The first aim of the project is to identify open challenges in the field of peer-to-peer (P2P) massively multiuser virtual environments (MMVEs). P2P MMVEs hold the promise of responsive and massively scalable virtual environments, wherein users can interact with tens of thousands of other users.

This aim has been achieved and two main challenges have been identified which is being addressed in this research project. These two challenges are state management (state persistency) in P2P MMVEs and defining a generic state consistency architecture in which state management and other areas of the research may be included, such as interest management.

State management for P2P MMVEs is also a new field with few published works and no published works mapping the complete field of state management and state persistency. These two may be seen as very similar. Another aim of this project was to map this new area and produce a comprehensive survey which would provide a solid base to new researchers in the field.

A survey paper was written and published in the journal: “IEEE transactions on parallel and distributed systems” (listed under the research outputs section), which has now mapped this new area of research.

Based on what was learned from the papers used in our survey paper, a novel state management and state persistency architecture, called Pithos, has been designed, which satisfies all the requirements of a state management and state persistency architecture for P2P MMVEs. The design is also being implemented in a simulation framework called Oversim. The design of Pithos along with some preliminary simulation results have been published in the MMVE 2011 workshop at the IEEE HAVE 2011 conference this year (listed under the research outputs section).

There are still some improvements that may be done to Pithos and some implementation work which needs to be completed. Pithos should also still be implemented in a real-world system, to measure real-world network effects and allow for testing in the “wild”.

The last objective is the design of a generic state consistency architecture where Pithos will be integrated into. A state consistency architecture has as one component, a state management module. Many other modules are contained in a consistency architecture. The objective here is not to implement all other modules, but to provide a simulation framework in which all modules might be integrated into and tested together.

Such a consistency architecture has also been designed and the simulator, Oversim, has been extended to support this consistency model. Pithos has also been integrated into this larger architecture and testing is currently underway to ensure that Pithos still functions correctly within the new environment.