RPC,...) for each interface
- Specification of security mechanisms
- Specification of common logging and monitoring requirements for the components
- ...

## e) Implementation of the components “from left to right” (DSPT=> SH => SI...)

## f) Integration of the components

- Local tests
- Comprehensive tests

## g) Go!

## h) Evaluate monitoring results

## NGTP Group members



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