Digital Bridge Schwindegg as a Prototype for a Digital Twin

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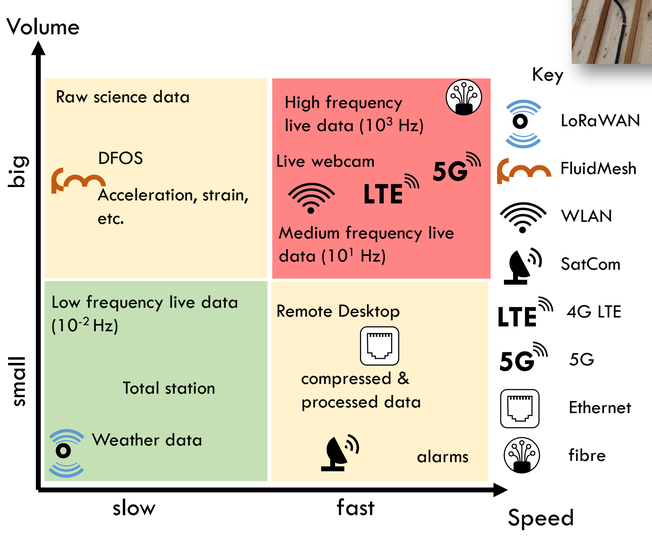
Physical Twin: Data Acquisition

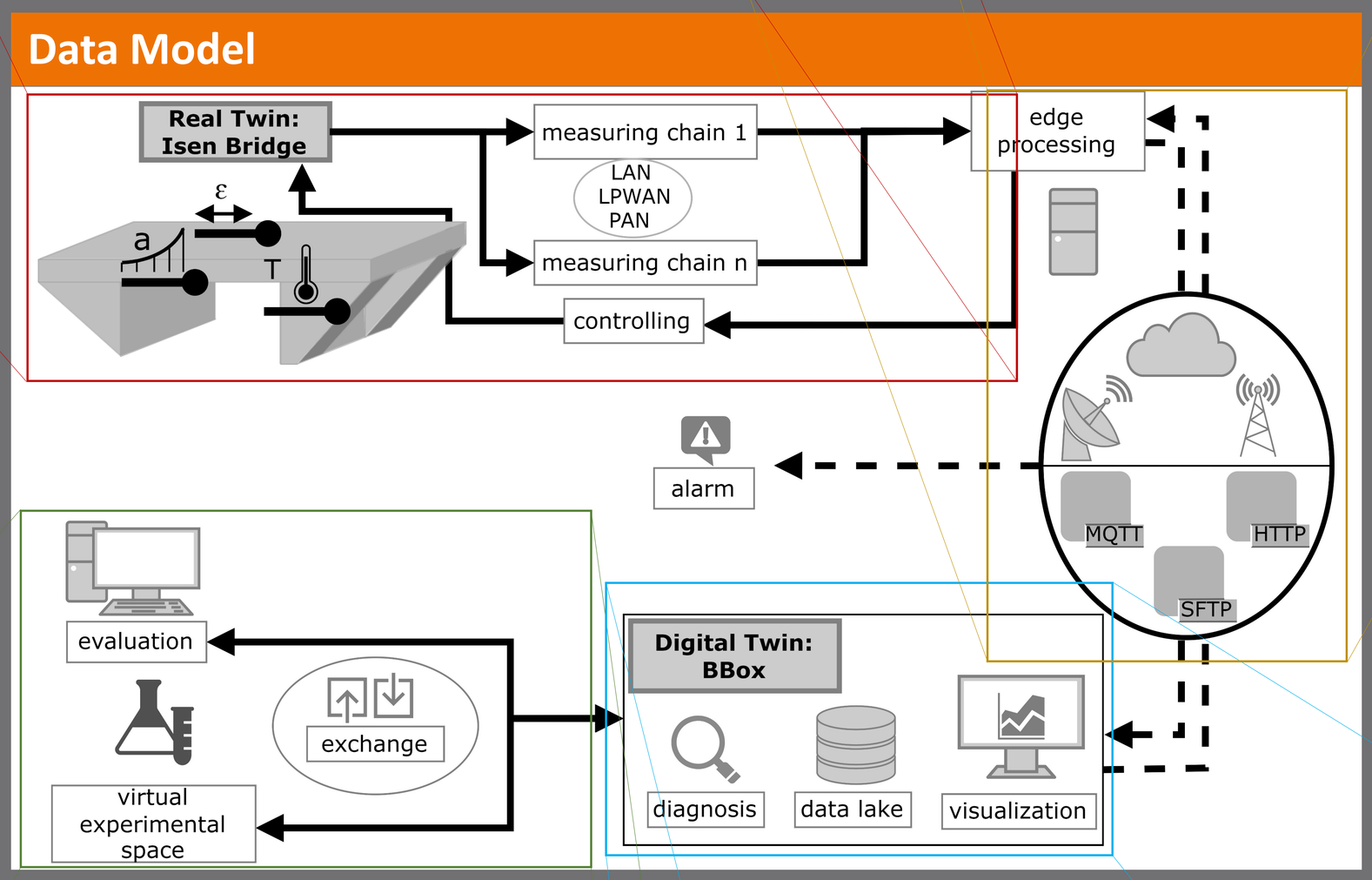
- Single-span frame bridge made of precast prestressed concrete elements
- **140** physical sensors deliver **170** individual data streams:
  temperature, strain, inclination, acceleration, deflection, earth pressure, weather
- **4** measuring chains
- Measuring from **release for traffic**

Data Transfer & Data Security

- Choice of **transfer media** and **transfer protocol**
- Depending on: **transfer speed** and **transfer volume**
- At the bridge:
  - **Fiber optic, 4G**
  - **MQTT, SFTP**
- Hardware:
  - **IoT-Router**
  - **IoT-PC**
  - **Antenna**



Data Model



Data Analysis

- Storage of Data in UniBw M **S3 storage grid**
- **Providing Data** for Data Scientist
- Exchange via **JupyterHub**
- Analysis using:
  - **Live load model**
  - Structural Health Information Patterns **SHIPs**
  - **Statistic Models**
- **Research Goals:**
  - **Predictive Maintenance of bridge**
  - **Live Condition and Health Monitoring**
  - **Identification of Key Performance Indicators**

Digital Twin: Data Storage & Data Visualization

- Use of **Asset Administration Shell** configurator **BBox**
- Visualization with **Dashboards**