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Experiences Developing a Collaborative Travel Planning Application with .NET Web Services

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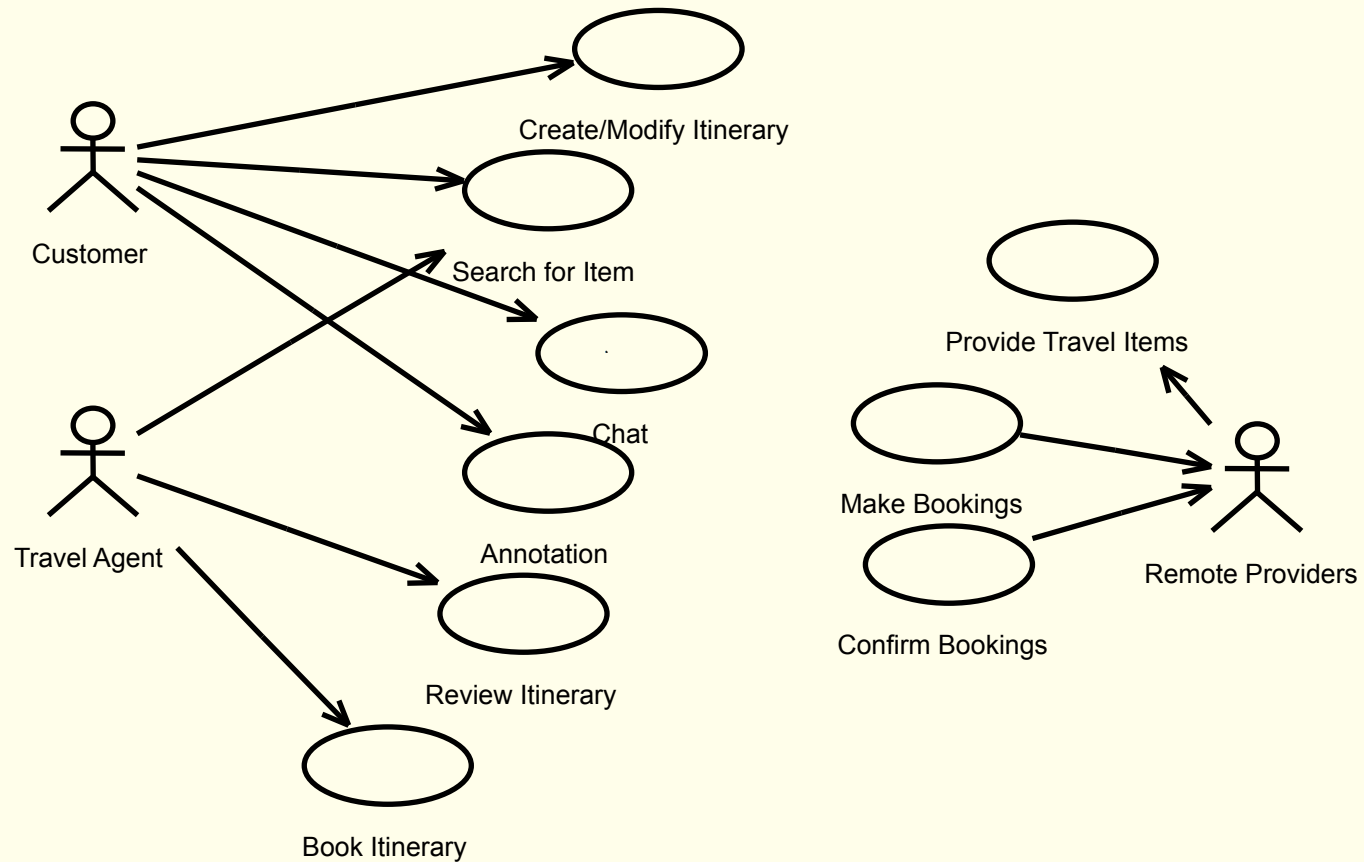
Outline

- ❖ Problem Domain
- ❖ Example Application
- ❖ Our Approach
- ❖ Design and Implementation
- ❖ Comparison to related work
- ❖ Future work

Problem Domain

- ❖ Highly distributed systems integration
- ❖ Service-oriented systems architecture
- ❖ Heterogeneous user interfaces
- ❖ Good end-user system performance, reliability, open architectures are required
- ❖ Exemplar: collaborative travel planning

Example Application



Example Operation

The screenshot displays a web browser window titled "online_booking2 - Microsoft Internet Explorer" showing a trip planning application. The application interface includes a menu bar (File, Travel, Accomodation, Insurance, Destination, Friends, Options, Help), a sidebar with icons for trip items, and a main content area with a world map and flight search details.

Where In The World - Trip Planning

File Travel Accomodation Insurance Destination Friends Options Help

Drag Items Across to add to your trip

Display Date and Time: 1/12/2001
Current Date and Time: 1/10/2001

Scale 1:10000

Travel Activities Added to Itinerary so Far:

View Details Add To My Trip... Delete

online_booking2 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address http://localhost:8080/travel/jsp/800x600/online_booking2.j

Google Search Web Search Site

Links BNZ WestpacTrust XTRA UnisWeb

John's Itinerary:

2001/09/21 - QF43; SYD to AKL: 2C
2001/09/20 - QF100; AKL to SYD: 12C

Flight search criteria:

Start Date: 2002/06/10
End Date: 2002/06/25
Departure airport: Auckland
Arrival airport: Los Angeles
Find

[Booking List](#)

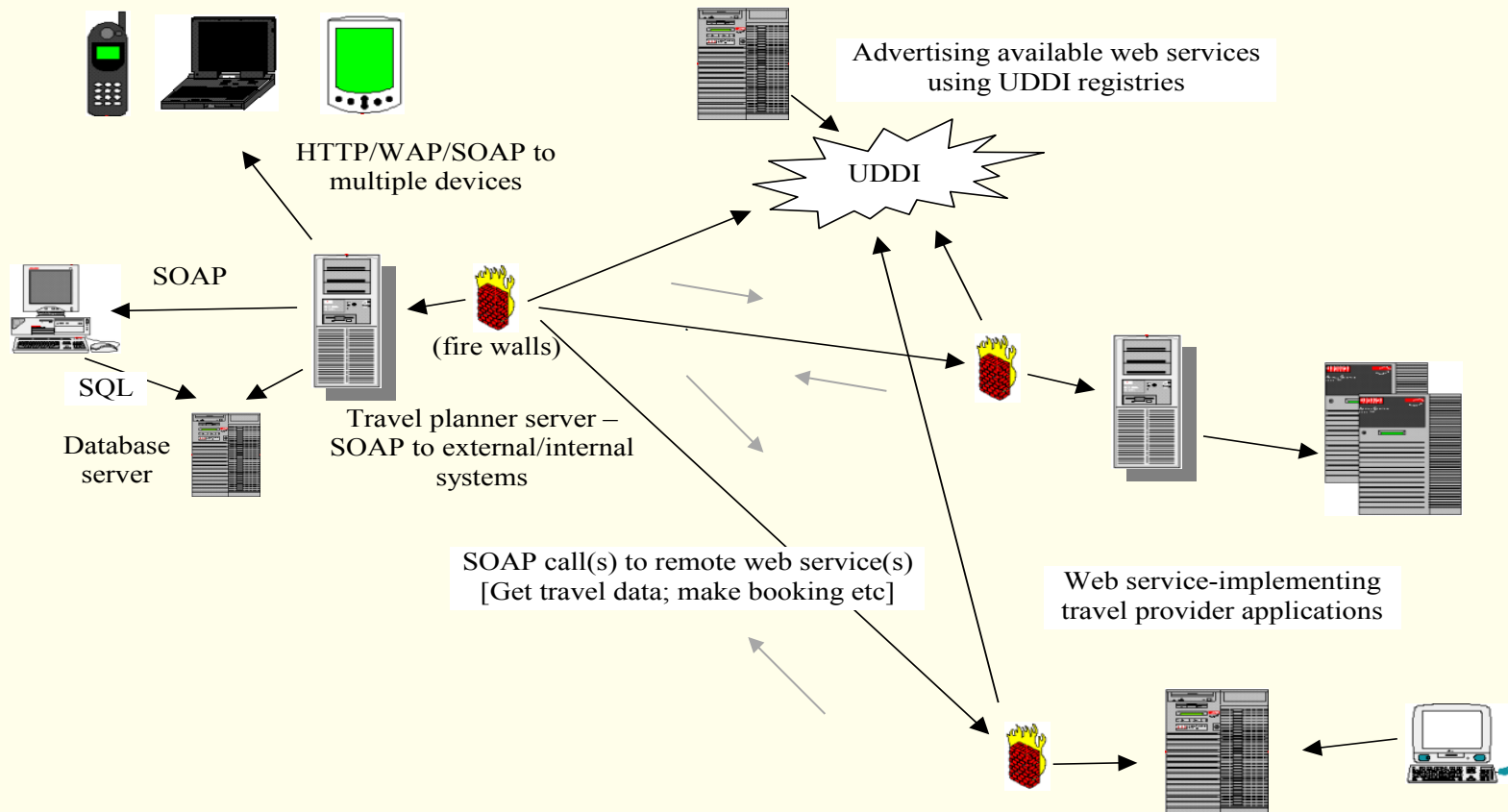
Book Seat

Flight find: 5
Flight selected:
QF43 2002/09/20: SYD to AKL
Select seat:
Row: []
Seat: []
Options

Our Approach

- ❖ Travel planner client architecture with heterogeneous clients supported
- ❖ Integration via web services with wide variety of remote services with different data formats, protocols, business processes
- ❖ Provide good performance and reliability for users despite the distributed nature of system
- ❖ Common, consistent integration infrastructure

Architecture



Design

- ❖ Communication with remotes via web services: UDDI/WSDL for locating + adapting to remotes
- ❖ Data replication of e.g. flight schedules, hotel rooms, cars etc from remote systems – “cached” by travel planner server for performance, reliability
- ❖ Booking operations form “long running transaction” across travel planner + multiple remote systems
- ❖ Combinations of sync/async interactions supported

Implementation

- ❖ C# and .NET web services
- ❖ Discovery of services via UDDI
- ❖ Description of services via WSDL
- ❖ Adaptor architecture to determine required parts of messages in WSDL; SOAP to communicate
- ❖ Data synchronisation with remote systems
- ❖ BTP to co-ordinate updates across remote systems



Comparison to other Approaches

- ❖ COM, CORBA
- ❖ EDI, XML messaging
- ❖ Virtuoso™
- ❖ BizTalk™, Vitria™

- ❖ Combination of data replication+asynchronous transactions; UDDI/WSDL for discovery, integration

Future Work

- ❖ Developing generic data integration engine & integration agents (for WS and other technologies) – see our IC'03 paper...
- ❖ Developing better support for good end-user dynamic configuration of systems
- ❖ Extending WSDL/UDDI for more powerful description, discovery, adaptor-based integration
- ❖ Possibly make use of more automated discovery; what is the degree of integration possible?

Summary

- ❖ Want to provide client with wide range of distributed systems integration necessary
- ❖ Combination of data-oriented brokering; service-oriented integration solution
- ❖ Successful prototype with wide range of integration strategies supported
- ❖ Variety of issues using web services - description, location, adaptation, configuration, performance and reliability - still to improve

References

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