

# madaPrint flexible repository

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Index:

1. About madaPrint
2. Technical description
3. Current Status
4. Personal thought
5. Licence

## 1. About madaPrint

madaPrint is a flexible, multi-tier document repository that can run on a Java enabled Multi-Functional Device as the Ricoh Aficio.

It was made for the Ricoh/Sun contest.

It can manage user's document and files, allow account managing, print payment with prepaid count and a reward system for the shared documents.

There are many possible scenarios in which madaPrint can be really useful: it's possible to easily build a net of trusted printers where users can print their documents and other's ones. Payment can be prepaid and accessed from every connected printer. Printers can be placed in public locations, and payment automatically managed.

Sharing can be really easy.

In an University context, for example, professors can share courses slides and notes, while keep control over them, controlling uses and updates: where a document is updated, changes are instantly available in every printer.

It is also possible to stimulate documents, like courses notes, sharing with a reward system. A user can share his notes and get credits every time someone print it. MadaPrint keep track of every print and of each user's credits, that are visible after login.

It is made of two component: a server and several clients, both can be on the MFP or on other Java enabled peripherals. The server manage users account (authentication, personal information and credits), the documents repository, permit basic administration task (create categories, manage users), files upload and to browse through the categories, all from a web browser.

The server has also an XML front end, which permit several client to connect and to be easily implemented.

There is a simple implementation of a client that run on the Ricoh MFP display. That client has all the basic functionality of the web front end, less the administration one.

Through the client it is possible to print document directly.

With madaPrint is possible to manage documents download/print in a secure way, because of the required application signing of the Ricoh MFPs. Because of only certified application can run on that machines, users can be sure that their documents are in a safe place, that their copyright is granted and that their prepaid cash count and reward points are trustly managed.

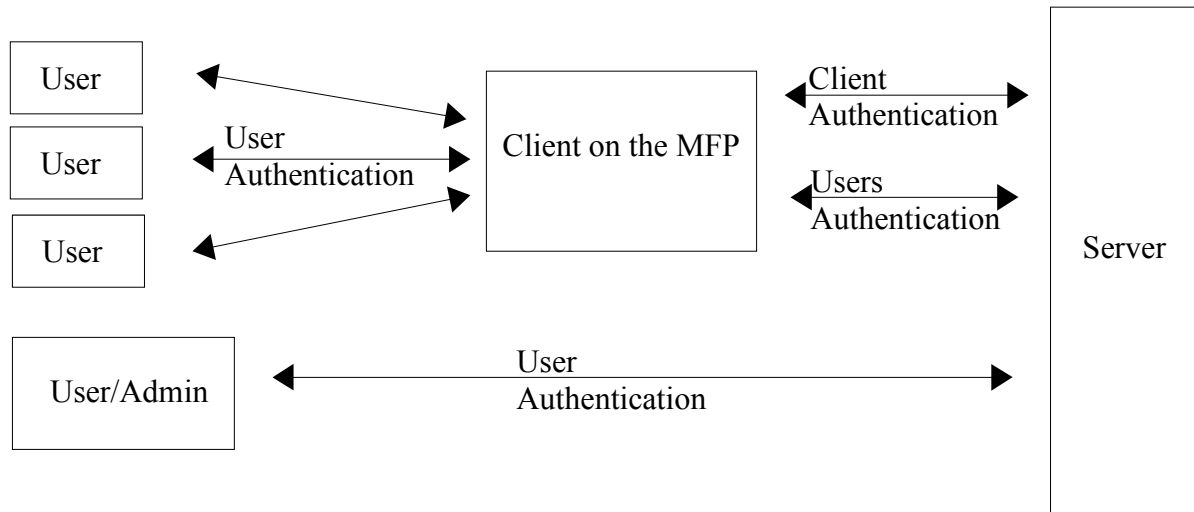
It is also possible that a client connect to one or more remote server. In that case, a client/machine authentication, beyond to the user's one, is made necessary: the client application running on the MFP identify itself with the server, so that only trusted client can access the repository. In that way, for example, can be denied download but not printing of documents.

## 2. Technical description

Server tier of madaPrint is a Java servlet, it uses serialization as a simple database. As a XML parser it uses kXML2 ( <http://kxml.sourceforge.net/> ), based on xmlPULL, witch can run on every J2ME device.

The MFP client uses kXML2 also.

Basically, madaPrint architecture can be described like this:



Users can login in both from the client running on the printers or directly from the web front. It is possible to disallow download of shared documents, but in that case the web access is limited to categories listing, while printing is possible only through an allowed client, that identify itself with the server prior to the user's login.

This is necessary because server can't know if who is connecting is a printer or another host, since communication happens on a shared link such as a LAN or Internet.

Each request is made with http and simple POST method.

Clients send login information and receive users' information and a list of all available categories. Users now can choose a category or to see their documents on the server. In each case the client downloads and shows a list of documents, showing for each information like owner, category, comment and how many times that document was printed. If a file is chosen, and it is a compatible type, it is printed.

In the sources JSP, it is possible to easily customize layout by modifying the html pages in the folder pages/html. There are also equivalent pages for the XML output.

In the class CategoryManager it is possible to modify the behaviour of the server when a file is printed or downloaded: for example, by default the code that decreases credits when a document is printed is commented out, and can be easily restored.

When a user prints a file, the server sends it to the client, giving a point to the owner.

Every file is stored in the "cat" directory, and under a directory with the name of the category in which files are. For example, file Slides.pdf in the category "Biology" can be found in cat/Biology\.

XML describing each category can be found in each directory, and a file categories.xml with a list of all available categories is in the cat directory, this because if it isn't required a restricted access to the list of documents it is possible to directly download those files without access to the servlet,

reducing server load.

### **3. Current Status**

Beyond to numerous bugs, the application currently doesn't support client authentication, user account management and files deleting.

### **4. Personal thought**

Its a common thought that embedded platform will have an interesting future, and I think that putting Java in a printer will have it too, but above all I'm really interested in what can be done in an embedded system that isn't possible in a pc: DRM and trusted computer. Although limiting user right over his own devices isn't a good thing, it will be really useful to have the certitude that on a device it is running only trusted software.

This open to an amazing quantity of possible applications.

This kind of "protection" solutions on pc, like copy protection, has been researched for a long while, but every one has been always breached and always frightened by the users.

I don't think the Ricoh's solution is perfect: the MFP is after all a pc, and an other well known embedded pc like the Xbox has been breached in few time, but i think MFP can already be considered enough secure for simple application like madaPrint.

It would be really useful if it was possible to press a button, and be sure that only certified application is running on my system.

I think that I should be free to do what I want with my computer or device, and I'll oppose to everything that limits my freedom, but this doesn't mean that I'm against DRM. DRM doesn't limit freedom by itself, it is only one of its possible applications.

### **5. Licence**

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