

Making the World Wide Space Happen: New Challenges for the Nexus Context Platform

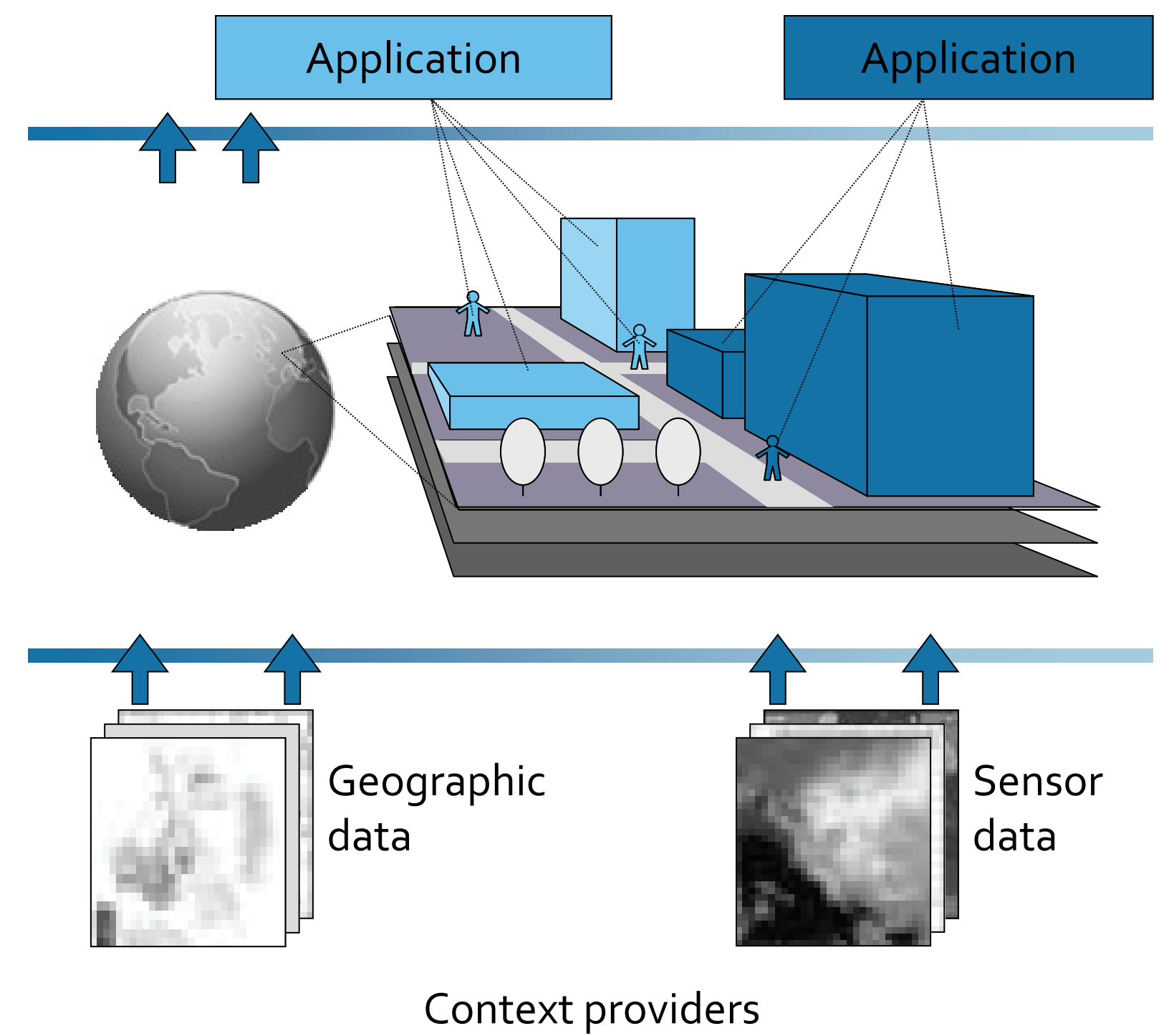
Vision and Approach of the Nexus Platform

Context-aware applications rely on context models

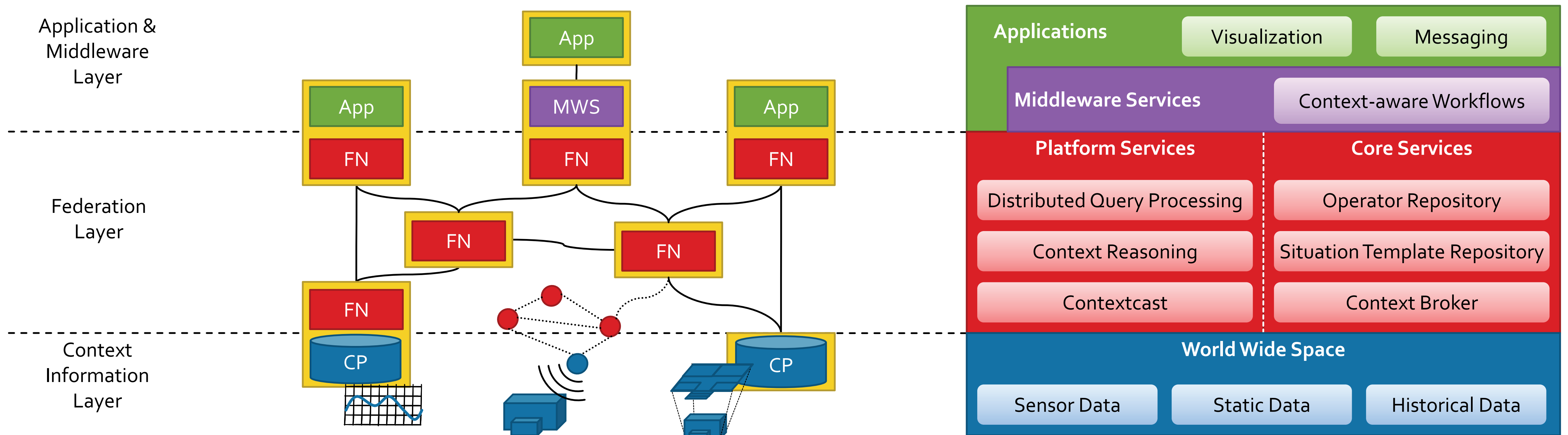
- Static information: Map data and 3D objects
- Dynamic information: Sensor data and position information
- Goal: Sharing and re-use of context models

Existing Nexus Platform

- Global platform for context providers
- Federated global context model and application-specific views
- Object-oriented data model
 - Extensible standard ontology



New Stream-oriented Nexus Architecture



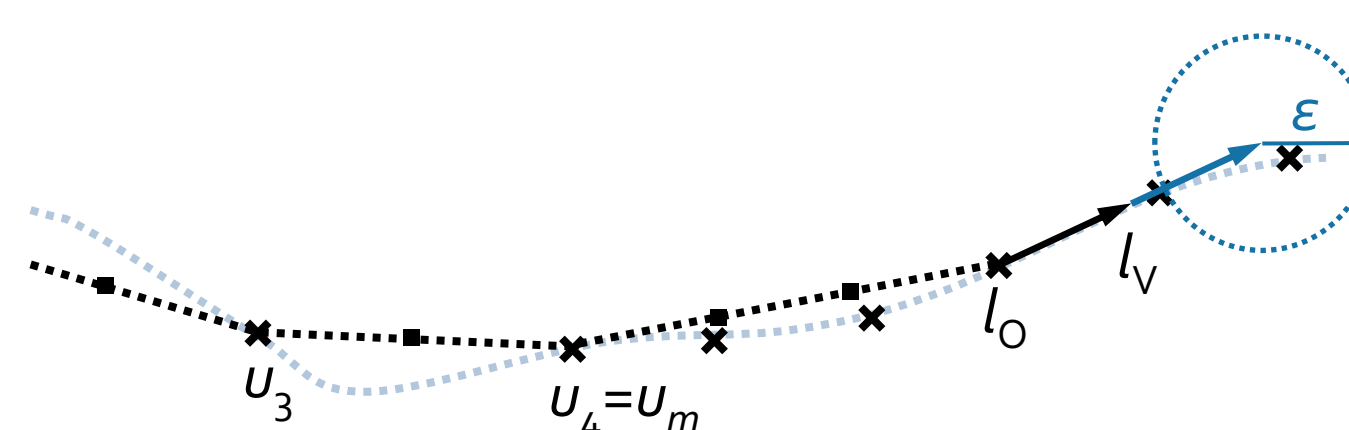
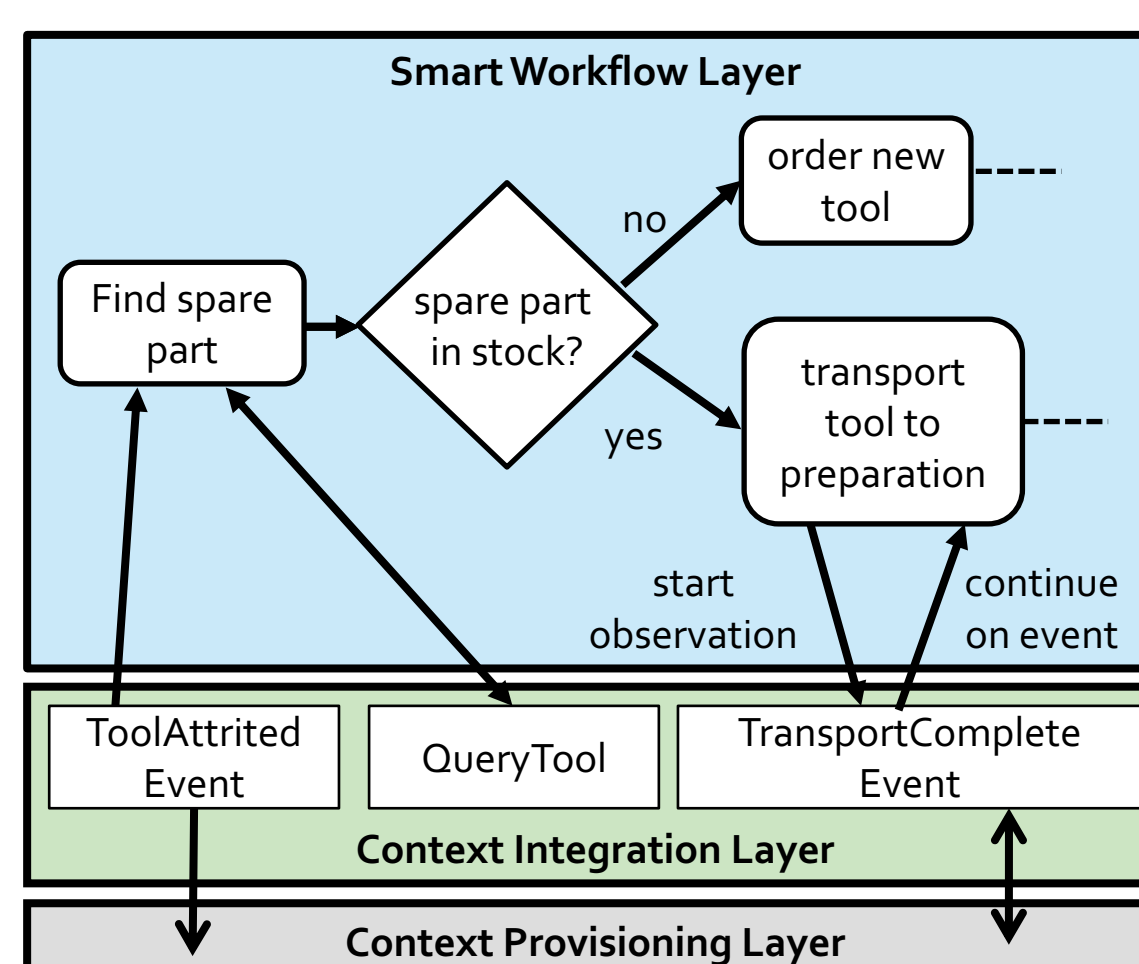
Challenges and Research Fields

Stream-processing of heterogeneous context

- Reusable, application-specific operators
- Streamed and static context information
- Efficient distribution within Federation Layer

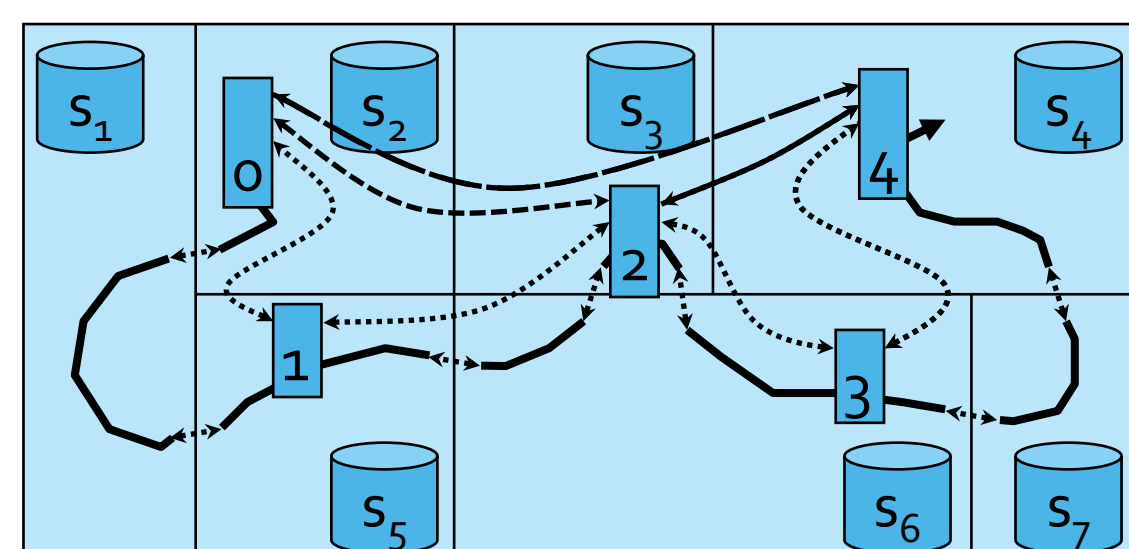
Situation recognition

- Based on expert knowledge and low-level context
- Scalable reasoning mechanisms
 - Distributed Bayesian networks
 - Optimization of communication and timeliness



Moving objects databases

- Remote trajectory simplification
- Energy-aware spatial query processing
- Index structures for distributed MODs



Context-aware workflows

- Workflow based modeling of context-aware applications
- Service-oriented Architecture for context provisioning

Energy-efficient urban sensing

- Cheap, passive RFID-based sensors
- Cooperative update algorithms for MANETs

Contextcast communication

- Context-aware addressing
- Overlay-based message dissemination

Quality of context information

- Variety of inaccuracy models
- Reference architecture for quality of context
- Generic inaccuracy model for position data