PROTECTRAIL WHITE PAPER DISCUSSION

Where we are and where we want to get to

BACKGROUND

- **Objective**
  - **Collect the main findings of PROTECTRAIL**
  - **Summarise them in an accessible manner for stakeholders with technical background**
  - **Provide guidelines for implementation of PROTECTRAIL Interoperability Framework**

Main Messages

- **PROTECTRAIL designed and tested an *interoperability framework* built on a system-of-systems approach which allows to plug new solutions into asecurity system**
- **PROTECTRAIL will help make security systems interoperable and future-proof**
- **A security system must be built on a security master plan integrating security and ICT**

Draft Content of the White Paper

1. **The PROTECTRAIL approach and its reusability**
2. Network Communication
3. Modern and practical approaches to video and video-based analytics
4. Levels of interoperability

THE PROTECTRAIL APPROACH

- A reusable **Service-Oriented Architecture** (SOA)
- An **Event-Based** Architecture for data exchange between various security components
- Reusing of well-established and **proven standards**
- Planning of an **extendable architecture** for the future to extend the framework with upcoming standards
- Building **modular components with web services**
- Supporting **discoverable components** to reduce the configuration effort and improve the reusability
- Building on **an IP network (cabled or wireless**) which is dimensioned to support consistently the video surveillance streams

THE PROTECTRAIL APPROACH

Interoperability Framework:
A design pattern to integrate the capacities

THE PROTECTRAIL APPROACH
STAKEHOLDERS

Event producer

Event consumers

Devices	CBRNE Sensors, Video Surveillance, Video Analytics, Scanners
Operational	Solutions for Operation and Control Centers
Crisis Management	Managing a Crisis with various responders and stakeholders
Public Announcement	Passenger Information & Announcement Systems, News Feeds, Google Public Alerts

THE PROTECTRAIL APPROACH TECHNOLOGY STACK

- Event Format: Common Alerting Protocol
- Event framework: WS-Notification
- Shared map representation
- Decision-making and complex event processing: graphical Business Process Modelling and Notation (BPMN)

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NETWORK CONNECTIONS - CONCLUSIONS

- **Open Standard**: Especially in an international environment, shared and opened interfaces are required. Legacy systems should gradually be replaced by standard-based systems (also for on-board broadband railway digital network)
- **On-Board Network Manager**: The integration and configuration phase can be optimised when a standardised on-board middleware is introduced
- **Security**: IP/MPLS technology means a *higher data* flow and connectivity, but also increases the exposure to *possible attacks*

NETWORK CONNECTIONS - CONCLUSIONS

- **Differentiated Services Code Point:** To cope with specific devices that were unable to mark traffic according to different mission-critical priority levels
- **Virtual routing and forwarding**: This solution was adopted because as it was unclear how many switches (and their capabilities to support QoS classes) will be involved in the architecture
- **Independent frequency and network**: since the 2.4 GHz channels (used in 802.11g) are very busy and also overlapping each other, it is important to use wireless bands which are freer (i.e. 5 GHz as used for the 802.11n).

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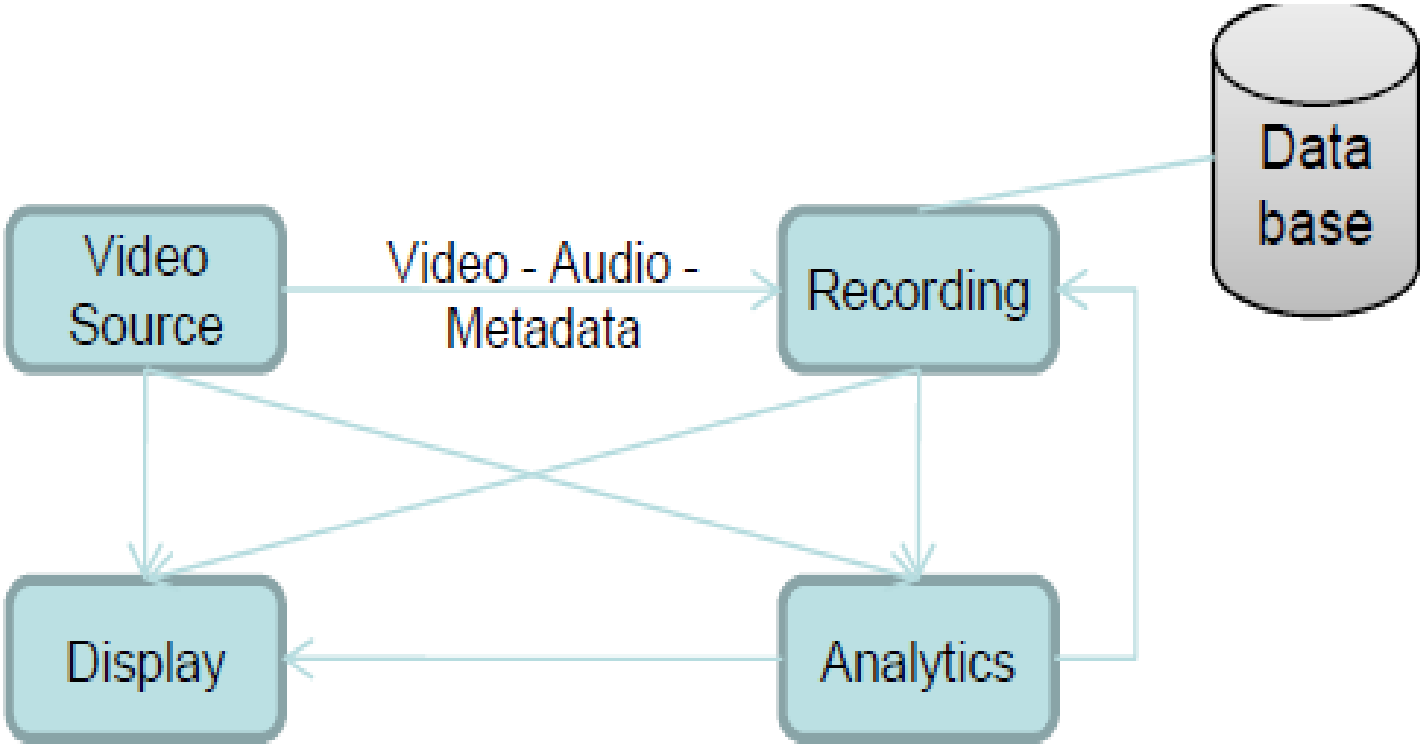
MODERN AND PRACTICAL APPROACHES TO VIDEO AND VIDEO-BASED ANALYTICS

- The sole implementation of the video-surveillance industry standards (IEC 62676-1&2, **ONVIF) is not enough**
- A generalised use **of RTP/RTSP streams** carrying video H264 compressed (or metadata) **time stamped** at the frame level
- **Full modularity** of the basic services associated with video, independently of their physical implementation
- Digital video, especially when live information with low latency is required, has stringent **needs for communications** channels (no buffering is allowed) → **trade off between UNICAST and MULTICAST**
- The systems must preserve full consistency between time and metadata associated with the streams

MODERN AND PRACTICAL APPROACHES TO VIDEO AND VIDEO-BASED ANALYTICS



MODERN AND PRACTICAL APPROACHES VIDEO-BASED ANALYTICS

- Using analytics for decision support and **not as fully-automated security solution**
- **Metadata standardisation**: Full consistency for video analytics remains an **open issue**; there are no established industry standards
- Wider system (e.g. **Storage/Playback/GUI/other) requirements**: Video analytics usually need more performance or have wider requirements than basic video solutions
- ISO 22311 is a helpful standard

DRAFT CONTENT OF THE WHITE PAPER

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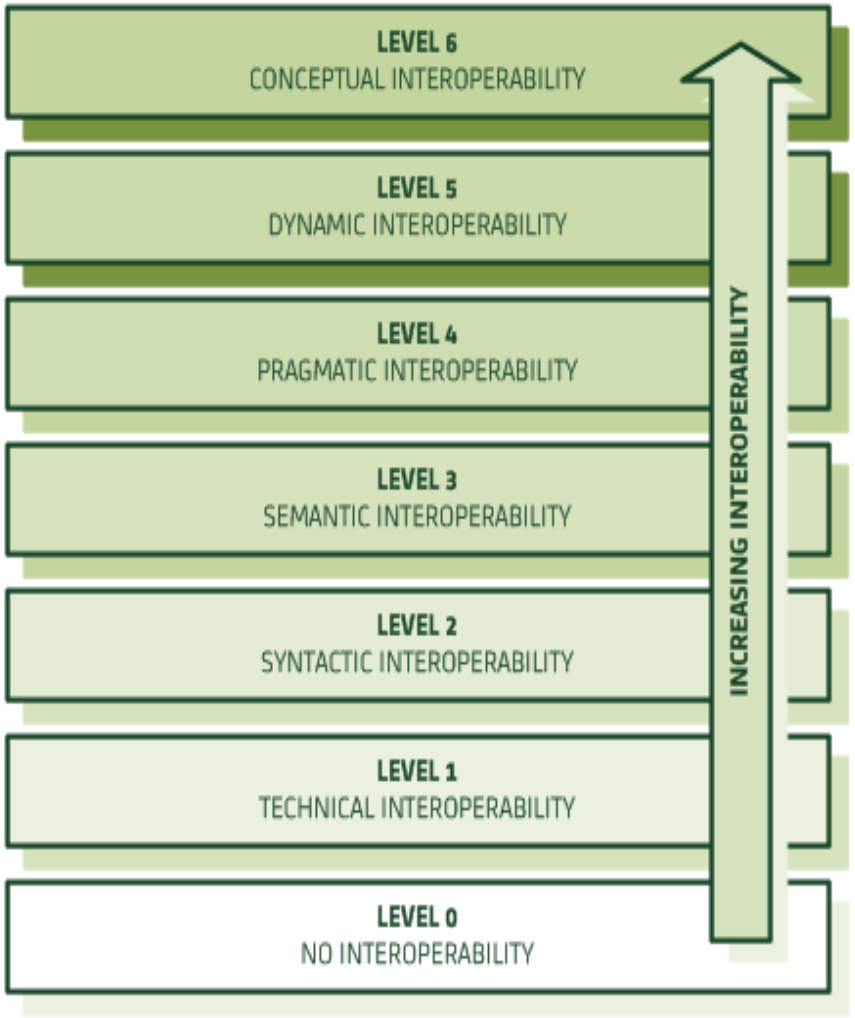
4. **Levels of interoperability**

LEVELS OF INTEROPERABILITY

- **Technical interoperability** is achieved using standardised common communication protocols in order to exchange data between the participating systems,
- **Syntactic interoperability** is achieved using a common data model such as the Common Alerting Protocol (CAP)
- **Semantic interoperability** is achieved by defining the content of the information exchanged in restricting the data model used.



COMMENTS WELCOME!

Open discussion among stakeholders