RESEARCH REPORT

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2. Current affiliation: University of Strasbourg

3. Research fields and specialties:

    Mathematical and Physical Sciences

    Interdisciplinary and Frontier Sciences

4. Host institution: Internet Initiative Japan Innovation Institute

5. Host researcher: Jean LORCHAT and Keiichi SHIMA

6. Description of your current research

Over the last decade, a multitude of medical sensing devices emerged, with a wide range of application (e.g. blood pressure, oxygenation, glucose). When deployed into a network, these sensors make possible to perform remote reliable monitoring of patients in hospital units and at home. Meanwhile, more and more patient felt the need to be able to access their medical records (e.g. monitoring readings, physician notes) easily, as well as managing it.

Consequently, adapted storage systems were designed, to fit both with medical requirments (privacy, security, resilience) and emerging needs (patients authentication, data access share and revoke, good performances to fith with telemedical applications).

Tamias is a data storage system currently developed at IIJ Innovation Institute. All data stored within Tamias is encrypted, and the system ensures that information cannot be mined without its owners' authorization. Erasure-coding also guarantees preservation of the stored data. On top of that, Tamias users can share and revoke access to all or part of their data at any time

Satisfying all mentioned constraints and needs, Tamias is an ideal solution for health record storage. However, its performances remained unknown. To ensure that the constraints imposed by telemedical applications were met, a thorough evaluation of the Tamias system performances remained to be done.

7. Research implementation and results under the program

Title of your research plan:

TAMIAS: a thorough experimental study.

Description of the research activities:

We performed a thorough evaluation of the Tamias storage system, in order to get a clear view of its performances. Precisely, we developed two monitoring systems, one external relying on remote periodical requests, able to evaluate performances as perceived by Tamias users, and one internal, built within the Tamias system, able to precisely detail the repercussions of each action performed by the user.

This evaluation was performed on a testbed composed of 18 Tamias nodes, deployed at the Internet Initiative Japan Innovation Institute.

At the light of the results, we improved several aspects of Tamias (e.g. leases management, API commands), in order to get a fully operational release. Several nodes based on this release will soon be shipped to several institutions around the world. This will provide us a real-use case configuration, allowing us to perform an even more realistic evaluation.

8. Please add your comments, including any cultural experience during your stay in Japan (if any):

Professionally speaking, this summer program was a marvelous experience. Indeed, I had the opportunity to learn new working methods, as well as a new research theme (data-storage and privacy). Also, while this 2 month period seemed short at first, I am very satisfied by the results obtained, and by the facts that all goals were met.

This experience in Japan was also exceptional on a personal point of view, allowing me to improve my Japanese language level.

9. Advisor's remarks (if any):

As advisors, we are very pleased with the summer program, and especially regarding the work that could be achieved within such a short-term stay. This is the first time we have hosted a JSPS summer intern, and for us this was a very succesful stay. We are looking forward to many future collaborations with Julien, and with other potential summer interns.