# JuxMem: Juxtaposed Memory

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## 1. Latest news

- 23th April 2007: JuxMem-C 0.4 Released, more information about it <u>here</u> !
- 21th March 2007: A wiki has been set up to gather documentations and tutorials about JuxMem-C, it is available <u>here</u>.
- 10th March 2006: <u>Mathieu Jan</u> won the **best presentation award** (an iPod nano) at the user feedback sessions of the <u>Grid'5000 school</u> held in Grenoble. The slides are available <u>here</u>.
- The latest news about JuxMem releases are <u>here</u>.

## 2. Motivations and Goals

Data management in very large-scale grids has not yet received sufficient attention from the Grid Community so far. We think that this aspect will be the next challenge to be tackled for the development of large-scale computing infrastructures. Our goal is to propose a data-sharing service providing transparent access to a globally shared address space in a large-scale distributed environment. Such a system is very similar to a **distributed shared memory** system: it is responsible for the memory allocation, for data localisation and replication. These issues, which have been extensively studied in the context of cluster computing, need to be revisited to take into account the specificities of a large-scale, highly distributed architecture: highly dynamic network composition and topology, heterogeneity, hierarchical architecture, etc.

We think **peer-to-peer** architectures illustrate well the key features of environments for handling large-scale distributed data on highly dynamic architectures. However, most recent efforts in this field have focused on file sharing, i.e. read-only data sharing.

We make a step forward and propose a peer-to-peer memory sharing service allowing peers to share **modifiable** memory data, not only **read-only** files. The main challenge is to correctly handle data consistency in a highly dynamic environment. We claim that both DSM systems and P2P systems can serve as major sources of inspiration for the design of a hybrid system, with intermediate hypotheses and properties. We propose the concept of **data sharing service** for grid computing, **as a compromise between DSM systems and P2P systems**. The main contribution of such a service is to decouple data management from grid computation, by providing **location transparency** as well as **data persistence** in a **dynamic environment**. To illustrate the proposed concept and validate its feasibility, we have implemented a software prototype: the **JuxMem** (Juxtaposed Memory) platform. JuxMem relies on the generic peer-to-peer service infrastructure provided by the <u>JXTA</u> environment.

## 3. Ongoing research activities related to JuxMem

If you are interested in current research activities related to JuxMem, check the following [page](#).

## 4. Using JuxMem: the GDS project

**GDS** is a project of the French ACI MD. Its main goal is to specify, design, implement and evaluate a data sharing service for mutable data and integrate it into the [DIET](#) ASP environment developed by the [GRAAL](#) team of [LIP](#) (Lyon). This service will be built using the generic JuxMem platform for peer-to-peer data management. The platform will serve to implement and compare multiple replication and data consistency strategies defined together by the [PARIS](#) team of [IRISA](#), Rennes) and by the [REGAL](#) team of [LIP6](#). (Paris).

## 5. Why JXTA?

JXTA provides an attractive generic infrastructure allowing to rapidly define and implement custom peer-to-peer services. It also provides support for the basic peer-to-peer mechanisms: peer and peer group management, peer-to-peer communication, while allowing the user to focus on the specifics of the service implementation.