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OPERATIONAL DATA EXCHANGE

TMP operation management and coordination among centres

Overview



- **Operational Data Exchange and TMP Management**
 - ▣ Requirements for TMP Management coordination among centres
 - ▣ TCC / TMC Operational Context
 - ▣ Information Communication and Validation
 - ▣ Exchange Operating Levels and Feedback
- **High Impact Events Operating Environment**
 - ▣ Emergency Management Scenarios
 - ▣ TMP in DG 2012 and definition
- **TMP Management with DATEX**
 - ▣ Traffic Management Plan Execution
 - ▣ TMP Management with DATEX
 - ▣ TMP and Feedback Publication Extension
 - ▣ DATEX pros and cons for TMP Management

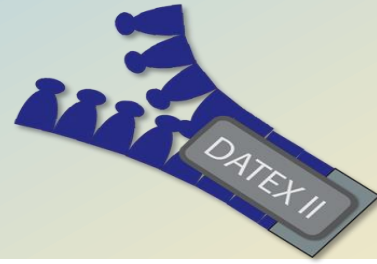


Operational Data Exchange and TMP Management

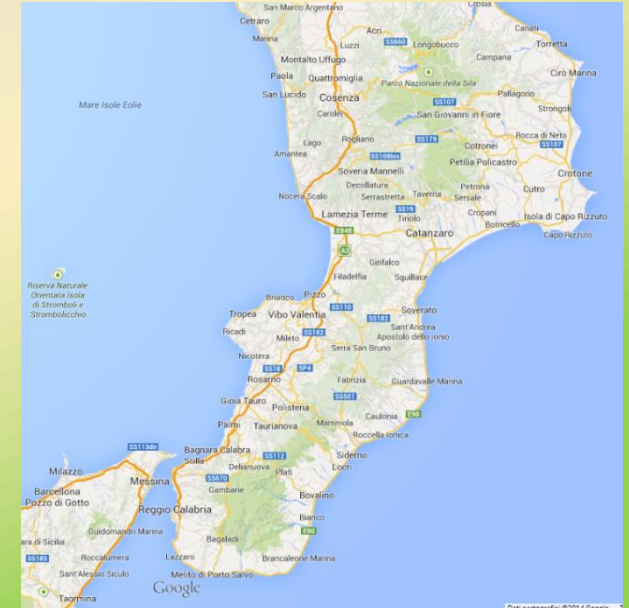
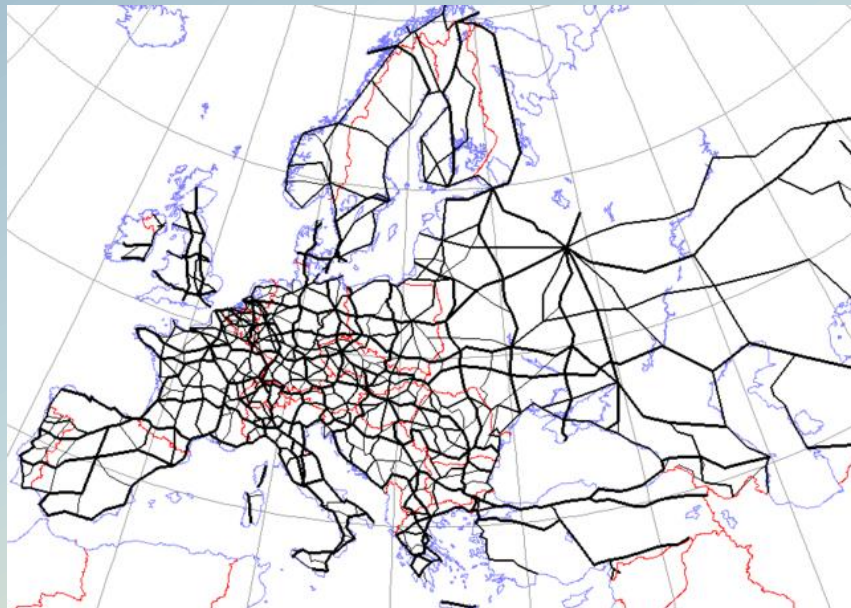
Use of DATEX II data exchange for Operational Purposes



Road Operator



- Operation of most considerable and strategic roads and highways management
- Interconnection of networks with different level and competence



Road Operation Objectives

- **Full Efficiency in Road Management**, within the frame of the following main objectives for travelers

Safety



Level of Service



Comfort



Information in Emergency Situation

High Impact Traffic Disruption

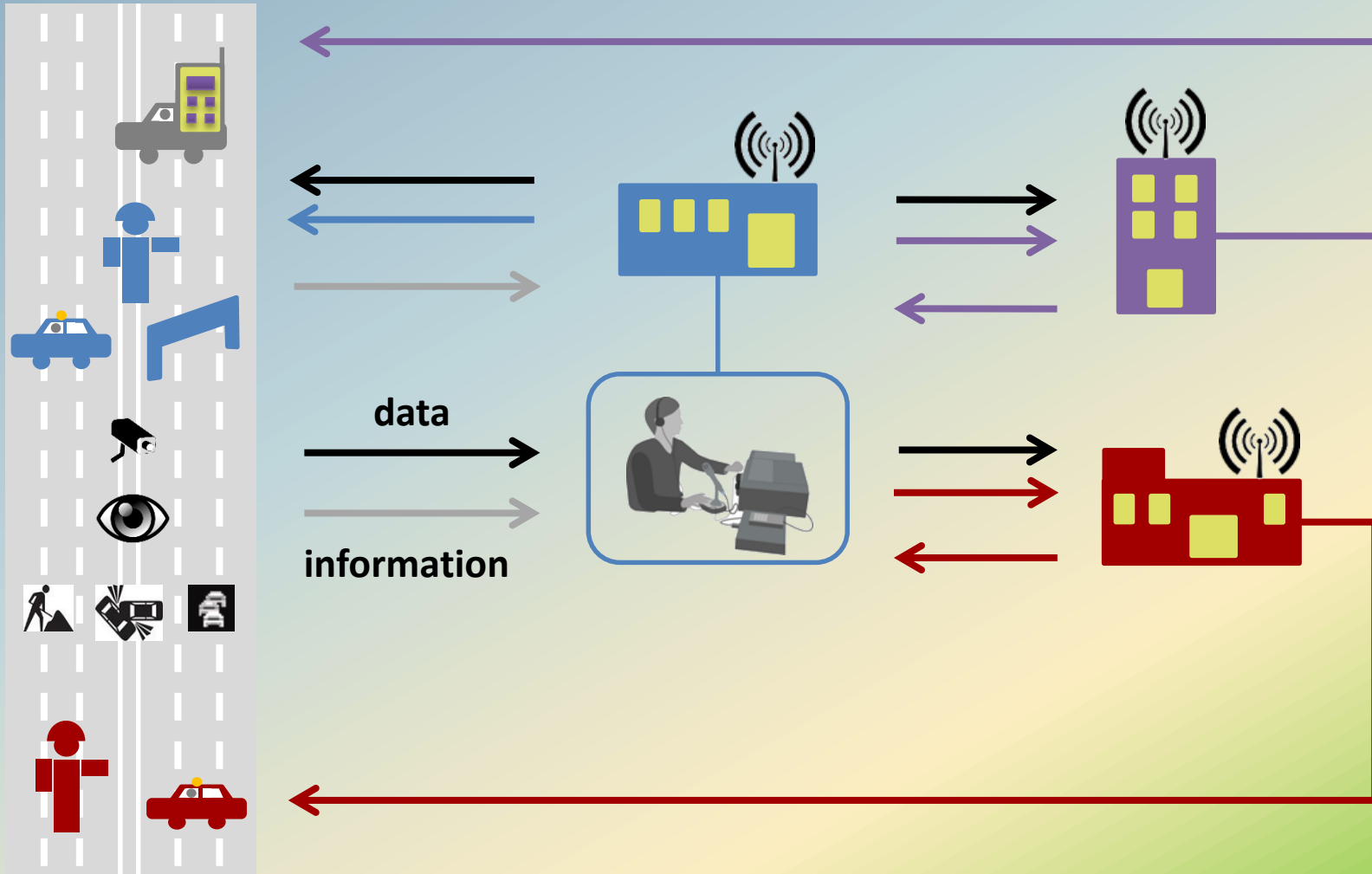
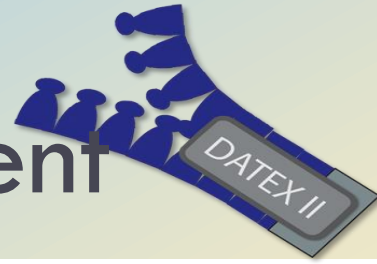
In order to prevent inconveniences and discomfort when risk of long delays in queues and traffic disruption is high, information is to be provided so drivers can choose alternatives to skip congestions.

Information provided is needed to be:

- **Timely**
- **Reliable**
- **Consistent**

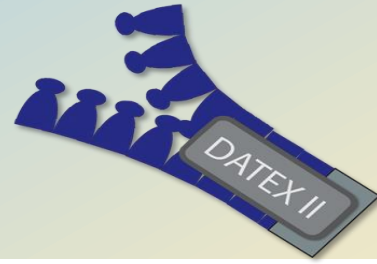


Actors and Information in Road Management

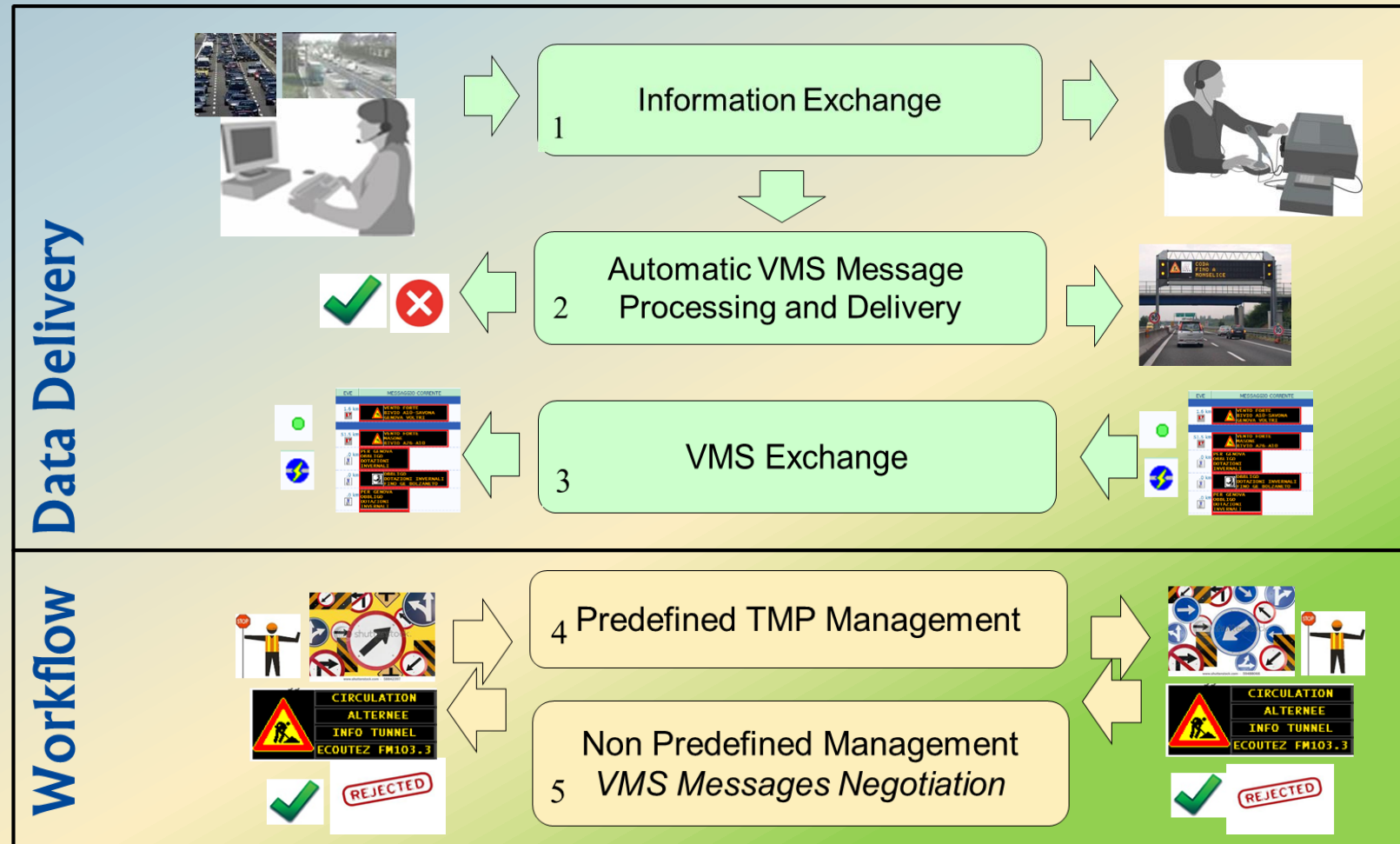


- Road Operator
- Traffic Control Center
- Data and information collecting
- Internal Communication
- Patrol Management
- Rescue Services
- Authorities
- SP Information Delivery Services
- Feedback

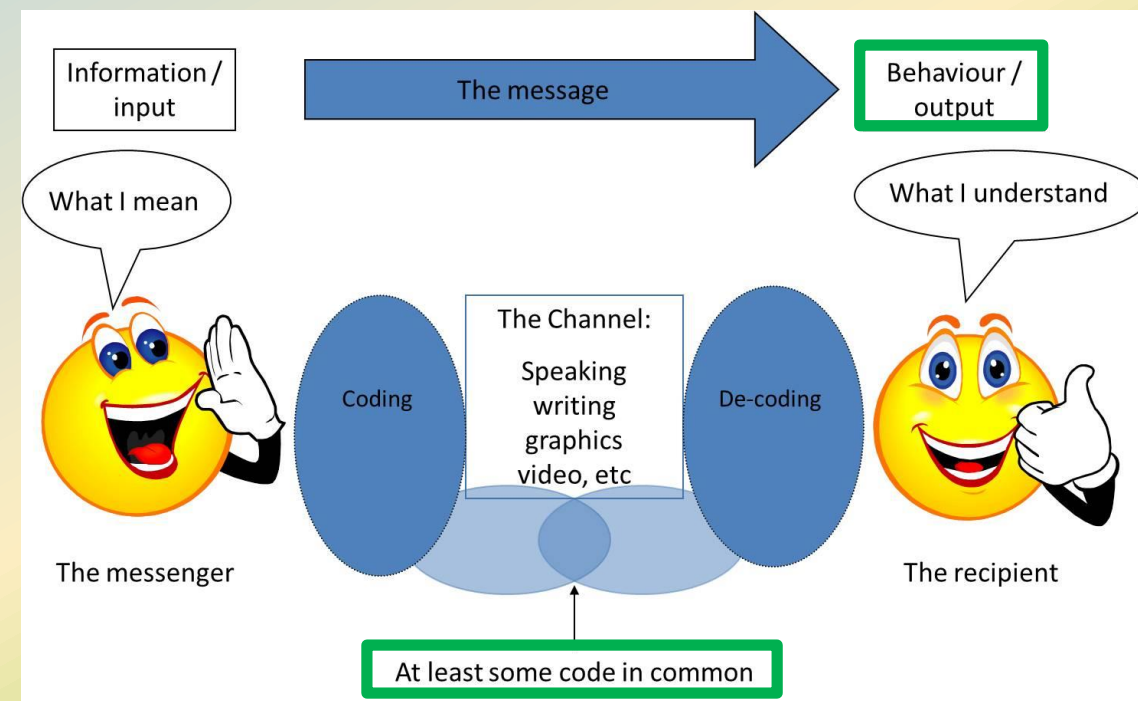
Operational Data Exchange Requirements



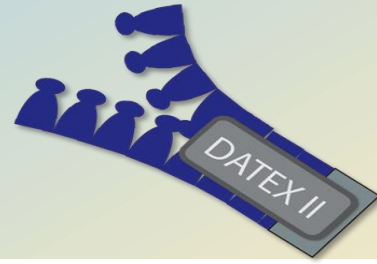
- Timeliness
 - ▣ Push
- Full Reliability
 - ▣ Session Management
 - ▣ Link Monitoring
- Management Use Case
 - ▣ Processing Feedback
 - ▣ Workflow Management



High Impact Events Operating Environment

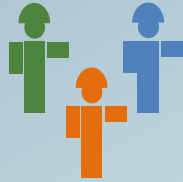


Emergency Operations



Intervention Teams

Monitoring Patrol
Maintenance Patrols



Emergency Signposting

Placed by intervention teams or authorities
Prepared for temporary events planned as constructions



External Operators

Maintenance Companies
Rescue Organizations



Variable Sign Devices

Variable Message Panels
Dynamic Lane Control
Dynamic Speed Control
Access ramps traffic lights



Authorities and Institutional Entities

Police
Ambulance
Governative and Local Authorities



Information

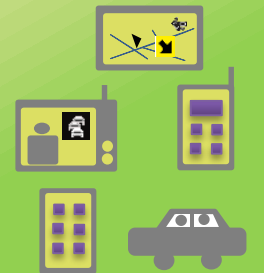
Navigators

With RDS TMC or DAB

Mobile

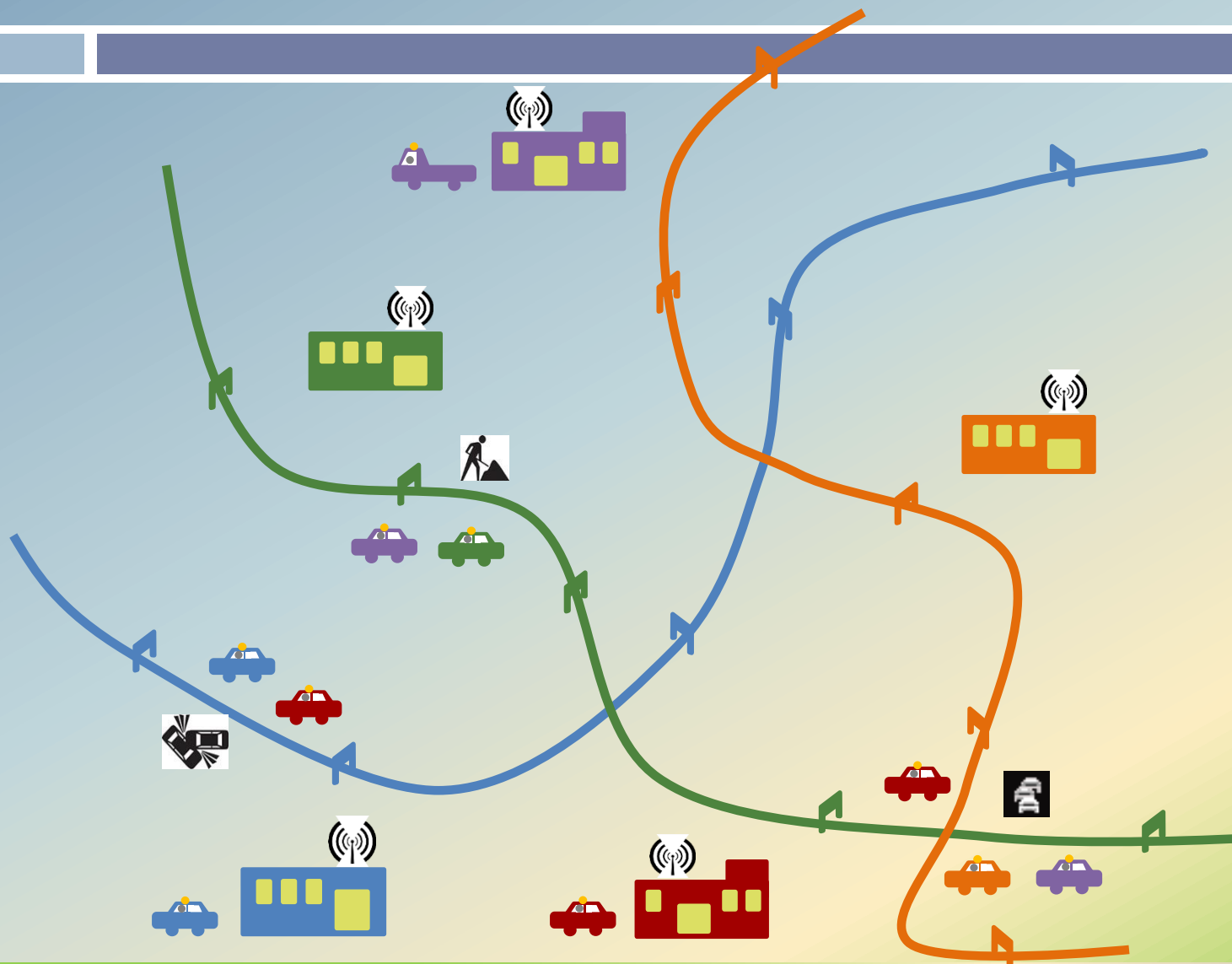
Call Centers Services
Browsers or smartphone applications

Other in-car devices





Road Management Cohordination



- Road / Motorway Operators
- Authorities
- Emergency Operators

Composite Situations
Occurrences

TMP Design (DG TMP 2012)



1. Context definition

- Network
- Operators
- Infrastructure

Feasibility Study

2. Definition of High Impact Scenarios



3. Management Measures



- Operations
- Information
- Signs



4. TMP Elaboration





SCHEDA TECNICA 1.1 deviazione SS - SR - SP


  **PADOVA EST** deviazione SS - SR - SP



  **PER VENEZIA**
A4 CHIUSA
RIENTRO MIRANO

  **CHIUSURA ENTRATA PADOVA EST IN DIREZIONE VENEZIA**

 SS - SR - SP

 **PER VENEZIA**
A4 CHIUSA
RIENTRO MIRANO

 **CHIUSURA RAMPA DI RACCORDO A15/A4 PER VENEZIA** deviazione A4 **PER MILANO**

PMV A15   **A4 CHIUSA**
PER VENEZIA USCIRE
PADOVA SUD PADOVA ZI

TMP Definitions

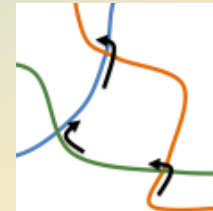
Scenario

- ▣ Based on TMP Design
- ▣ Recognized
- ▣ Decision Support Tools



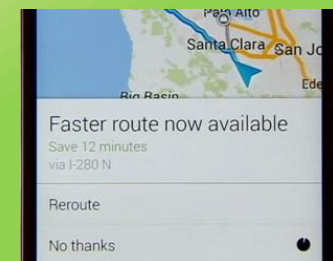
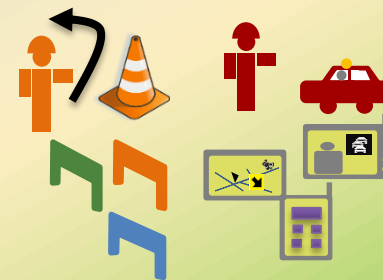
Measures

- ▣ Agreement Acknowledge

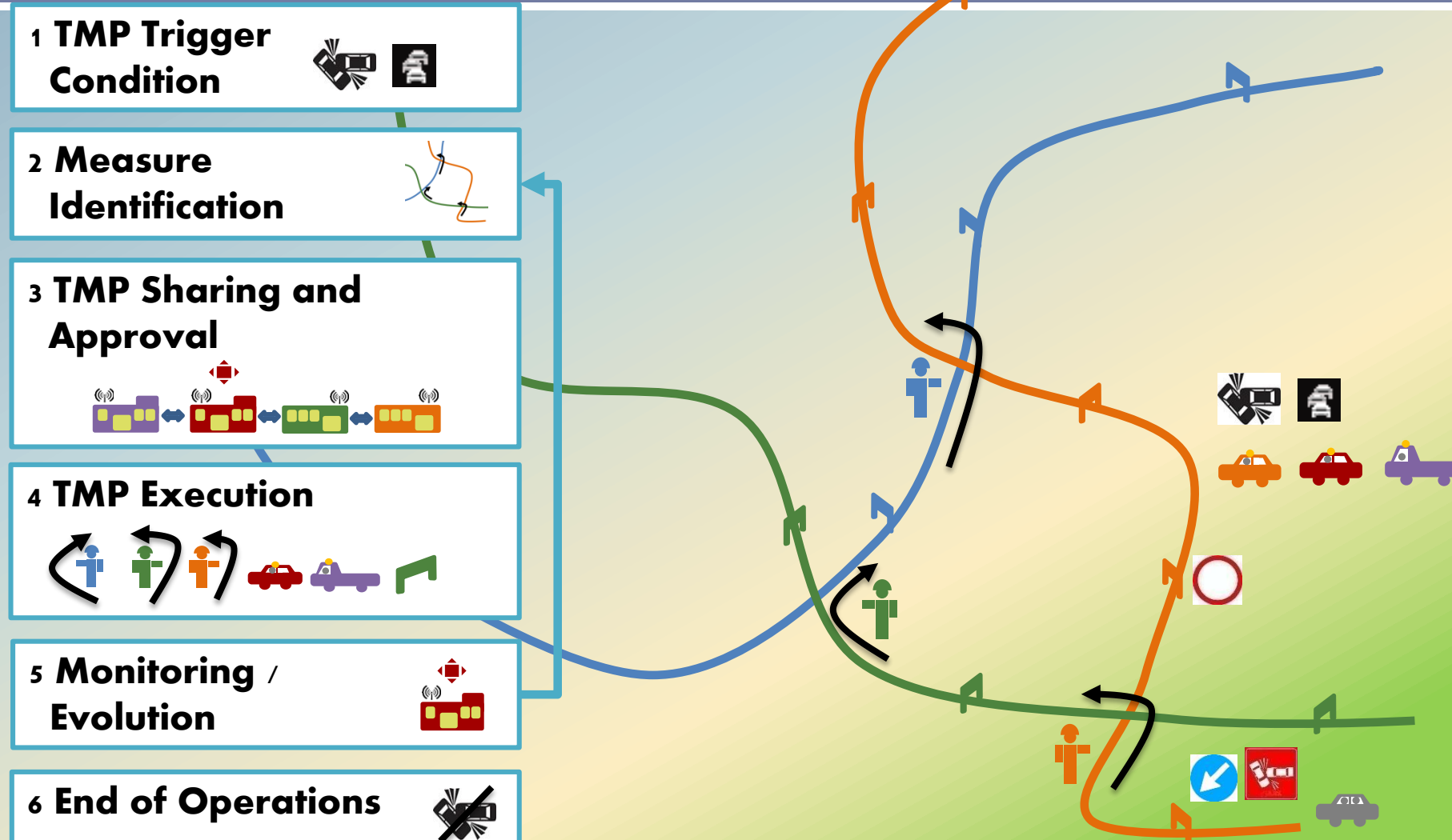


Actions

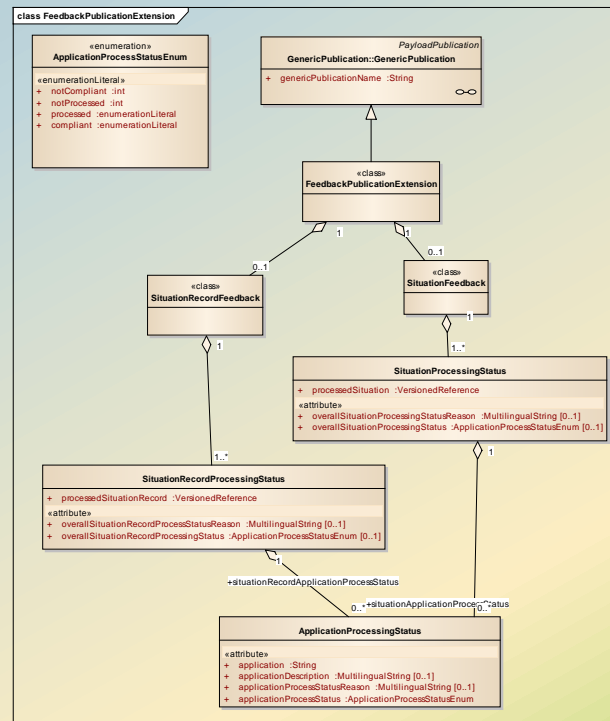
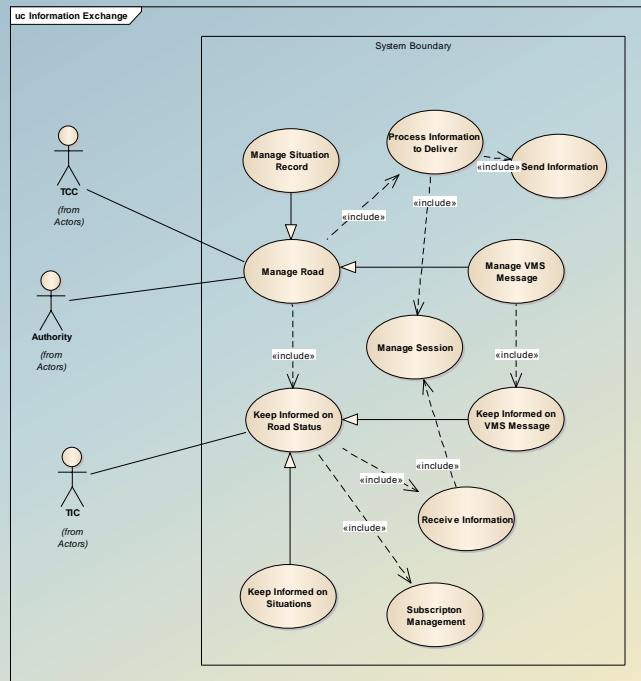
- ▣ Implementation



Operating TMPs



TMP and DATEX II



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History of DATEX II TMP approach



- ❑ In the frame of ESG2, a supporting action was created to analyze the viability of the use of DATEX II in Traffic Management Plans. This work was initiated as task of ESG2 group TMS (Traffic Management Systems) and ESG5 DATEX II.
- ❑ The activity had been further developed in a coordinated way between: the TMS-SA03 “DATEX II and TMPs” [1] and the Activity 5.3 “Support to TMPs” from ESG5.
- ❑ From ESG5 WI5.3 a proposal to manage TMP with DATEX II had been presented to EGS2 Technical Group in 2011-2012;
 - ❑ The DATEX Italian team composed by several Motorway Operators and Road Operators (ANAS) had started reviewing it.
 - ❑ Some concerns had been elaborated by Italian Motorways operators, widening the principles of DATEX as Data Exchange for operational purposes and a global management of Information and Operation among Centres and specific operations for TMP management with DATEX II has been elaborated
- ❑ PON01_01501 Landslide Early Warning a chance to implement a first pilot

DATEX II Operational Approach



❑ **Feedback** to be aware of Information:

❑ **Received**

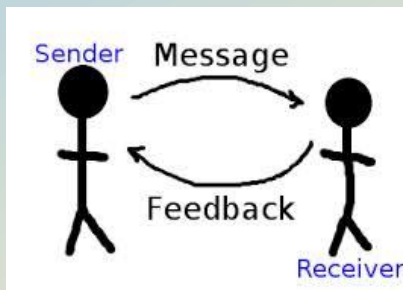
❑ *Intrinsically available in DATEX II*

❑ **Correct / Understood**

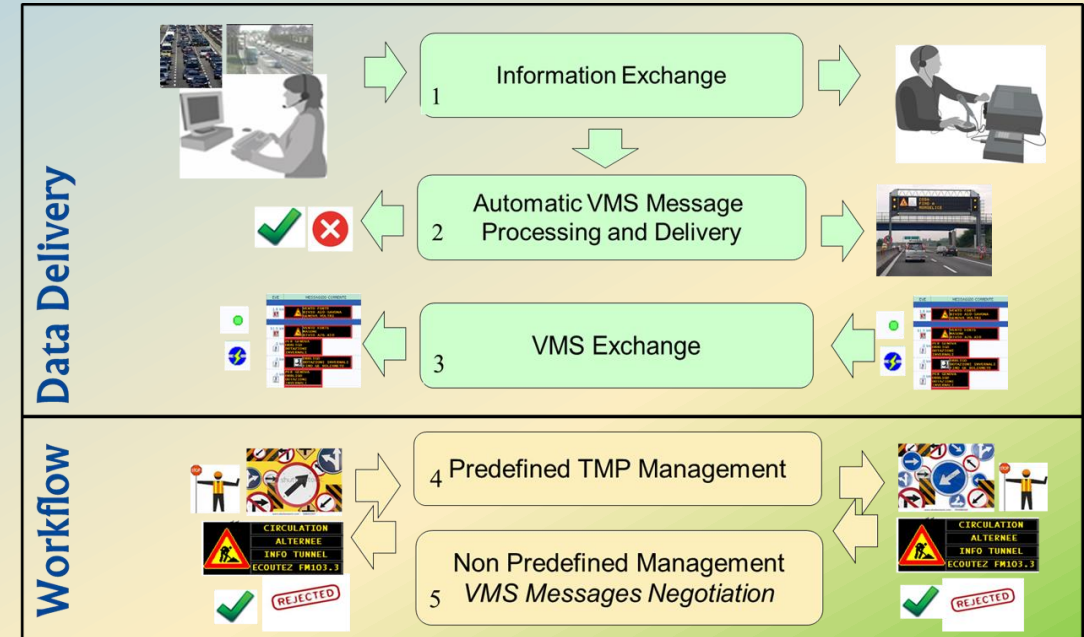
❑ **Viewed / Managed**

❑ **Implemented**

❑ *Implemented by Feedback Extension*



= **Communication**



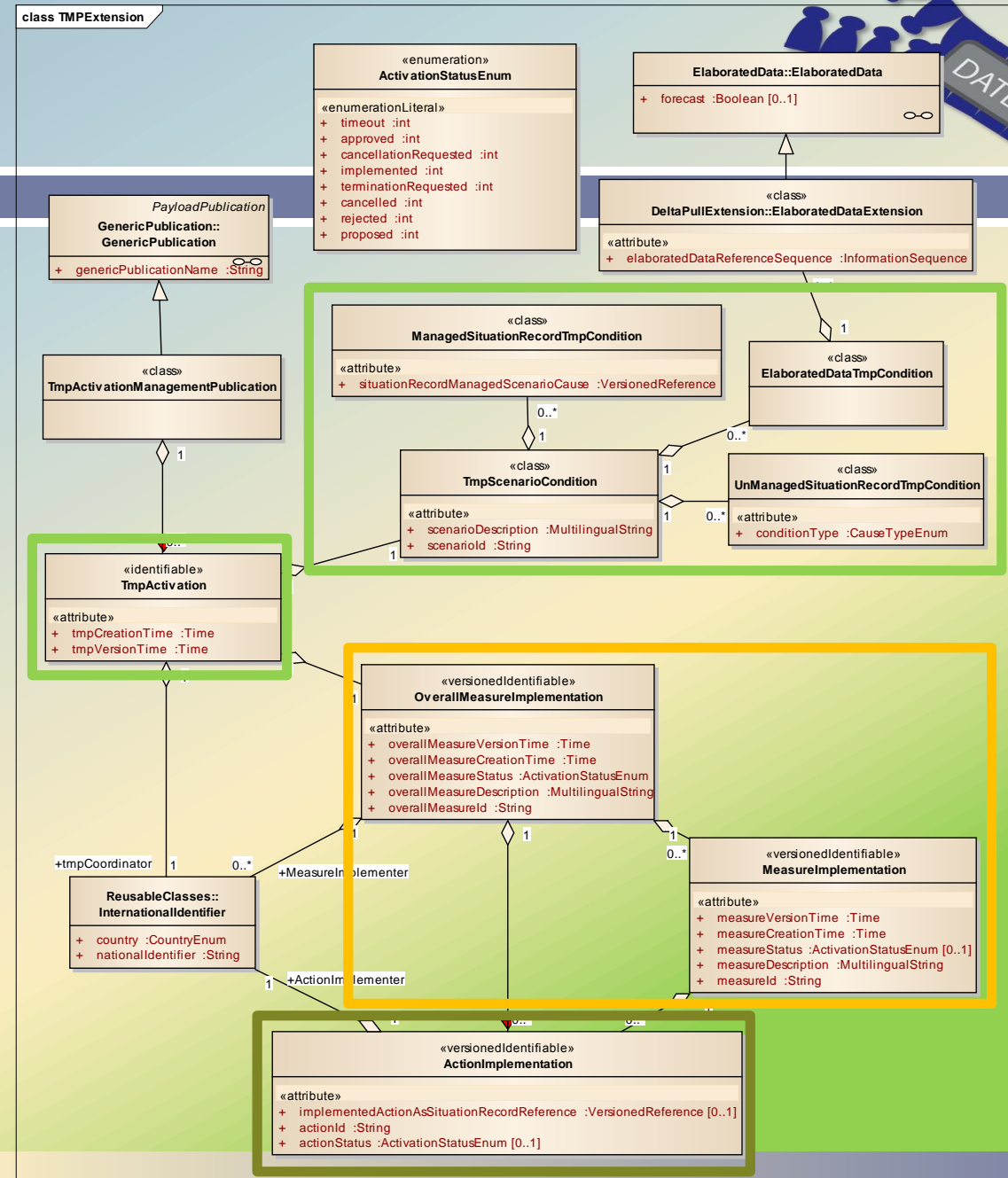
- ❑ DATEX Client / Supplier
- ❑ Bilateral = Peer to Peer Communication
- ❑ Delivery of Information e Feedback

TMP Extension

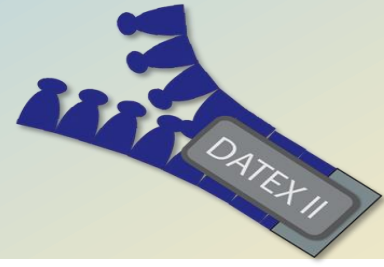
- TMP Activation
 - Triggered by Scenario Condition Recognition
- Overall Measure / Measure
 - Use of Measure based on definition and local usage

Overall Measure / Measure
 «reduce traffic flow towards Amsterdam»
 «M1 closed from J22 to J33, traffic via RN293»

Actions
 Single Activities by each Operator



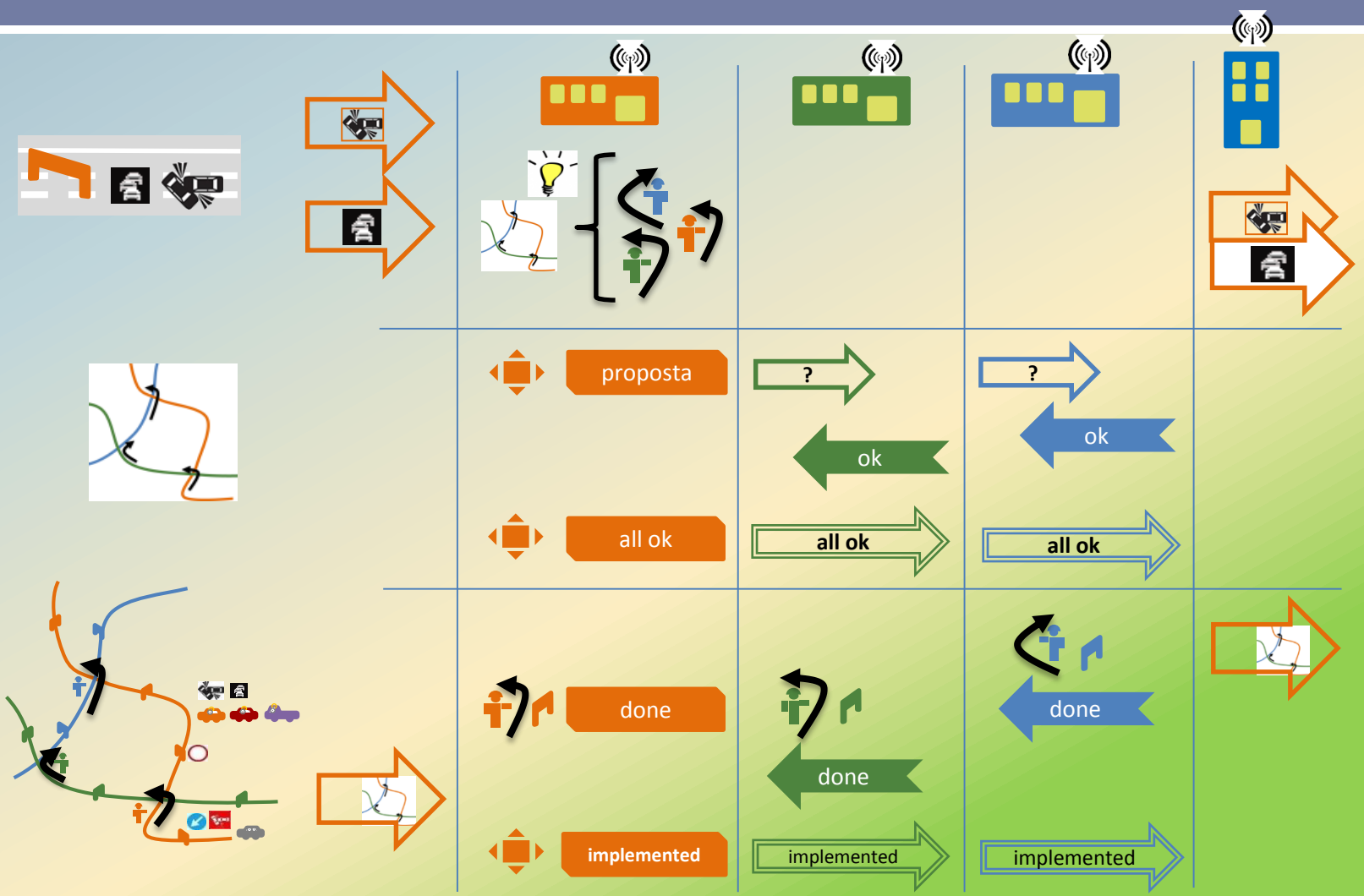
DATEX II TMP workflow management



**Cohordinator
Node manage
Workflow**

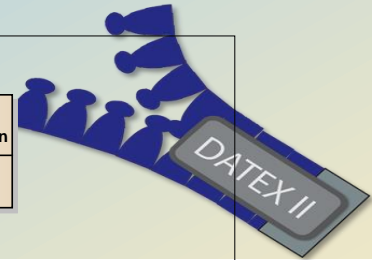
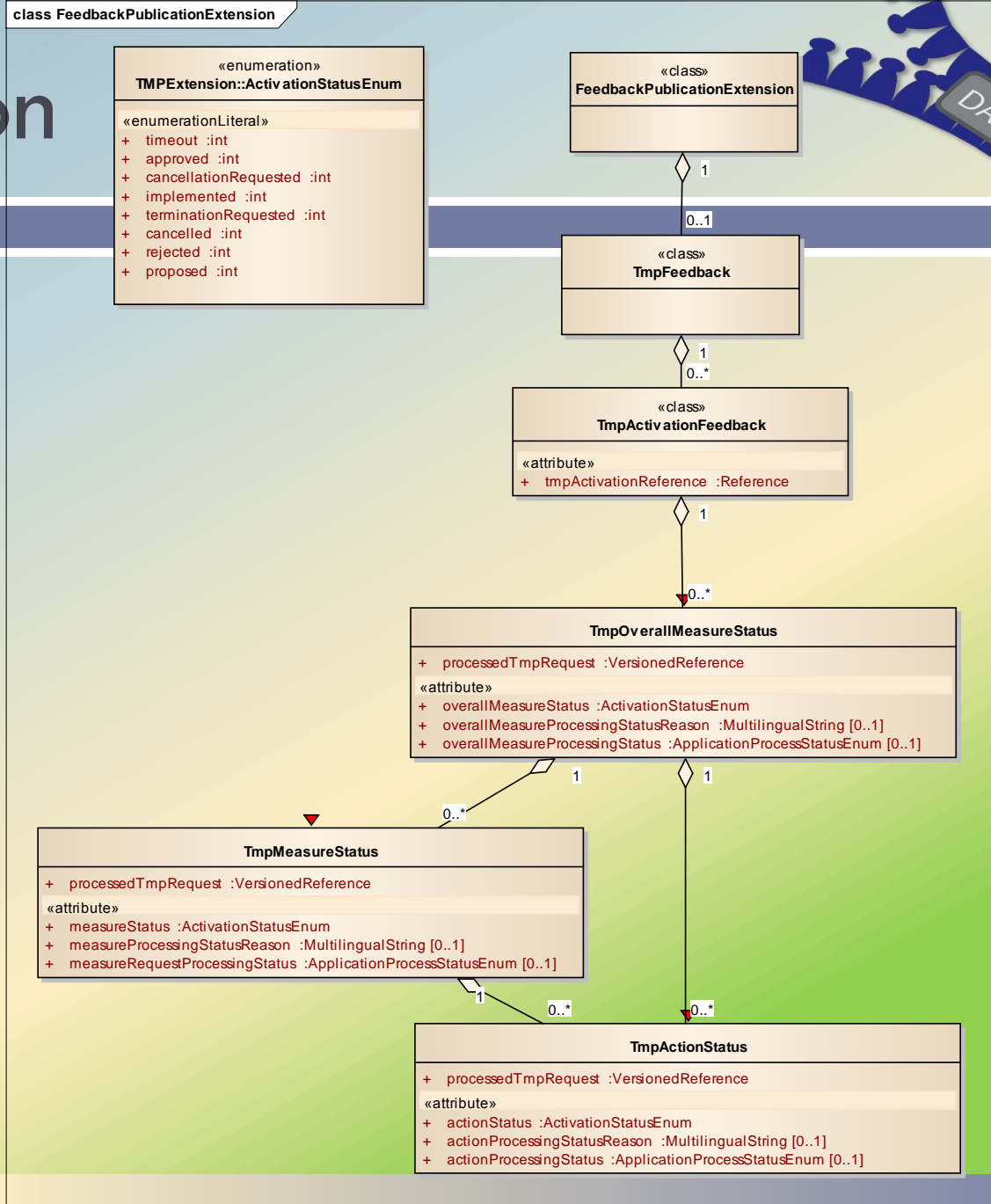
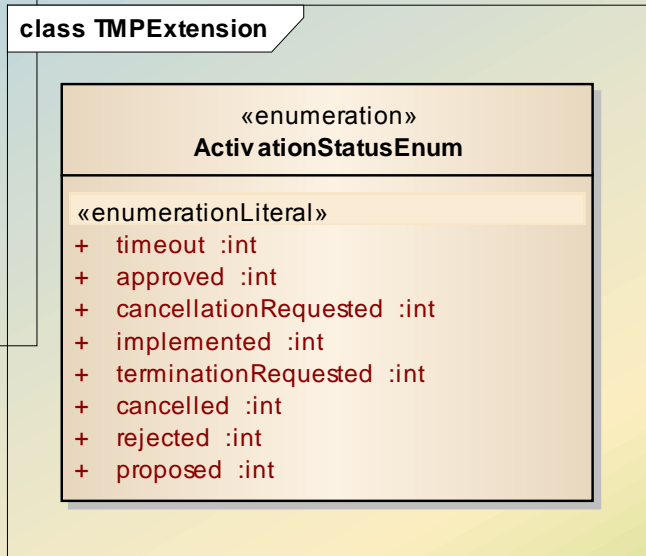
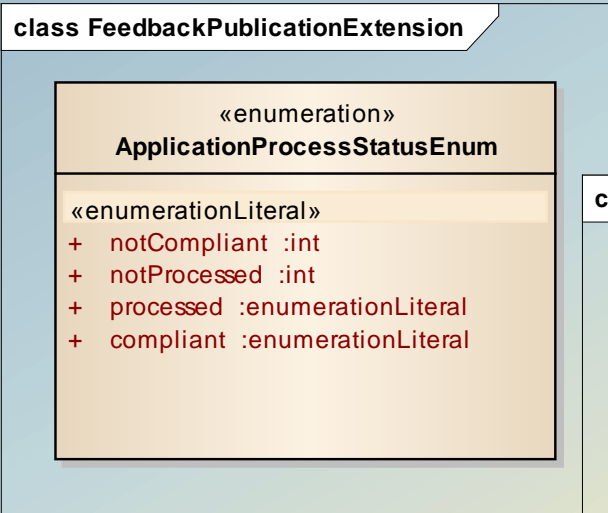


**Recognise Scenario
and issue the First
Request**



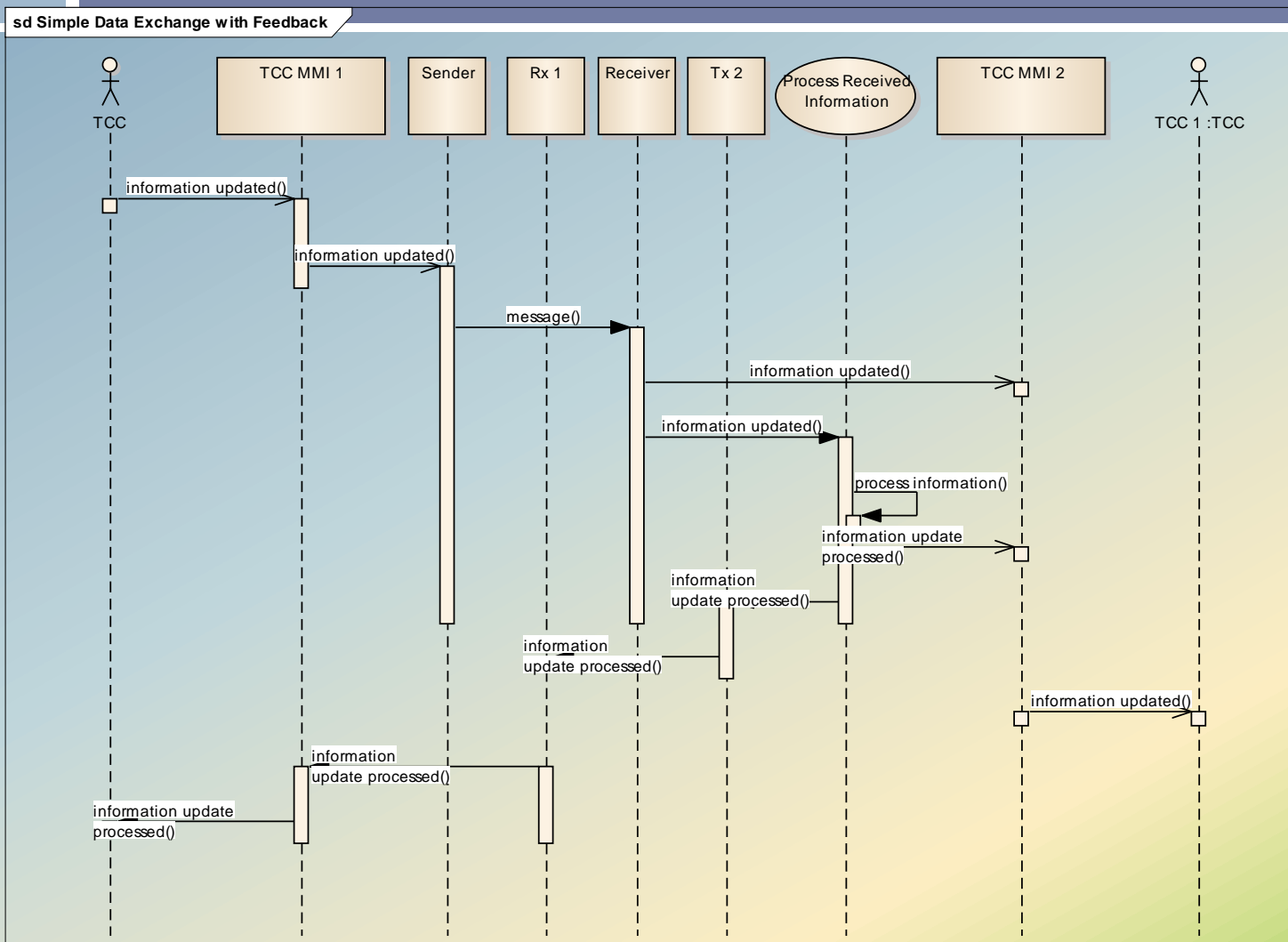
TMP Feedback Extension

- Status
 - Communication
 - TMP / Measure / Action





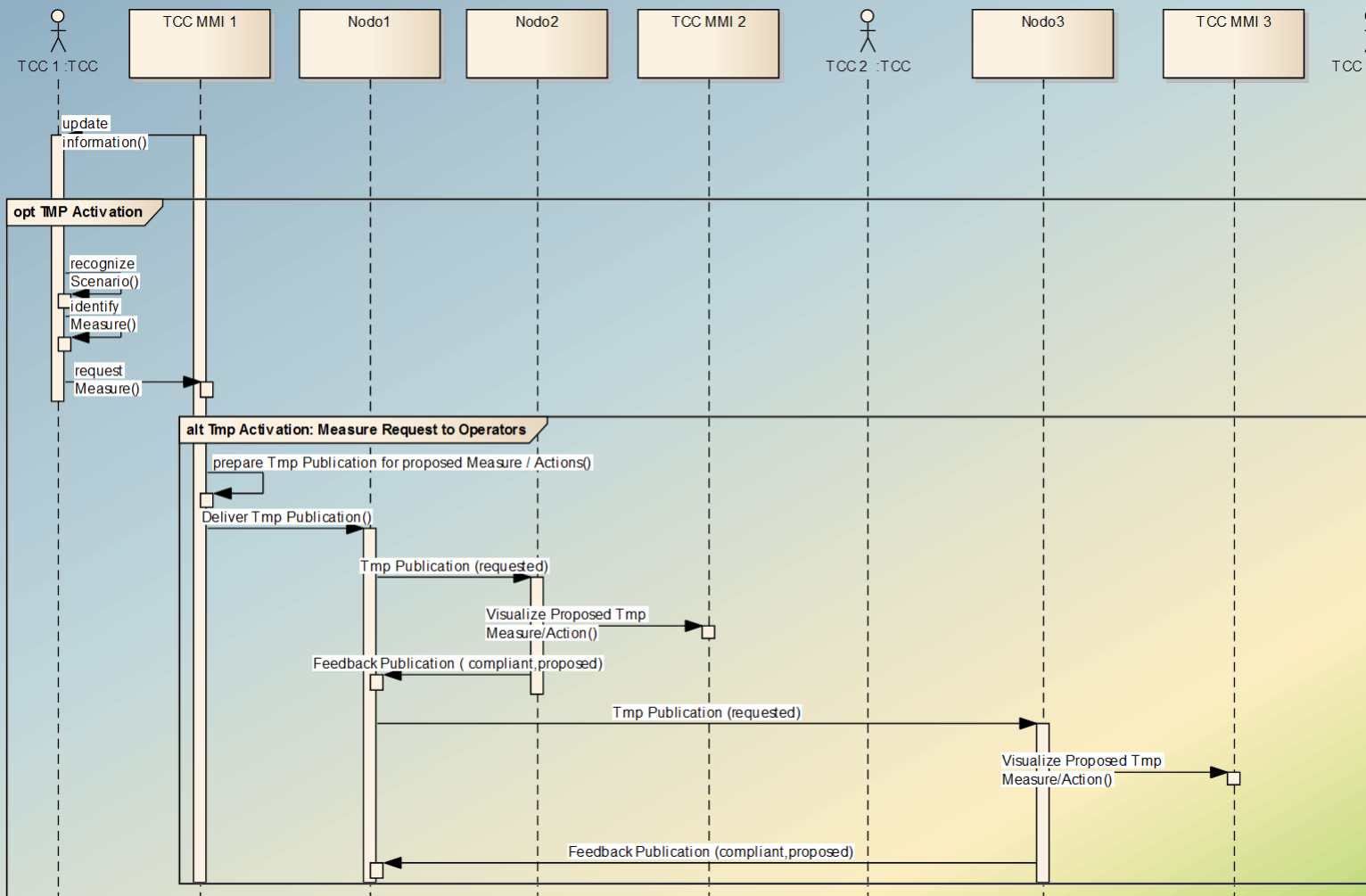
Actors in modeling interaction



(from Actors)

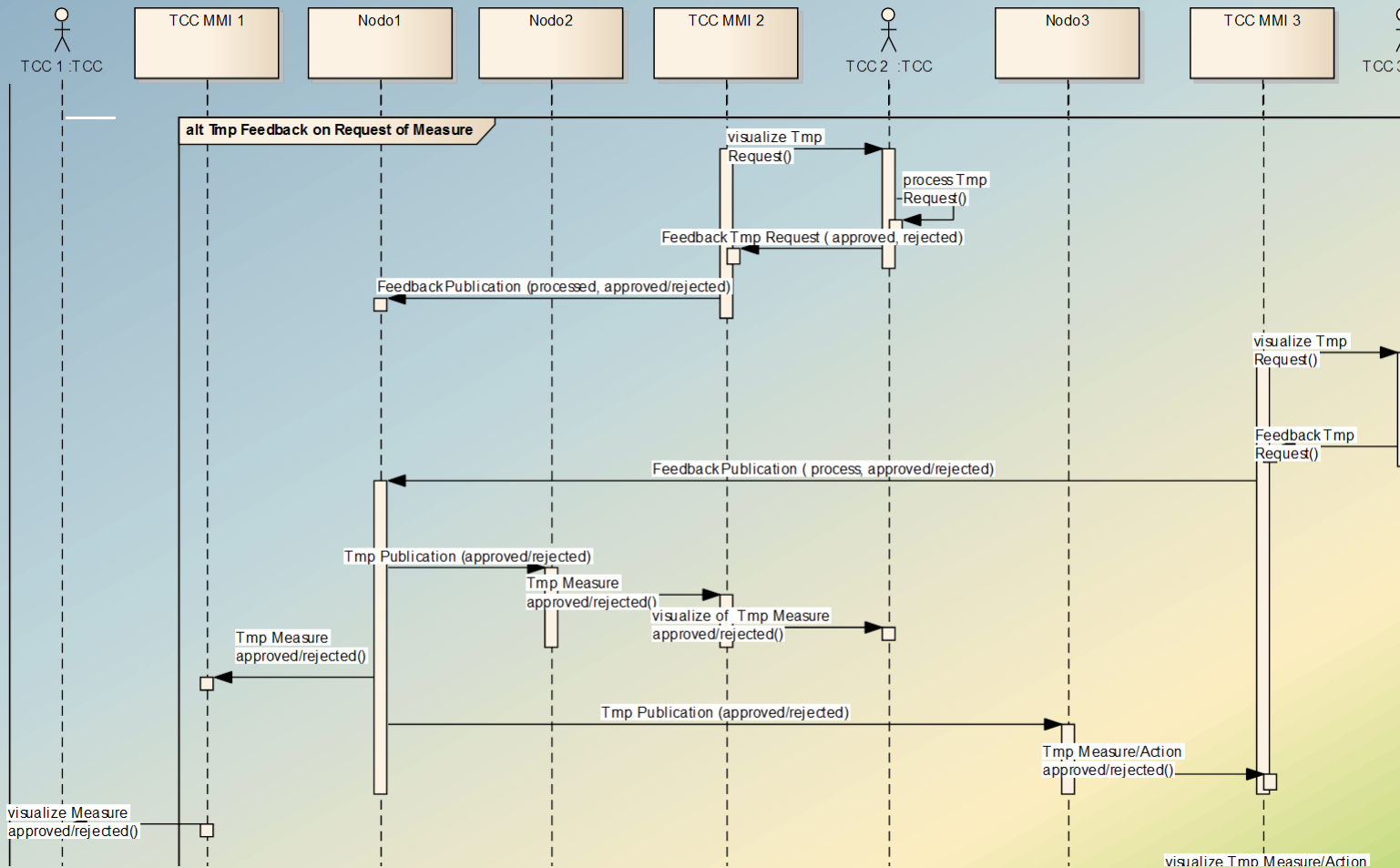
- Operator involved: human
 - ▣ See Information updates
 - ▣ Evaluate
 - ▣ Send Feedback
- TCC MMI
- DATEX nodes
 - ▣ Rx / Tx detail
 - not needed but explicit here
- Processing

Sequence Diagram Detail



- TCC Recognise Scenario and as Cohordinator
 - Deliver TMP Activation Request
 - for specific Measure
 - Send Feedback for TMP request processing for compliance

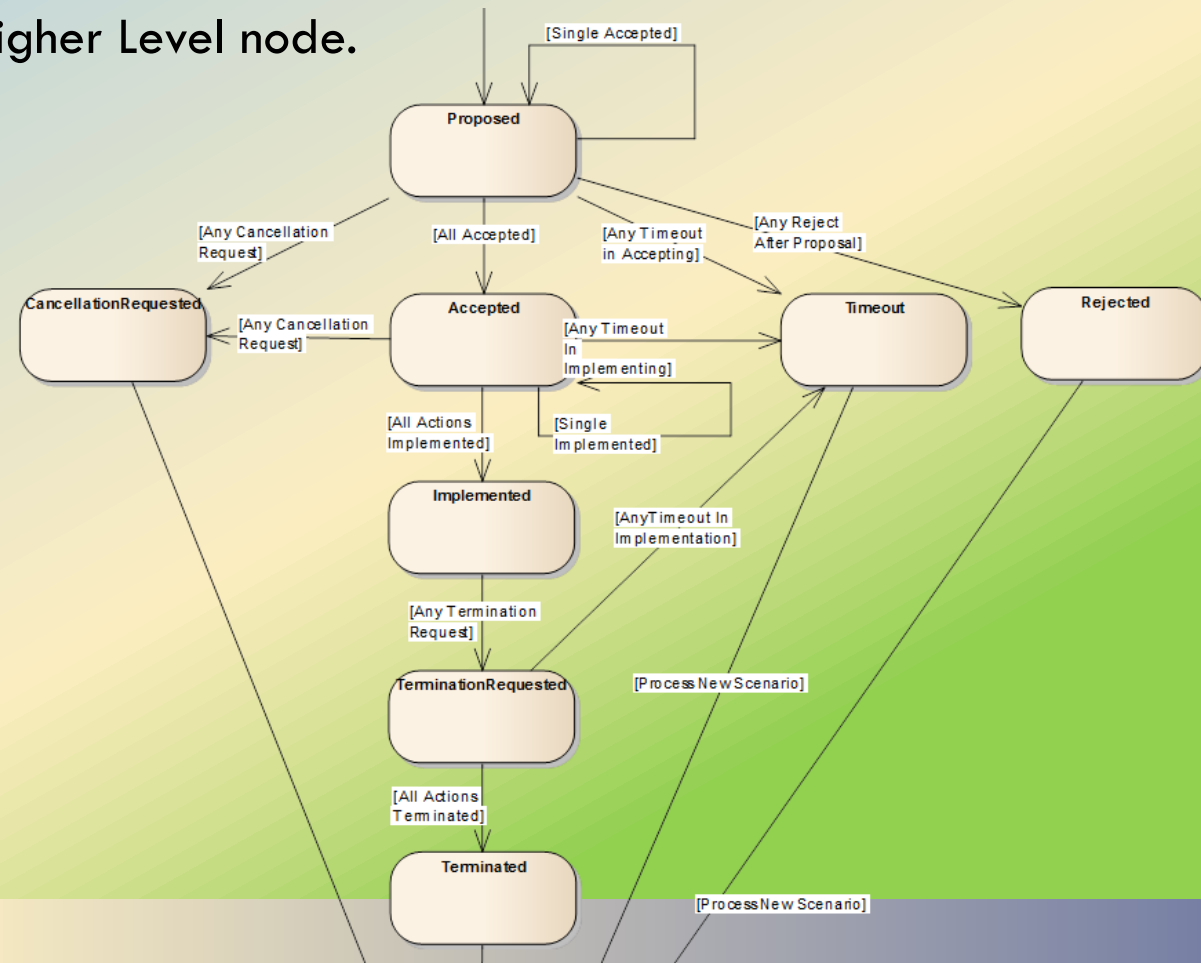
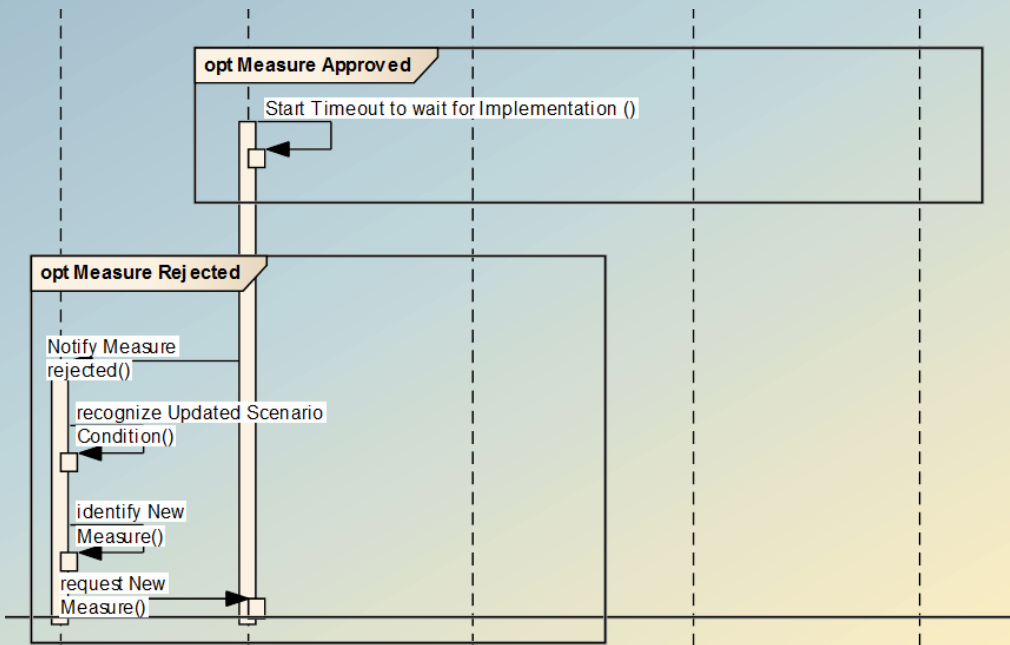
Approval / Rejection Feedback



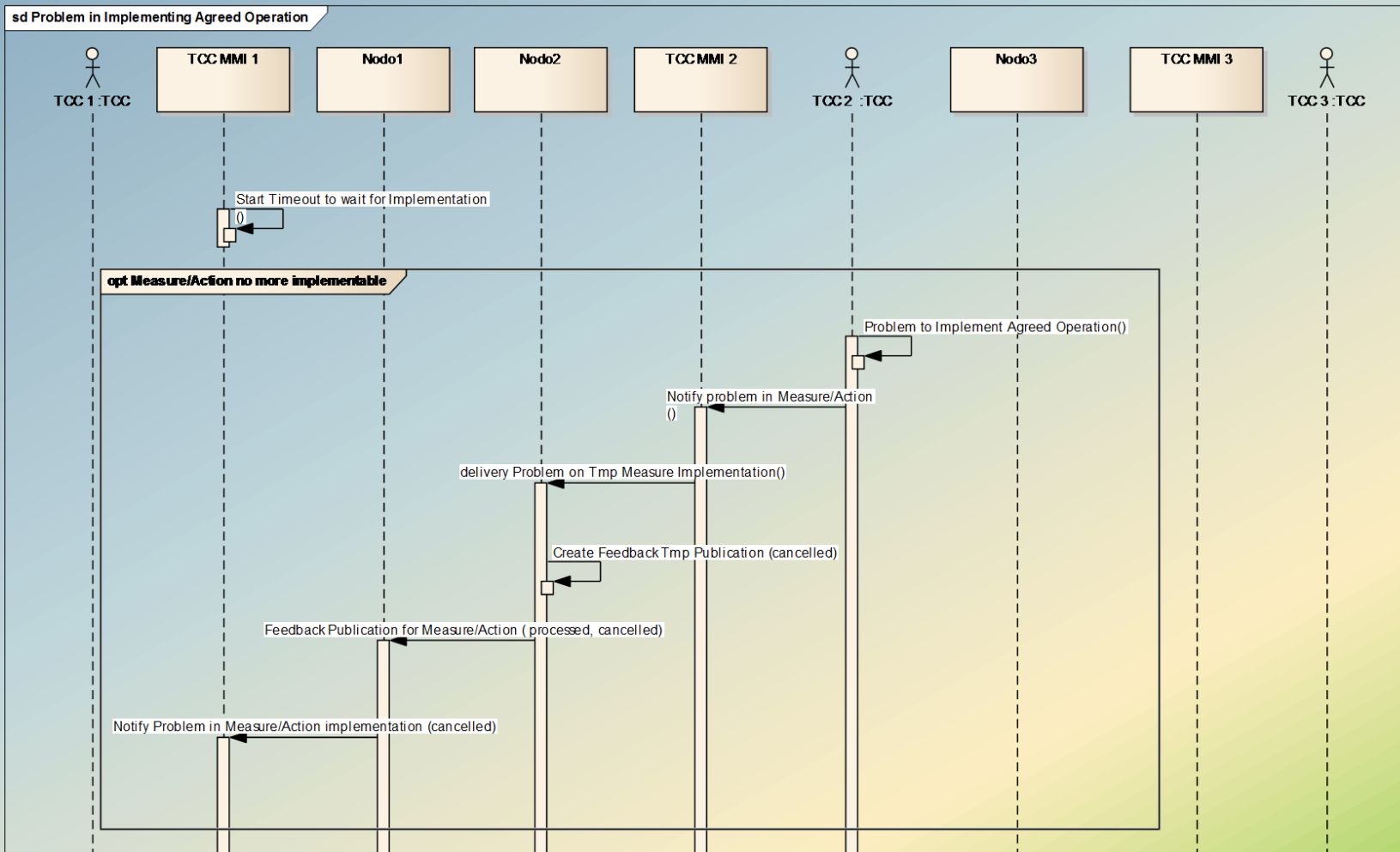
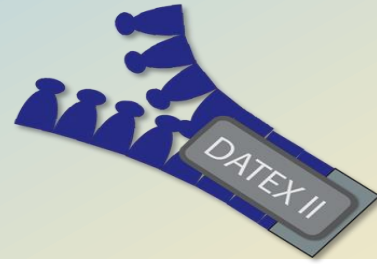
- In TMP Involved Nodes
 - ▣ Operator Manually Process Proposed TMP Request
 - ▣ Accept / reject the Request
 - ▣ Send Feedback on Approval / Rejection to Coordinator

Error and Timeout Management

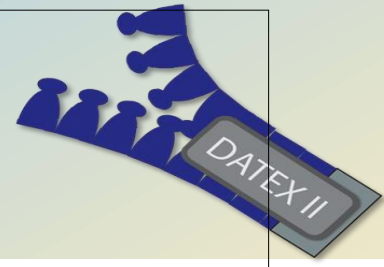
In case the Measure is not implemented as one or more nodes are not able to implement their related measures/actions this condition is notified the Coordinator Node and there has to be managed as a new Scenario has arised or passing Control to a Higher Level node.



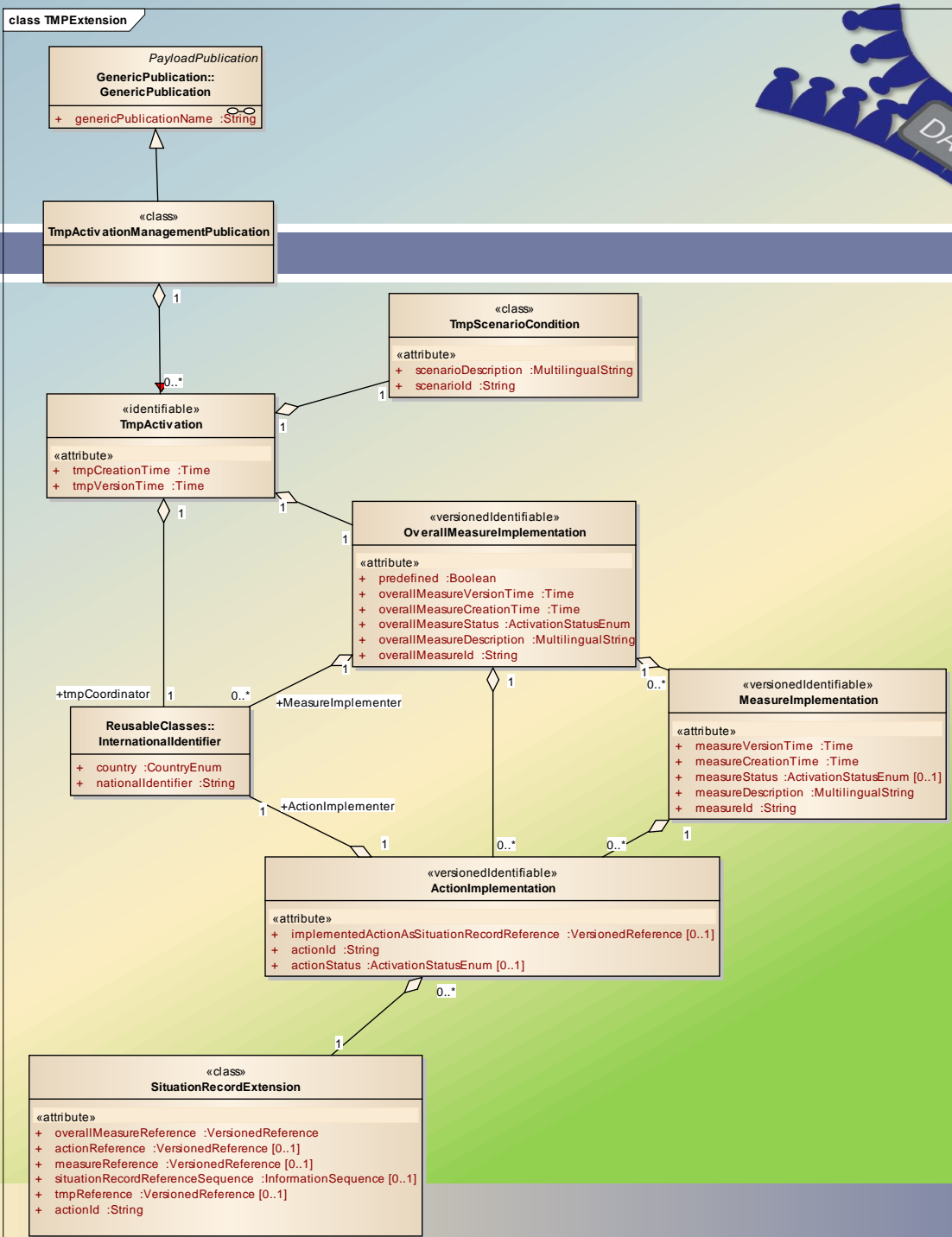
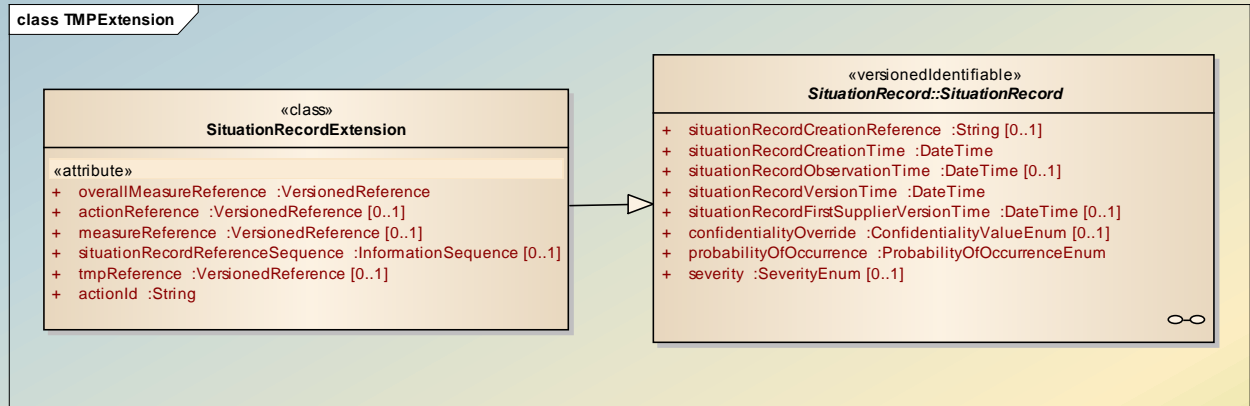
Implementation Monitoring / Management



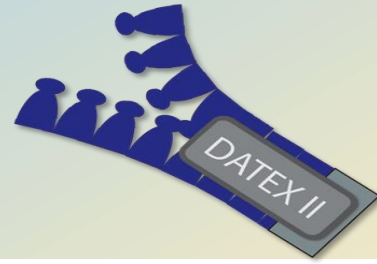
Not Predefined TMP



- ❑ Situation Record Link
 - ❑ VMS Setting
 - ❑ Other Operation
- ❑ Feedback in Situation Publication



Conclusions



- **DATEX II is suitable for TMP management**
 - ▣ Automate real time TMP negotiation to fasten decision
 - ▣ Trace of operation management workflow and responsibilities
 - ▣ Monitoring Operations Evolution
 - ▣ Same Dictionary and Platform
 - Situation Publication .. Extended !
- Cons
 - ▣ Link Monitoring and Session Management
 - ▣ To be improved in next release of DATEX
 - ▣ Some hints to manage in DATEX II v2.x will be presented in the same session



Thank you for your attention

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