The 3D e-Tourism Environment „Itchy Feet“

Ingo Seidel
Markus Gärnter
PhD Students
Vienna University of Technology

Helmut Berger
Project Leader
Outline

- Project Description & Motivation
- Conceptual Design
- Architecture & Middleware
- “Itchy Feet”
- Electronic Institutions in Itchy Feet
- Conclusion & Future Work
Project Itchy Feet

• With “Itchy Feet” we provide a 3D e-Tourism environment
  ◦ for providers and consumers that enables versatile interaction between participants including the trade in tourism products.
  ◦ that is information-rich and multimedia-based to offer transparent and unified access to disparate information sources.
  ◦ that uses 3D virtual worlds and agent technology to create a lively community and provide insights on the interaction between humans and agents
Project Setting

- Funded by the Austrian Science Fund
- 3 years runtime
- May 2007 – April 2010

- Project Leader: Helmut Berger
- Project Partners
  - Vienna University of Technology
  - Matrixware Information Services GmbH
Project Members

- Ingo Seidel
  - Framework
  - 3D Virtual World
  - Tourism

- Michael Pöttler
  - Game Design
  - Communities

- Markus Gärtner
  - Software Agents
  - Information Retrieval

- Josef Froschauer
  - Game Design
  - Communities
  - 3D Virtual World
Motivation - Tourism

- Tourism is the leading market in B2C commerce
  - for Austria: 6.4% of the gross domestic product
- Number of booking platforms increases steadily
- Internet: main source for information gathering
  - community-based (usenet groups)
  - forums (Thorn Tree, VirtualTourist)
- Tourism demonstrates the importance of emotional aspects in commerce
  - decision for a product is not purely rational
Motivation - 3D Virtual Worlds

- Realistic and immersive experience
- Implicitly address social interaction
- 10 Million people regularly connect to online 3D virtual worlds
- Example Second Life
Motivation - Agents

- Use Agents when data and expertise is distributed
- Agent research often deals with technical details on the micro level
- The society of agents must also be studied
- Less is known about the interaction of Humans and Agents
Legend
1) Elaine attempts to open the door
2) Requests action: “open door”
3) Corresponding message is forwarded for validation
4) Agent is informed about the requested action
5) Validation response: “action permitted”
6) Response is forwarded
7) Action is performed and perceived by Elaine, i.e. the door opens
Environment Specification

- Start with an Electronic Institution design …
Environment Specification

• ... create (generate) a floor plan ...
Environment Specification

... and specify a mapping specification

- Agent Mapping – How an agent is visualized
- Room Mapping – Which scene is mapped onto which room
- Door Mapping – Which scene/transition is mapped onto which door
Architecture

3 Layers

- User Interface
  - Torque Game Engine by GarageGames
  - Industry proven engine
  - Editors are built in
  - Multiple target platforms
  - Used in education

- Middleware

- Multi-Agent System: Electronic Institutions
Architecture

Torque Layer

Middleware Layer

Ameli Layer

Administration Console

Data Store (User Data, Domain Specific Data)

Legend

- A. Agent: Autonomous Agent
- Agent: User's Agent
- Execution Environment
- TCP Port
Middleware – Agent Layer

- Connection between Ameli and Connection Server
- Events are monitored and handled
  - Internal state is updated
  - Forwarded to 3D Virtual World
- Unidirectional connection
Middleware – Torque

- Connection between Torque and Connection Server
- Bidirectional
- XML Message Protocol

<CS3DMessage id="23">
  <header>
    <!-- contains Platform/Federation/El information -- >
  </header>
  <EnterScene>
    <agent>Auctioneer1</agent>
    <role>Auctioneer</role>
    <scene>AuctionScene1</scene>
  </EnterScene>
</CS3DMessage>
Middleware – Torque

- **Torque Server**
  - Dedicated
  - Runs the world
  - Responsible for room logic

- **Torque Clients connect to Server**

- **Each client represents a user**
Torque – Agent Layer

- A User is represented by one agent
- The CS controls the agent
- Agent communicates via XML protocol with Ameli
- Bidirectional
Middleware – Torque

• Indirect coupling between Torque and Ameli
• Torque must know of scenes and transitions
• Other possibility:
  ◦ Put this logic into the CS
  ◦ But then the CS must have information of all connected Worlds
Itchy Feet

- Book hotels & flights
- Buy products in auctions
- Get advice from travel experts
- Share knowledge and communicate with travelers around the world
- Get multimodal information about travel related topics
Itchy Feet Products

- Flight & hotel products (incl. Combination)
- Fixed price & auction products
- Manually added & automatically added products
3D Virtual World of Itchy Feet

- Consists of three buildings and a communication service provider
  - Travel Agency, Forum, Auction House, Ether
Electronic Institutions of Itchy Feet

- Ether Electronic Institution
  - General functionality; domain independent
- Forum Electronic Institution
  - Itchy Feet’s public communication platform
- Travel Agency Electronic Institution
  - Fixed price products
- Auction House Electronic Institution
  - Auction products
Forum Electronic Institution
Travel Agency Electronic Institution
Auction House Electronic Institution
Auction Protocol
The Implementation

- The project consists of several separate components (seven in total)
  - Connection Server (Java)
  - DataModel (Java)
  - Admin Interface (Java)
  - Forum Webservice Client (Java)
  - Itchy Feet Federation (Java)
  - Torque Server (C++)
  - Torque Client (C++, Torque Script)
Starting the environment

- Certain sequence necessary
Conclusion

- We have developed an instrument to connect Electronic Institutions with a 3D World
  - Agents and Humans can participate
  - It is domain independent
- First prototype of tourism platform
  - Services defined in Electronic Institutions
  - Visualization of services in 3D Virtual World
Future Work

- Completing the implementation
- Comprehensive usability test with multiple users and evaluation of the system
- How can tourism product suppliers integrate their products
- Presentation of Products
Future Work

- Design of an appealing 3D virtual world
- Final system:
  - A test bed for assessing the acceptance of virtual environments, as medium to overcome the non-tangible nature of tourism products
Thank you