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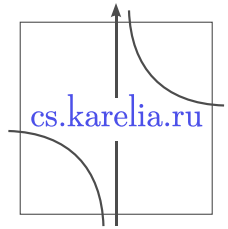

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An Approach to Creation of Smart Space-Based Trip Planning Service

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Background

- Tourism growth every year, long-term trend is 3,8%
- Large part of individual tourism and small groups
- Organized tourism with infrastructure usage
- Recommender systems with mobile devices
- Trip organization and trip support

Trip planning problem

- Goal: provide detailed trip plan
- Tasks:
  - selection of attractions to visit
  - selection of the route
  - defenition of timetable
  - selection of stops and places of accomodation
  - selection of recommended attractions
- Hardest problem (NP-complete class)
- Large computation resources and special algorithms

Trip planning algorithm

Steps of algorithm:

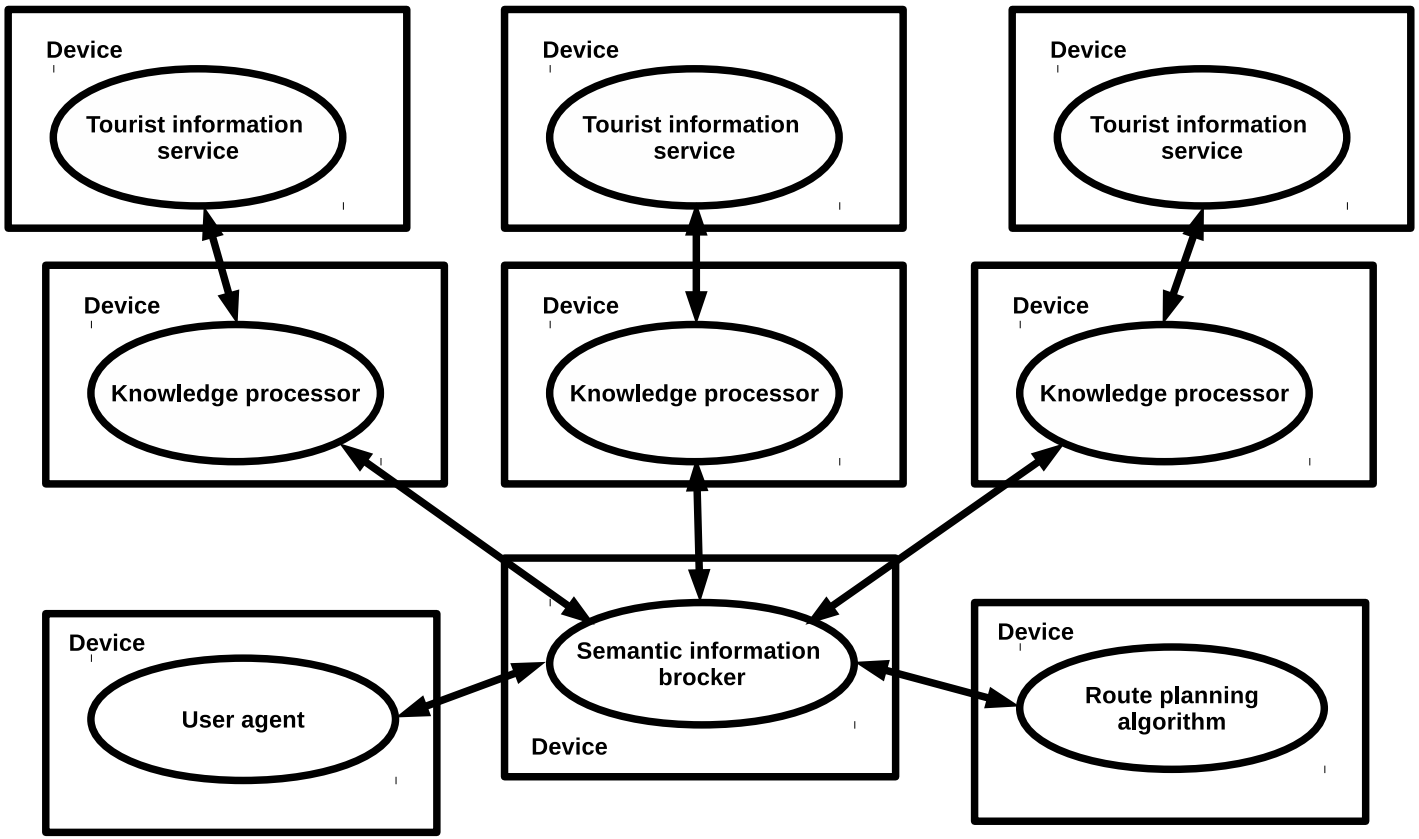
- Definition of start and end points and target of the trip;
- Route creation for selected points and transport;
- Conditions including (stops, accomodation, etc.);
- Time planning (attraction schedule, weather conditions, etc.);
- Recommendations.

Usage:

- before the trip (prepare);
- during the trip (update);
- personal and group trip.

Smart Space usage

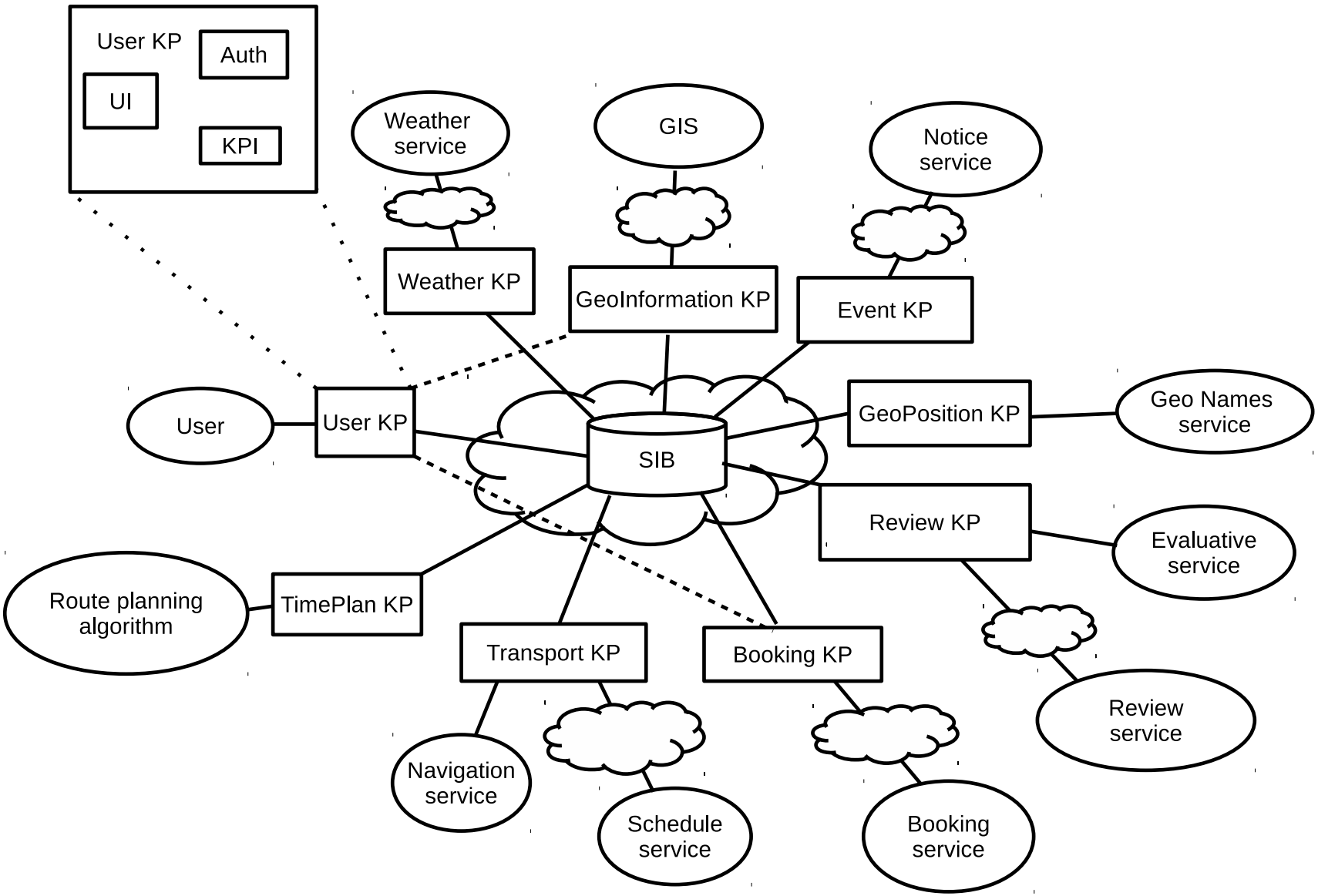
- Each service presents as a KP and provides a piece of information
- User agent (mobile application) generates trip planning task
- Route planning algorithm implemented as a mediator
- Proactive service: update timeplan without user request



Service implementations comparison

Indicator	Client application	Web service	Smart space service
Internet connection	Unstable Internet connection, mainly mobile Internet	Single point high speed Internet	Multi point high speed Internet
Computing resources	Mainly mobile device	High-performance server	High-performance cloud
Access to external service	Direct access to personal data, service limits	Indirect access to personal data, service limits	Indirect access to personal data, reduced service limits
Dynamically changed data	Static slice, manual updates	Static slice, periodic updates	Proactive service, dynamic updates
User relations	Manually	Can be implemented	Can be implemented
Privacy	High	Medium	Medium-High
Extensibility	Low	Medium	High
Trip plan updates	Dynamically	On request	Dynamically

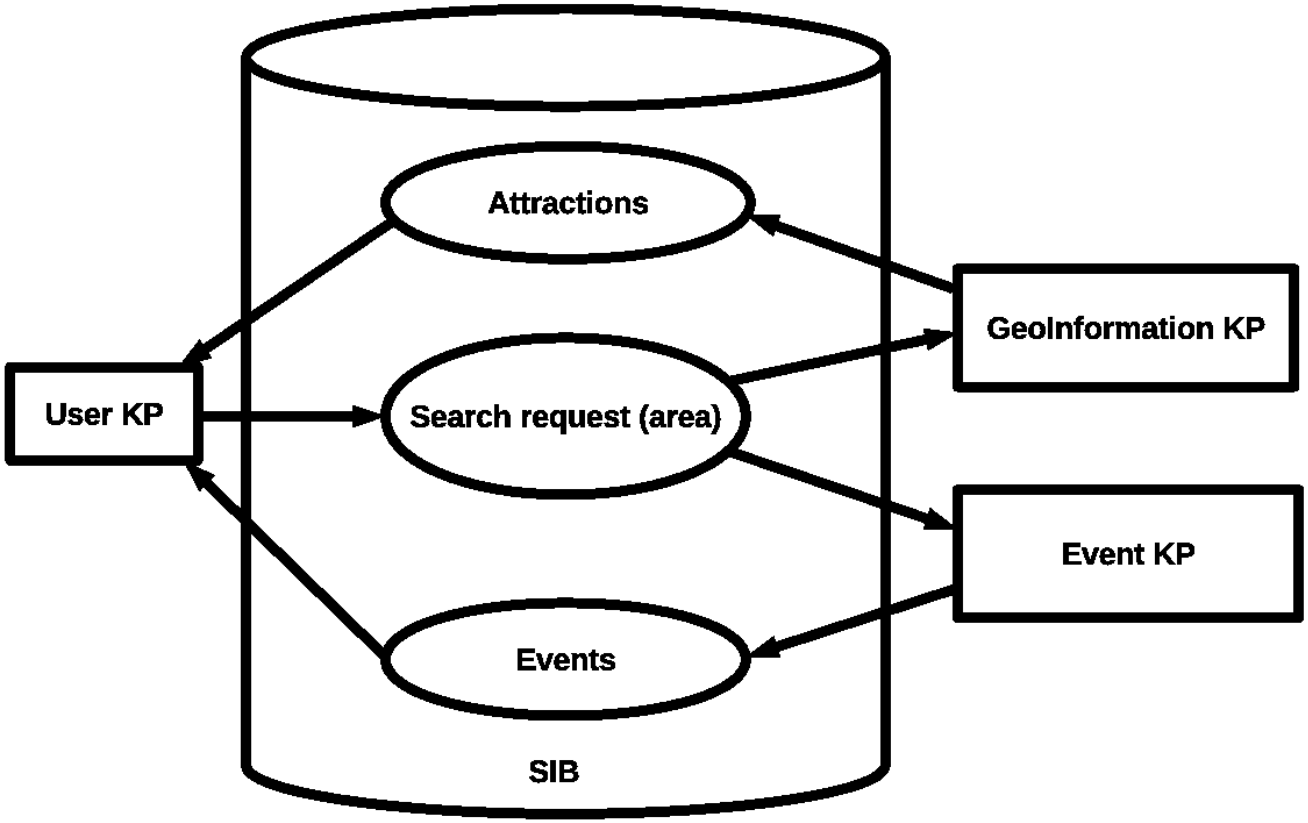
Route planning service architecture



Data sources

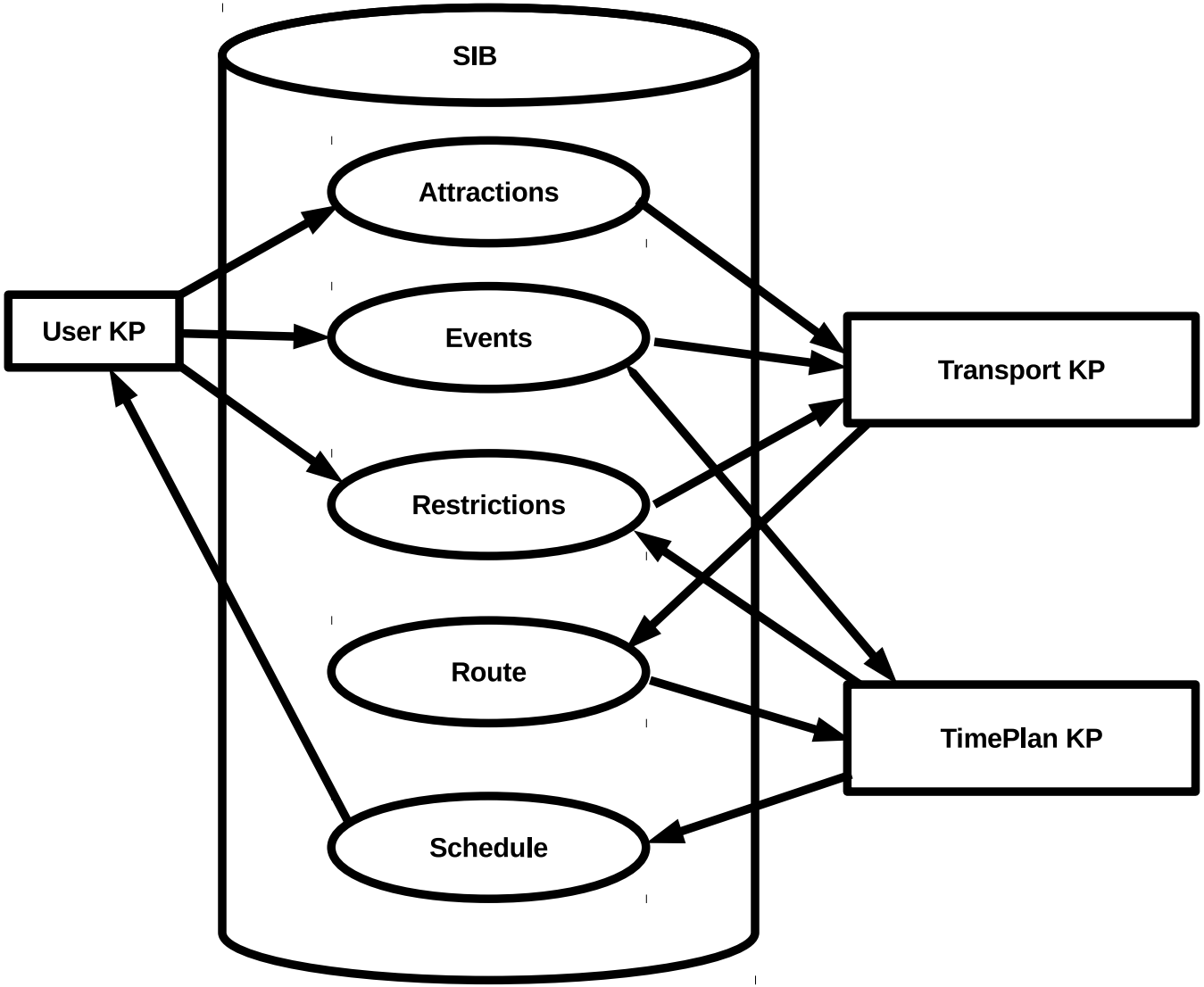
- weather.com – weather
- geonames.org – binding geo-coordinates and towns
- Forsquare, Wikimapia, Geo2tag etc. – attractions
- Booking services – accomodation
- Openstreetmap + graphhopper – “off-line” navigation service
- Local services – notice, attraction schedule and review

Usage scenario: gathering attractions and events

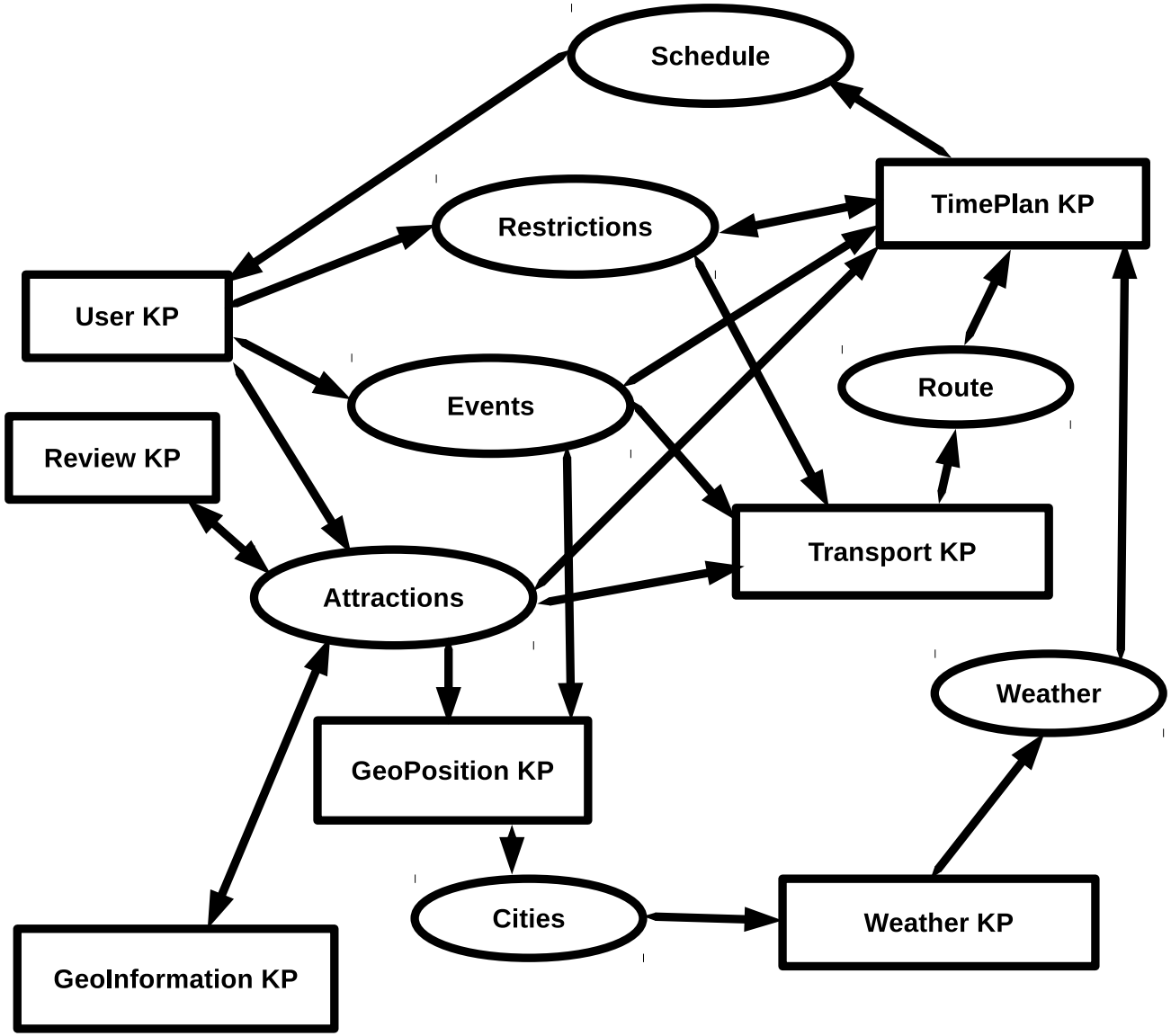


- Search attraction to visit
- Extension: additional information for attractions and events from review services

Usage scenario: schedule preparation (basic)

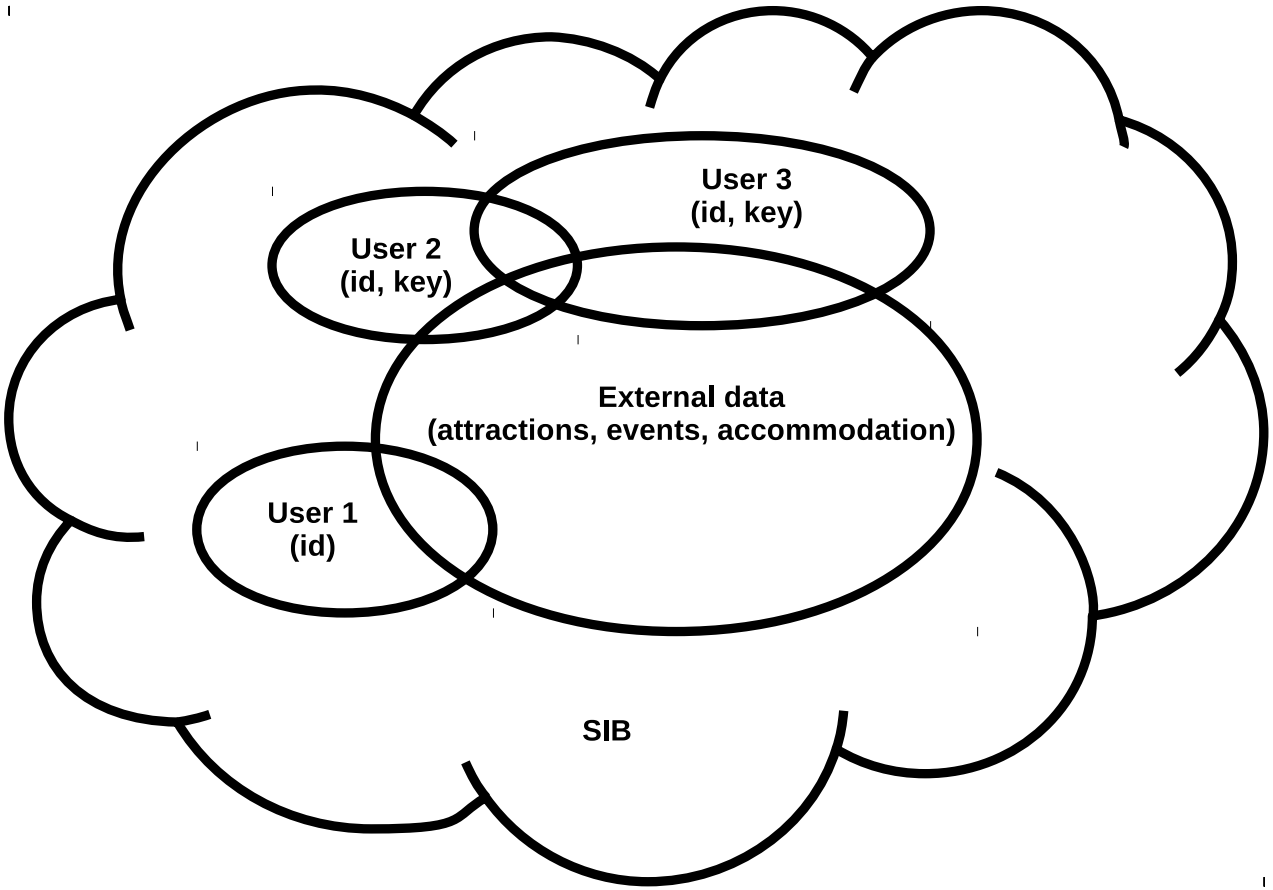


Usage scenario: schdule preparation (extended)



Inter-user iterations

- Case: users, who are unwilling to share their plans
- Case: tourists meeting at some of the attractions
- Case: create trip plan for a tourist group



Conclusion

Current state: approach to use of Smart Space technology

- Architecture
- Data sources
- Core scenarios
- Inter-user iterations

Future plans:

- Design data model
- Trip planning ontology
- Implementation
- Evaluation