

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

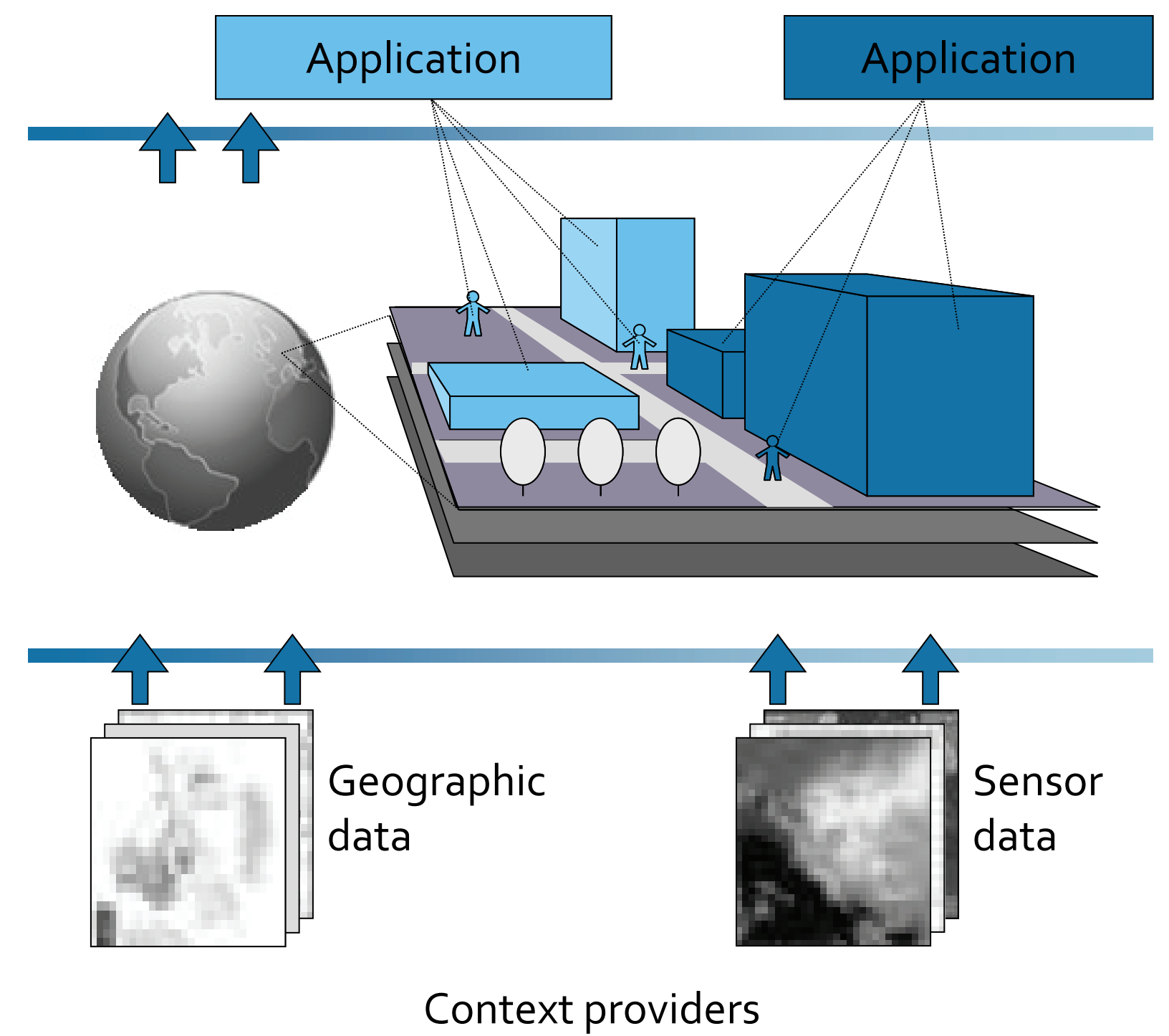
## Vision and Approach of the Nexus Platform

Context-aware applications rely on context models

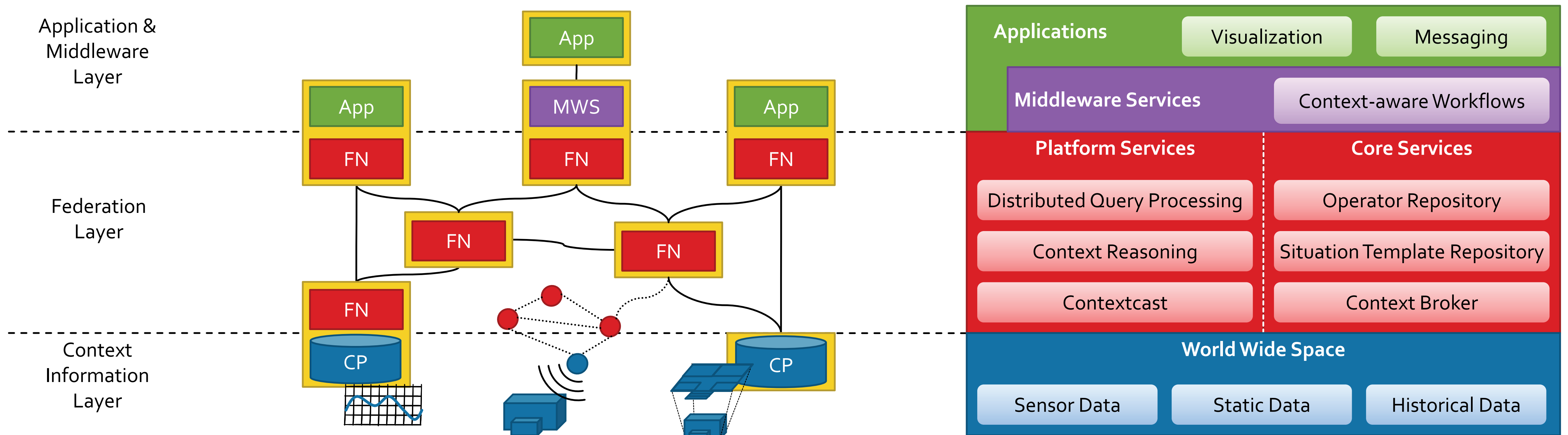
- Static information: Map data and 3D objects
- Dynamic information: Sensor data and position information
- Goal: Sharing and re-use of context models

Existing Nexus Platform

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



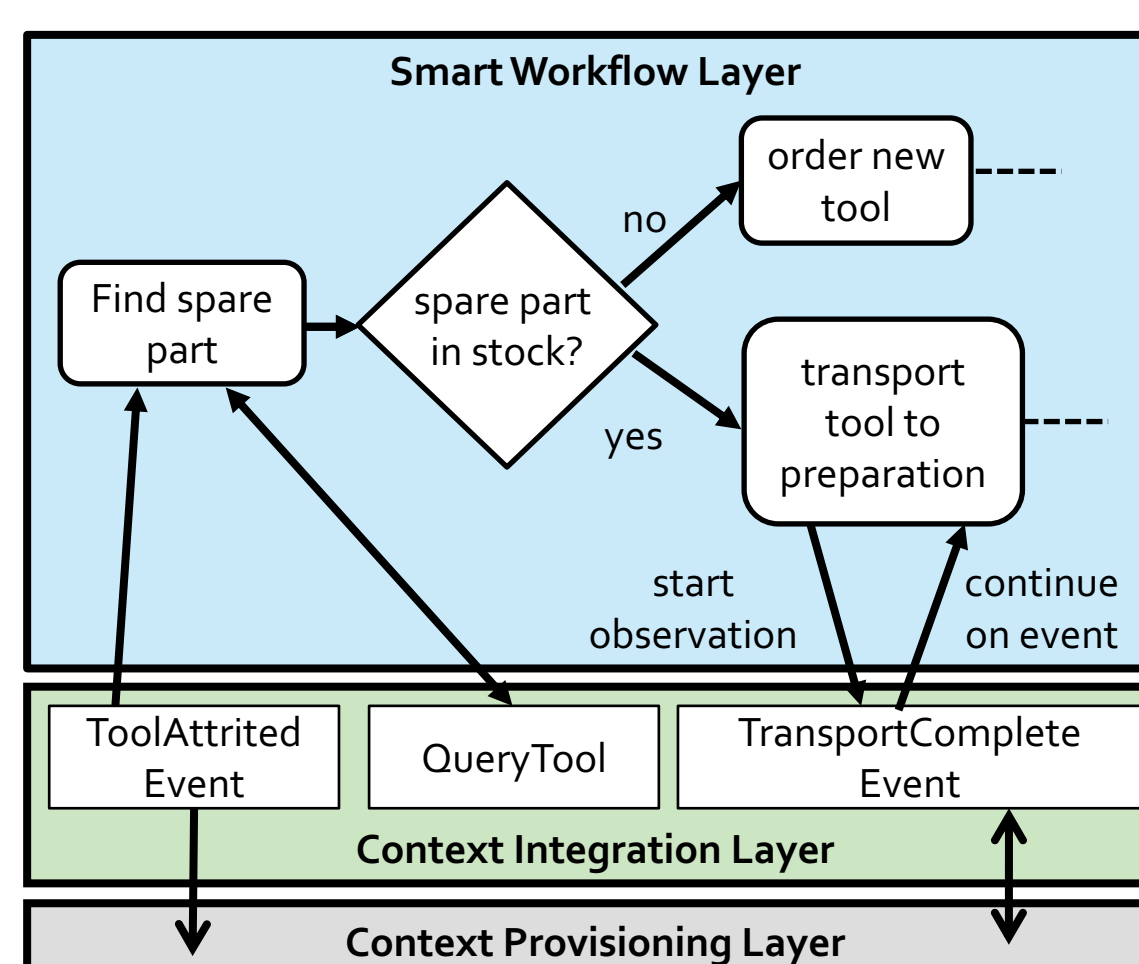
## New Stream-oriented Nexus Architecture



## Challenges and Research Fields

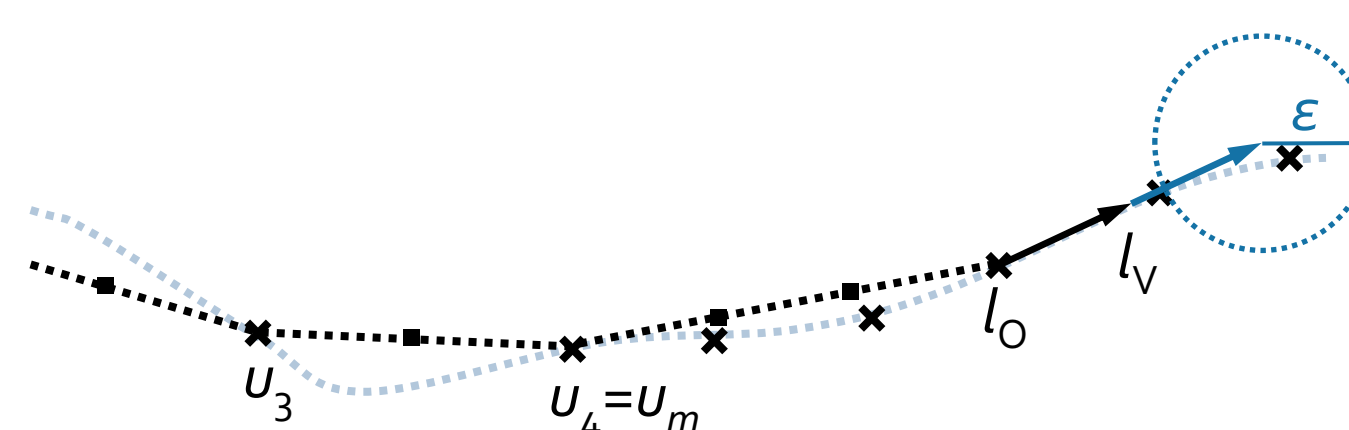
Stream-processing of heterogeneous context

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



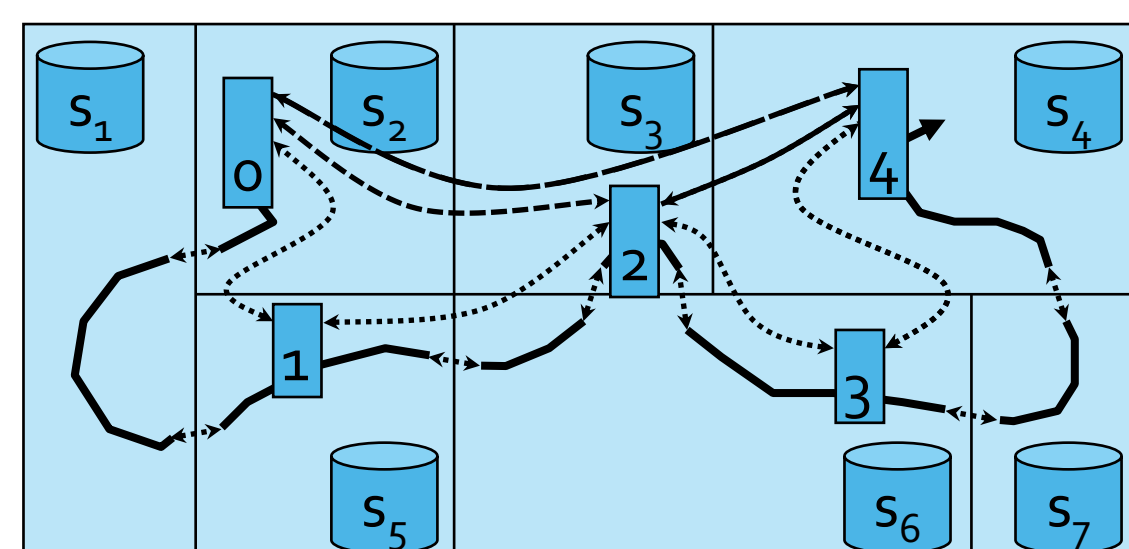
Situation recognition

- 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