Thales Data Solution

Thales China R&T initiative

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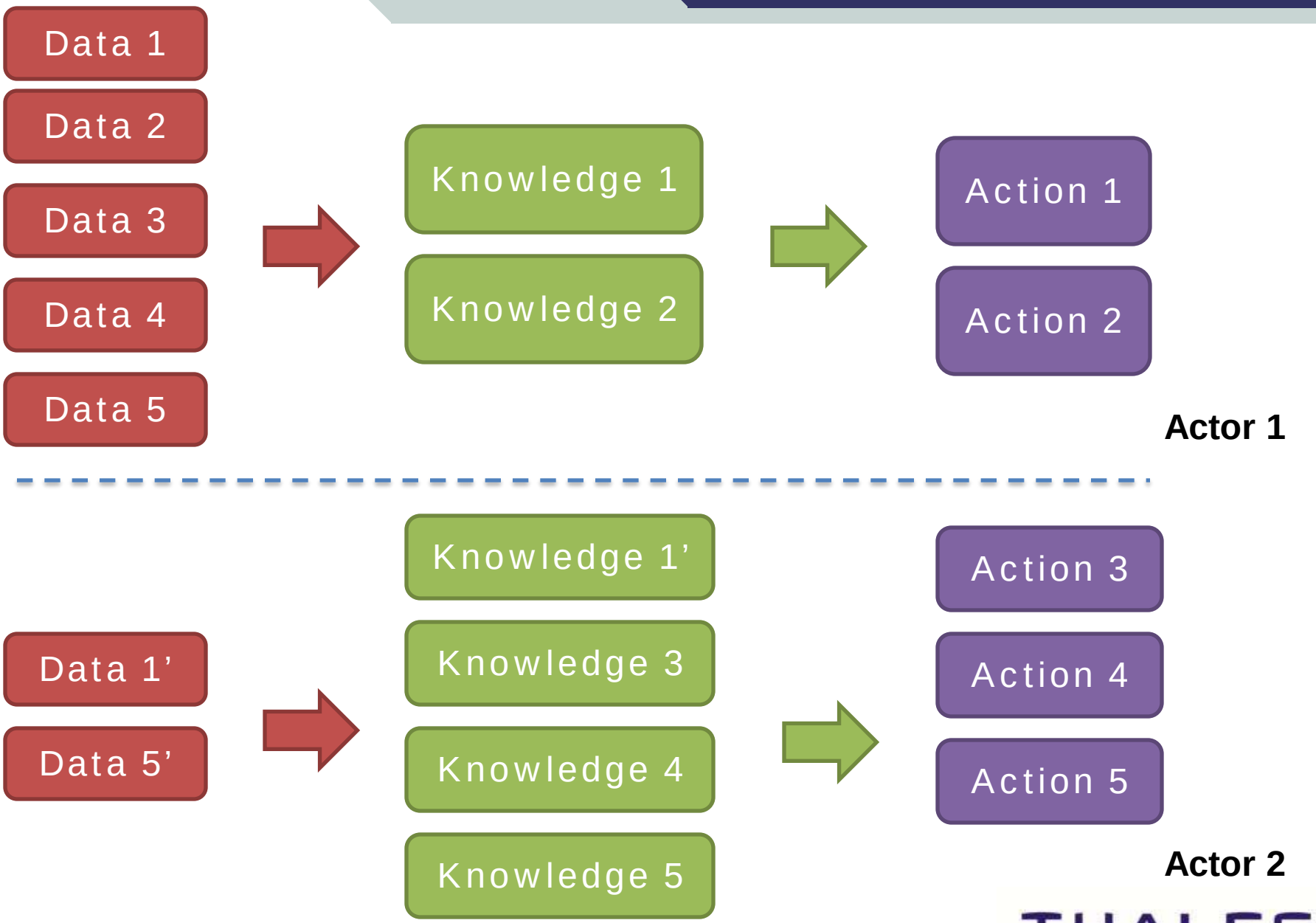
We used to…

- Information
- Eqpt Status
- Signal
- …

- Situation Awareness
- Processing Result
- …

- Operation
- Execution
- Command & Control
- …

It might get complicated…



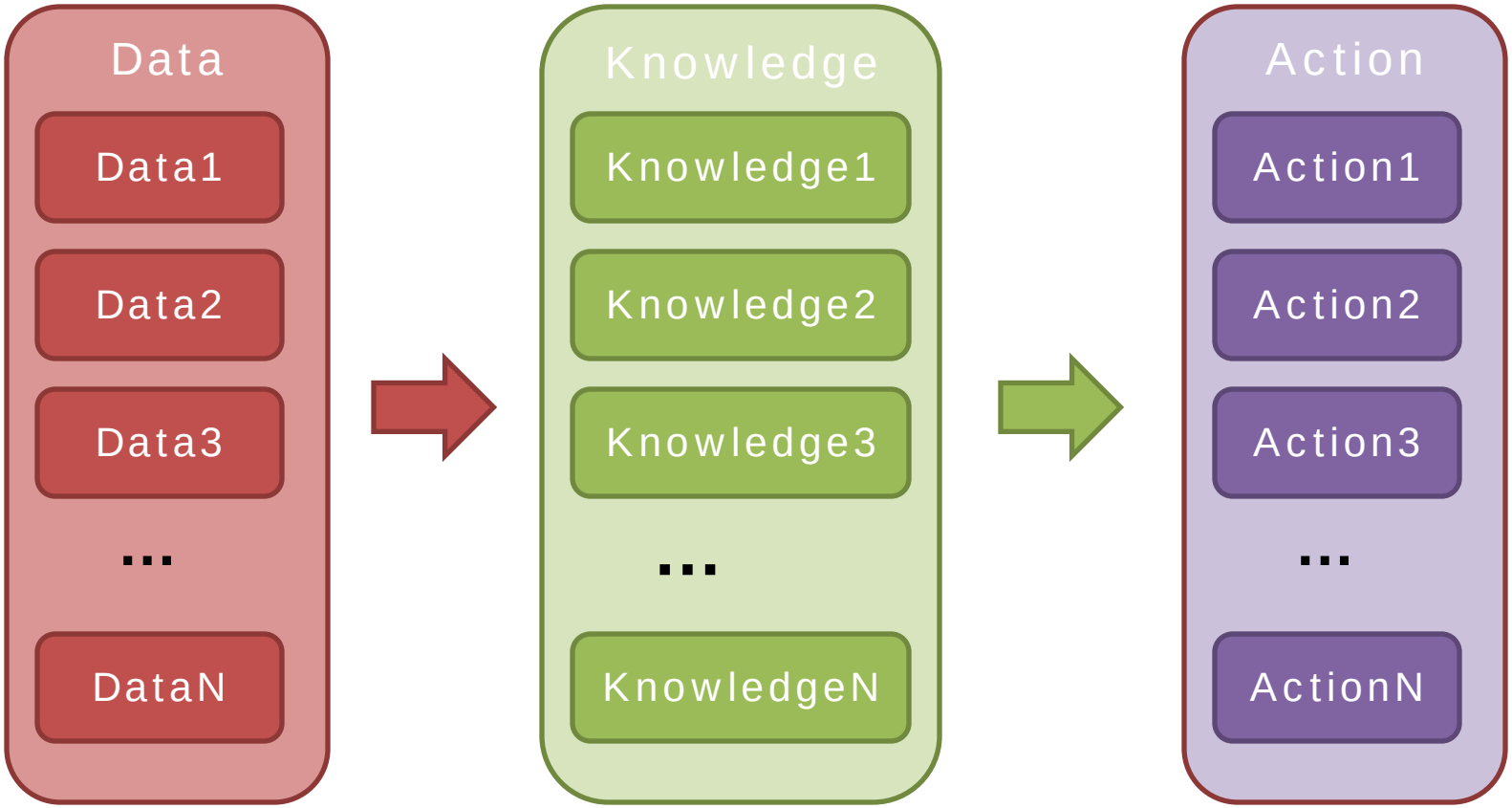
Problems may look like…

Typically it results in:

- **From decision maker**
  - My information does not make sense!
  - I don’t know what to do!
- **From functional operator**
  - I don’t have enough information to get it make sense!
  - I only know what I should do!
- **From city resident**
  - I don’t have at all any information!
  - I’ll do it exactly as I did it before…

All about sharing…

Hence, we would need to put them together and benefit more



Challenges

Of course we've thought of that before. But.....

- **My precious data!**
- **Extra responsibility**
  - Data quality
  - Maintenance
  - Service management
  - …
- **Lack of incentive**
- **Complexity to cooperate (ping-pong syndrome)**
- **Political issues**

Possible Solution

Challenges

- **My precious data!**
- **Extra responsibility**
  - Data quality
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  - Service management
  - …
- **Lack of incentive**
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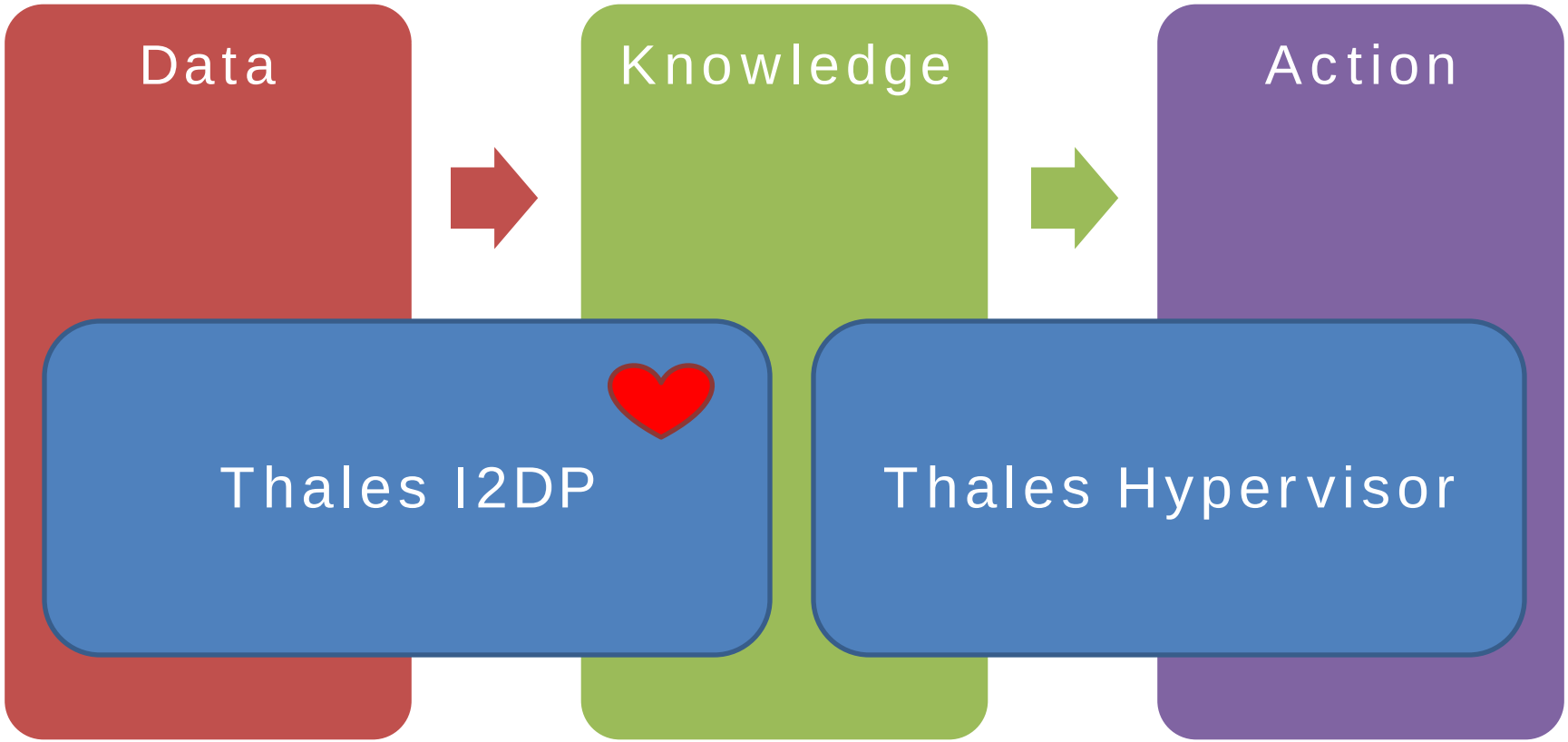
Potential Solution

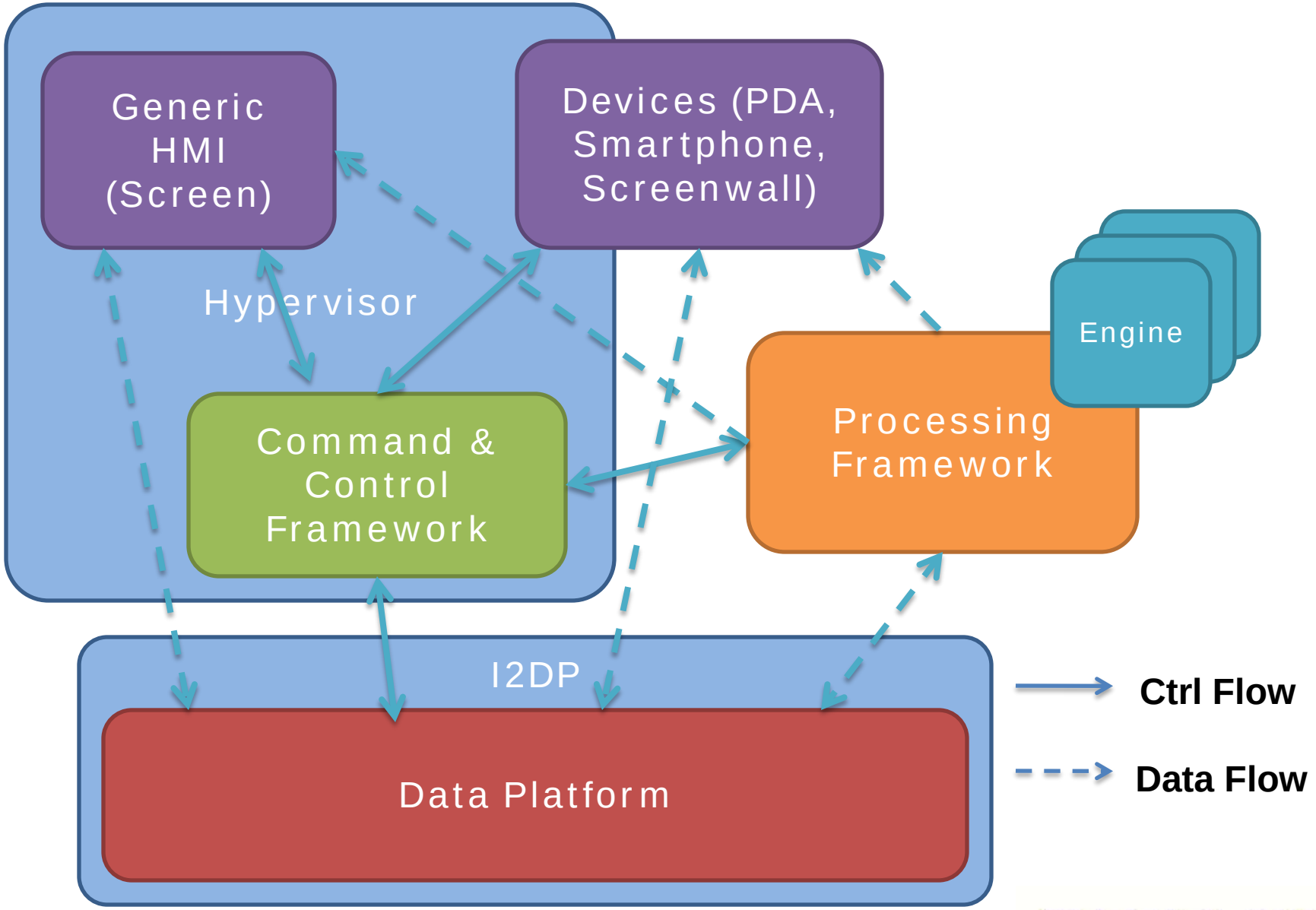
- **Data/Service “App Store”**
- **Simplify & Encourage**
  - Ensure quality
  - Ease maintenance
  - Simple management
  - …
- **Reciprocal (axe for sheep)**
- **Flexible solution to break tight link**
- **Higher authority coordinating all stakeholders (ideal)**
- **Non-ideal cases? We see it later…**

Where we are…

Thales Solution:

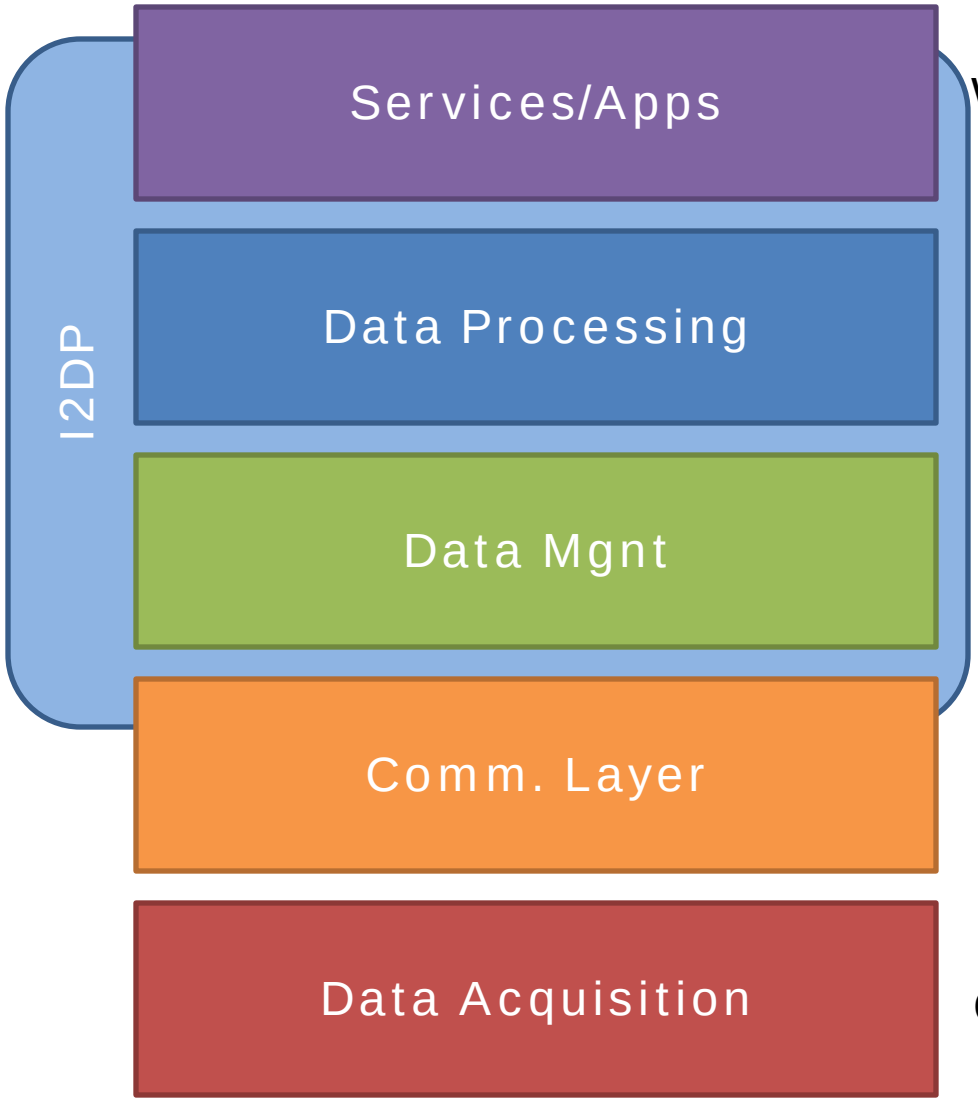


Overall Concept



Thales Intelligent Integrated Data Platform (I2DP)

Conceptual Stacks



WS, SOA, API, Web Portal, Fileserver

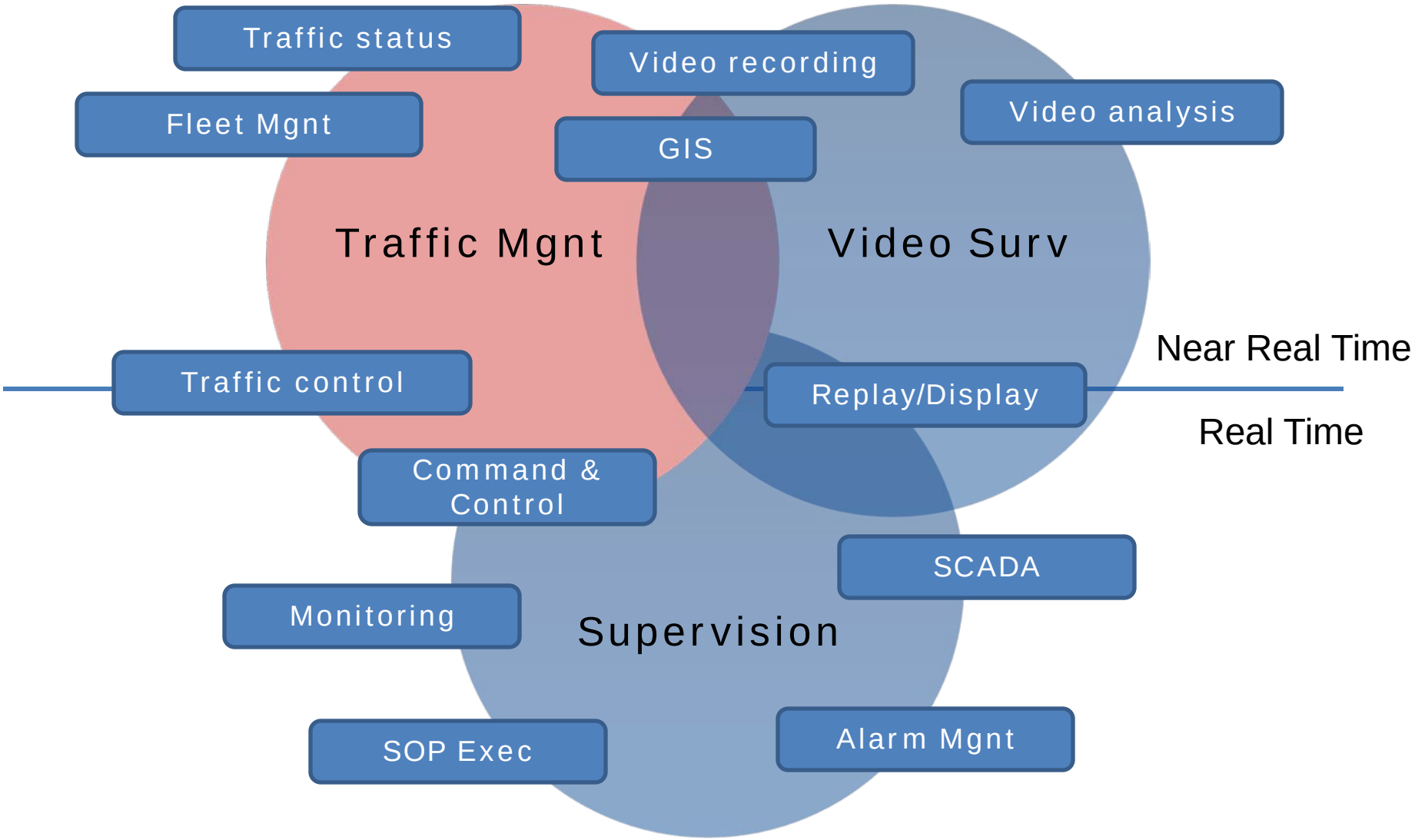
Algos, processing engines, apps

IDC v.s distributed storage
SQL v.s. NoSQL

RFID, Wifi/3G/4G, LAN/WAN

Cameras, sensors, data generators

Typical Domains



So what data we're dealing with…

Data Acquisition

Traffic management	Video Surveillance	Supervision
• UTC • CCTV • FCD • Speed Detector • ETC	• Recorded video (all formats) • Real-time video stream	• Equipment status • Alarm/Event • Business data

A framework able to:

- **Store data** (schema-free, standard, ref/semantic)
- **Manage data** (query/retrieve, process, access control, housekeep)
- **Maintain data** (data quality, correctness, connection, update)
- **Integrate/Share data** (transcoding/parsing, connector)

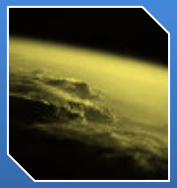
Urban Mobility Challenge

Accidents

Noise

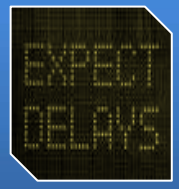
Congestion

Pollution



GHG

Irritation



Urban Mobility Challenge - Key Objectives

To reduce traffic congestion and better manage disruption due to infrastructure works

To ensure security and safety for commuters and travelers, and all people working in the urban traffic.

To reduce operational cost and maintenance.

To facilitate the logistics in the City.

To reduce air pollutants (PM10, PM2.5, NO2, CO) and GHG (CO2).

To offer faster and more convenient public transportation alternatives so as to attract passengers.

The transport system or traffic problems is the city's most significant infrastructure challenge.

Thales Mobility Vision

City Command Center

Traffic Control Center

Public Transportations C2

Security Control Center

The mobility management centre provides a synthetic view of traffic status and coordination tools

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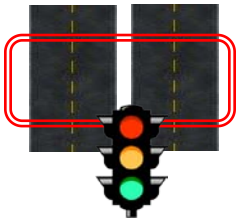
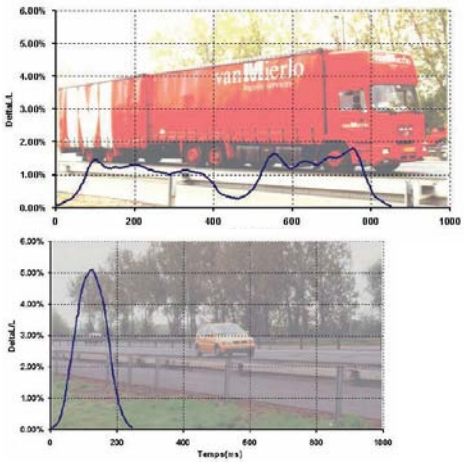
I2DP - Design Properties

- **Data diversity**
  - Traffic measurement: GIS, FCD, loop, CCTV, ETC, microwave…
  - Traffic event: congestion, accident, regulation, road Works…
  - Other info: social event, weather, transport infra, historical record…





GHG/Pollution

Congestion

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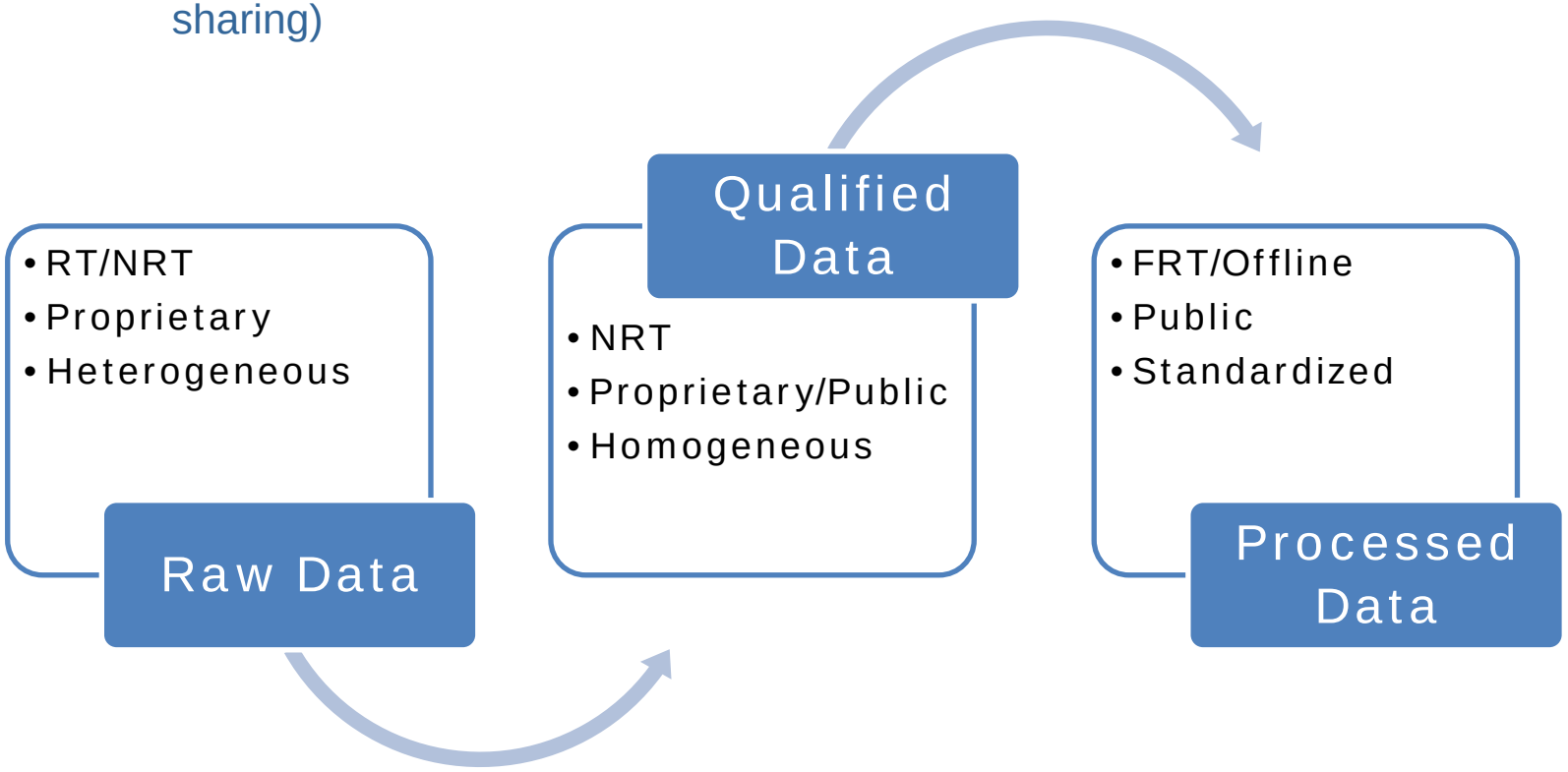
I2DP - Design Properties

Internal Data Flow

- Raw data→ qualified data→ processed data (semantic evolution)
- RT/NRT → FRT/Offline (decrease of real-time)
- Proprietary/Heterogeneous data →Sharable/Standardized data (increase of sharing)



I2DP - Design Properties

- **Data Mining**
  - Framework + Engine plugins
  - Annotation / result mgnt

More powerful processing

- Cloud Computing.
- Parallelizing task

Flexible engines integration

- Processing framework
- Processor plugin

Manage result

- Associate with original (video annotation)
- Store according to semantic growth design (traffic data)
- Real-time event/alarm notified & shared (hybrid)

Open integration

- Designed to be external / internal to I2DP based on requirement (I/O centric, processing centric)

I2DP - Design Properties

- **Data Storage**
  - Centralized solution (Data Centre, Server Farm, Virtualization, …)
  - Distributed solution (SAN, clustering, cloud, …)

When "relation" is not enforced

- SQL v.s. NoSQL (for video, FCD, ...)

When data is too big

- Document Oriented DB
- Distribute file system

When data is too much

- Less constraint → More freedom to scale

When the performance is an issue

- Buy one super machine
- Chop task into 100 pieces feed to 100 dummy machines

Optimized for specific operational requirement

I2DP - Design Properties

And more importantly for storage,

- **Standardized and well specified data model**
  - EU standard: Efficient information storage, avoid duplication → optimized info mgnt
  - Open standard: open source tools and SW sdk support → low cost dev
  - Industrial reference: mature market & service provider → high quality services
  - Open market: potential innovative added value services → advanced services
- **Schema-free design**
  - Encouraged standardization
  - Flexible customization
    - Extension (CN standard)
    - Less transformation → higher performance

I2DP - Design Properties

Data sharing

- Access control mgnt
- Data services (multi-mechanism, multi-tech)
- Semantic annotation & resource retrieving

Knows what data we have

- Resources semantic annotation
- Indexing/Retrieving (DB table, content topics, URL, ...)

Knows what data others need

- Matching: Query composition
- Ontology → Bridge language gap

Knows who is allowed to get what

- Access control / authentication
- Rule management (axe for sheep)

Knows how to exchange data

- Multi-tech (http, ftp, jms, msgQ, ws, streaming, ...)
- Request/Response, Publish/Subscribe

I2DP - Design Properties

- **Open arch/data provider & consumer integr/security...**

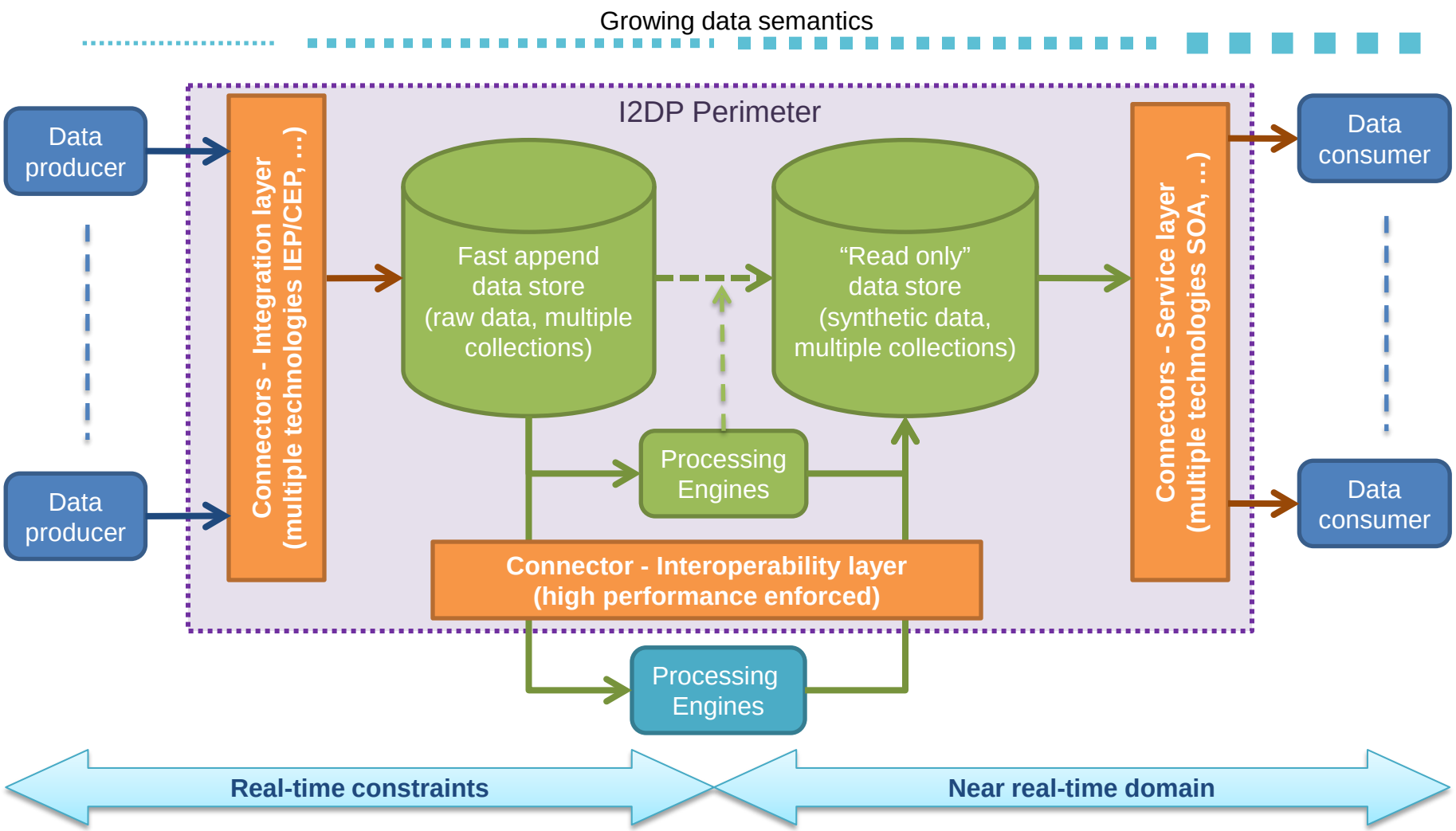
Service Composition (BPMN)

- Processing logic customization (service orchestration)
- Service QoS composition

Policy Enforcement (non-functional)

- Security
- Authentication
- RBAC

Schematic Illustration



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Emergency/Event Handling

- **Event detection (Raw data alarm + data analysis)**
  - Automatic: Data analysis for event detection (video, camera, loop, FCD, …)
  - Manual: Report to call centre, operation in plan
- **Event sharing**
  - Setup city wide event sharing platform
  - Allow different authorities to subscribe and be informed of new event
- **Event answering (operational view)**
  - Dynamic dispatching resources (police, fire brigade, ambulance, road rescue, …)
  - Traffic control, regulation, PT rescheduling
  - Traffic guidance (Delayed time, queue length, bypass/multimodal suggestion, …)
  - Info dissemination (On-Board display, radio, mobile, micro-blog, website, …)
- **Event Close**
  - Report, historisation, DSS optimization

Strategic View

Framework sustainable development

- **Short Term: Traffic management platform**
  - Dedicated for traffic mgnt (info from the police, for the police)
  - Integration of professional traffic mgnt sub-systems
  - Serves for traffic mgnt daily operation
  - External coordinated functions (notification only)
- **Mid Term: Transport exchange platform (Multi-dept)**
  - Reciprocal based, multi-dept info exchange (incentive)
  - Coordinated operation under supervision (notification, request/response)
- **Mid-Long Term: Grand Transport Hypervision Platform (Centralized Organization)**
  - Setup dedicated central department to coordinate depts (external mechanism)
  - Complete information integration and sharing
  - In-depth coordinated functions (notification, request/response, command & control)

Thanks! Merci! 谢谢!