

 miRicoH

m3i – Platform within Platform

A white paper outlining the technical and operational benefits of the m3i platform in relation to other MFD embedded solutions.

Who is this document for?

Ricoh Dealers or Developers wishing to evaluate Ricoh embedded solutions and where Select Technology's m3i Platform sits in the MFD development space.

Table of Contents

m3i – Platform within Platform	3
Embedded Java Solutions	3
Web Services Platforms	3
miRicoh, a Bridge Between the Two	4
The Details	5
The Benefits	6
Chameleon – The Flexible User Interface for miRicoh	7
Summary	8
Ricoh Dealer/ISV/VAR Advantages	8
Ricoh Developer Advantages	8
Ricoh Company Advantages	9
Contact Us	10

M3I – PLATFORM WITHIN PLATFORM

Most manufacturers of multi-function devices (MFDs) now offer embedded solutions with their products to allow for customisation of the interface and the functionality of the device. Processing power and improvements in interfacing with MFDs mean that much more is possible with these devices than the traditional uses of the past.

Solutions that vendors offer with their products fall into two main categories: embedded Java, such as Ricoh's ESA or Canon's MEAP products; a web services approach such as the Sharp OSA platform or EIP from Xerox. These two approaches are very different in principle and design and also require different approaches to development of products using the technologies.

EMBEDDED JAVA SOLUTIONS

Embedded Java solutions consist of a Java Virtual Machine residing directly within the MFD. A solution of this type means that, due to its tightly integrated nature, all the functionality of the MFD is available through the VM on the MFD. This enables products to be written that take advantage of all the abilities of an MFD including the entire interface, scan and printing functionality in a very flexible way. Applications can be written to use the functionality of an MFD in any way the developer wishes. Additionally, if something is required from within the MFD that is not natively made available, then the developer is free to add this functionality by writing or using Java components that provide the required functionality.

For example, if a user-based solution has been developed that requires authentication against Active Directory, this is not a no problem - Java classes can be used to perform LDAP authentication against the directory. If database access is required, again this can be achieved utilising Java over the network to interact with a database of the developer's choice. Almost any functionality that Java provides can be made available to the application developer or vendor. All of this back-end functionality is augmented with a large amount of flexibility with interface design. The embedded solutions typically provide APIs to interact with the interface on the MFD and create an interface of the developers choosing.

Unfortunately, with all of this flexibility comes a caveat. Implementing solutions on embedded platforms of this nature requires a good deal of knowledge and expertise, not only with Java itself, but with the API provided by the vendor, which can be complex. This is the downside of Java embedded platforms. The flexibility provided by them needs expertise to harness, requiring time. Additionally, applications developed using these platforms have to be individually authorised by the MFD vendor before they can be deployed in the market place.

WEB SERVICES PLATFORMS

Web services platforms offer a different approach. With these solutions, less power resides in the MFDs themselves and applications are hosted on servers, with which the MFD communicates. Interface design is achieved using web technologies such as HTML and XML and application functionality, such as scanning services, is represented by a set of services provided on the MFD which can be accessed from an external application typically using web services technologies such as WSDL, AJAX and SOAP. The MFD is basically used as a thin client to display and to provide an interface for a server based application.

Such technologies are said to offer several advantages over embedded Java platforms. The processing power of the server hosting the application, and not the MFD itself, becomes the (un)limiting factor for providing application services. As the application does not directly interact with the MFD (other than via a set of defined APIs) and because its lifecycle is not managed by the developer, it is not necessary for the hardware vendor to test and approve each individual application. This has the potential to reduce development time and costs for both developer and vendors. The technologies used to integrate with web services platforms are commonplace today,

with the development of XML and web services being easily achieved with modern development tools.

Web services platforms therefore do offer a great deal of flexibility in developing interfaces and applications for MFDs and are easily accessible to developers and resellers. The flexibility offered however, inevitably cannot match that provided by a truly embedded integrated solution, where all of the capabilities of the MFD, combined with the power of Java can be harnessed, albeit with greater expertise required to do so.

MIRICOH, A BRIDGE BETWEEN THE TWO

miRicoH from Select Technology provides a bridge between these two approaches. It enables Ricoh MFDs to work within the m3i technology platform. m3i, through a combination of components, provides the richness and integration of an embedded platform with the ease-of-use of a web services platform.

miRicoH was developed using the ESA (SDK/J) solution from Ricoh and is hosted within a Ricoh MFD. miRicoH, through m3i, enables all of the information provided by an MFD to be made available to external and internal client applications that may wish to consume that information. Such information includes machine settings such as the scan resolution, the number of copies to be printed, or the machines current processing state. MFD control functionality is also made available alongside information presentation, enabling external applications to control the MFD. All of this functionality is presented over a lightweight protocol using industry based standards such as XML, JavaScript and simple HTTP queries.

The functionality provided by miRicoH extends the Ricoh ESA platform to allow its use in a similar way to web services offerings from other vendors, whilst providing this functionality in a way that is easy to understand and easy to implement quickly. Libraries are also available for .NET and Java that enable the information presented by miRicoH to be utilised easily by modern applications.

THE DETAILS

Information is made available from the MFD using web technologies which are also wrapped in libraries that further simplify interaction. Using the .NET library, the following simple code is all that is required to establish communication and to start interacting with a miRicoh enabled MFD.

```
public void CreateClient()
{
    m3iConfiguration config = new m3iConfiguration();
    config.Address = "192.168.1.45";
    m3iClient client = new m3iClient("license-key");
    client.RegisterEventHandlers(
        new m3iServerEventDelegate(HandleServerEvent),
        new m3iClientEventDelegate(HandleClientEvent));
    client.Configure(config);
    client.Initialise();
}
```

Along with configuring and initialising the client software, event handlers are registered that the client will use to receive information about the MFD.

```
public void HandleClientEvent(object sender, m3iClientEvent clientEvent)
{
    switch (clientEvent.EventType)
    {
        // process based on the client event type
    }
}

public void HandleServerEvent(object sender, m3iServerEvent serverEvent)
{
    switch (serverEvent.EventType)
    {
        // process the server event
    }
}
```

This is all that is required to start interacting with an MFD in the simplest manner. By default, communications are established over SSL with optional authentication, providing for a secure means of interaction with the MFD. Other layers of security are provided so that only specific clients can control certain functionality of the MFD.

In order to obtain information from or to command the MFD, commands can be sent over HTTP (also using SSL and authentication if required) to request information from an MFD. This is achieved using a simple HTTP GET, which can originate from within a web browser or which can be also be sent using the client libraries. For example, the raw http request to start a scan to print on the MFD is as simple as:

```
GET https://192.68.1.45:51443/m3i/mi/control?method=setAttribute&arg1=job-scan-print&arg2=start
```

This request can also be generated using client libraries using a simple method call.

Along with requesting that the MFD perform certain tasks, clients can request information from the MFD regarding the values of all the attributes of the machine. When communications have been established with miRicoh, any changes in values of these machine attributes are communicated to

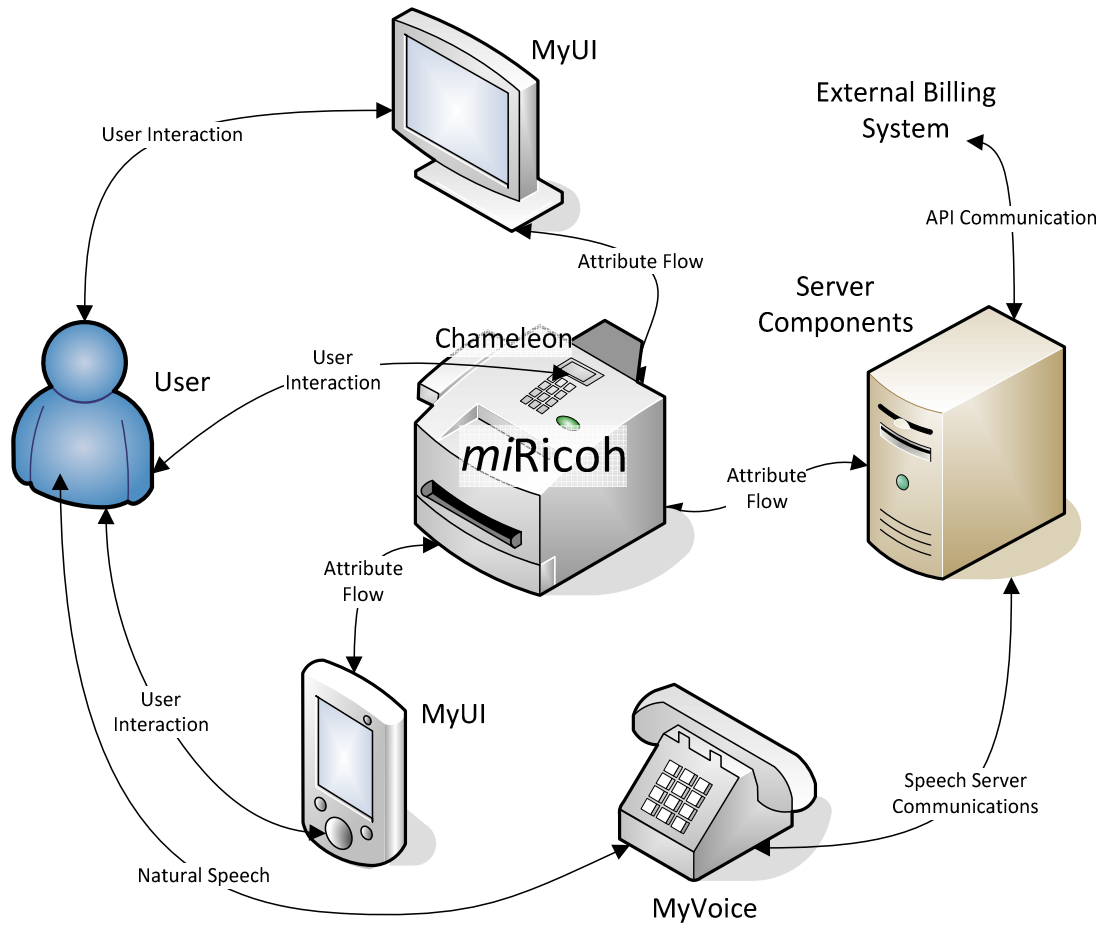
connected clients in real time. This enables all of the information that is available to a Java embedded solution to be presented to clients and other applications, whether they are inside the MFD or hosted remotely in a simple and consistent manner.

Information can be obtained from miRicoH in either XML or JavaScript. XML provides the maximum flexibility as it can be used by any application but Javascript is provided to enable ease-of-use within a web-browser.

THE BENEFITS

At the end of the last section two important concepts were raised: multiple clients and the richness of information available from an MFD via miRicoH. m3i allows multiple clients to be connected to a single MFD at any time and the information regarding the MFD can be presented to an end user in many different ways. For example, Select Technology has developed the following applications to interact with miRicoH via m3i:

- MyUI Access Module – a browser-based, dynamic User Interface that allows control of the MFD from PCs or mobile devices. Designed to take advantage of assistive technology.
- Chameleon – a customisable UI that sits inside the MFD, alongside miRicoH and provides interaction with the MFD directly from the panel.
- MyVoice – an innovative approach to interacting with an MFD. Have a natural language conversation with your MFD!



It is worth noting that all of the user interfaces described above could be connected to the same MFD and a user could choose the interface(s) to use depending on their needs.

The second concept involves the richness of information available from miRicoH. The ESA platform allows access to large amounts of information regarding the state of an MFD. All of this information

is available from miRicoh via the technologies previously discussed, thus providing all the available information in a simple and consistent manner and avoiding the complexities of writing an embedded Java application.

miRicoh is also extensible. If application specific functionality is required that miRicoh does not offer natively, then this information can be added to the system. This allows applications to communicate with user interfaces and, indeed, other applications in a very flexible manner.

CHAMELEON – THE FLEXIBLE USER INTERFACE FOR MIRICOH

Chameleon is a companion product to miRicoh which enables rich user interfaces to be created by the MFD owner which sit inside an MFP and utilise the panel functionality of the machine. Chameleon is highly configurable and enables easy customisation of the MFD control panel. A Chameleon user interface is defined completely within XML and, as such, the combination of miRicoh and Chameleon offers a high level of customisability with a small learning curve. The XML screen definitions for Chameleon allow user interfaces to be designed by MFD owners/administrators, requiring little development expertise. Resources within interfaces can be accessed via HTTP, enabling custom images and company logos to be incorporated within an interface. The same interface that miRicoh uses to communicate its information to external clients is used internally to communicate with Chameleon, meaning that only one set of technologies are used across the board to communicate with miRicoh.

The screen definition file below describes a screen that displays the current value of the number of print copies and provides a means to increment the value. This simple example demonstrates how easy it is to present and manipulate an MFD empowered with miRicoh.

```
<?xml version="1.0" encoding="utf-8"?>
<chameleon screen="wVGA" xmlns="http://www.m3ic.net/schema/1.0/chameleon">
  <!-- Create the main screen -->
  <create control="GroupBox" id="main">
    <set attribute="Bounds" arg1="int:0" arg2="int:0" arg3="int:600" arg4="int:229"/>
    <!-- Add a button to press to increment print copies -->
    <create control="Button" id="main_button">
      <set attribute="DefaultAppearance" arg1="int:5" arg2="int:5" arg3="int:70"
        arg4="int:20" arg5="Print Copies"/>
      <set attribute="Wink" arg1="boolean:true" />
      <!-- The action that will be performed when the button is pressed -->
      <action>
        <invoke method="offsetAttribute" arg1="print-copies" arg2="int:1"/>
      </action>
    </create>
    <!-- Create a label to display the current value of print copies -->
    <create control="AttributeLabelArea" id="main_label">
      <set attribute="Bounds" arg1="int:5" arg2="int:30" arg3="int:70" arg4="int:20"/>
      <set attribute="AttributeListenName" arg1="print-copies"/>
    </create>
  </create>
</chameleon>
```

The UI definition can become much more complex dependent on requirements - displaying images, reacting to value changes on the machine, changing screens, requiring user input and much more.

SUMMARY

Embedded Java solutions and web services platforms have a variety of differences and strengths. Both approaches provide valuable means of creating applications for modern MFDs. miRicoh and associated m3i components provide an extension to the Ricoh ESA platform offering a new way of integrating with an enabled MFD.

The base technologies required to interact with m3i are widely available and used in modern development and libraries are available to further simplify interaction. miRicoh, Chameleon and other m3i components provide a platform which offers functionality similar to a web services platform while offering an innovative means of connecting multiple user interfaces to an enabled MFD.

In addition to the power, simplicity and flexibility provided by m3i, using the platform allows applications to be created for Ricoh MFDs that do not require authorisation or testing by Ricoh. miRicoh and Chameleon themselves are the integrated applications and anything built on these platforms is not constrained by the testing process.

miRicoh and its associated m3i components give Ricoh a unique ability in the MFD space - the ability to provide application integration across the spectrum. Fast-track, unregulated solutions can be designed and integrated very quickly on the m3i platform by Dealers, ISVs and VARs while at the same time supporting fully integrated development with the Java SDK. This platform-within-platform approach offers Ricoh and its development community the best of both worlds.

See m3interconnect.com for more information.

RICOH DEALER/ISV/VAR ADVANTAGES

- Allows easy, fully customisable solutions at the end user level, including language customisation
- Full white-label branding of miRicoh and other m3i components possible
- Advantage can be taken of additional on-going hosted service revenue streams – e.g. Internet fax, Voice integration.
- Brandable web-based hosted service control panel in development
- Advantage can be taken of connected external application integration – e.g. PaperCut Software
- Accessibility compliance – e.g. Section 508, Disability Discrimination Act

RICOH DEVELOPER ADVANTAGES

- Removes financial and compliance barriers to developing on Ricoh MFDs
- Lowers the technical entry barrier for development
- Built on open standards with transparent security in mind
- Extensible nature of m3i allows application specific data attributes at the system level
- Simple integration of external applications using .NET or Java toolkits with example projects
- Advantage can be taken of customisable m3i User Interfaces and devices now and in the future

- Direct interaction with m3i using lightweight (embedded) clients if required
- Employment of Open Standards and protocols

RICOH COMPANY ADVANTAGES

- Allows Ricoh to support solution development using both the embedded Java and Web Service-like methodologies
- m3i is intentionally committed to a Ricoh-only scope for the foreseeable future
- Rapid increase of SDK/J take-up by providing a quick/easy route to market
- Encouragement of innovation on SDK/J
- Provision of an easy route for customer specific customisations
- Accessibility compliance – e.g. Section 508, Disability Discrimination Act
- Ultimately more MFD sales directly attributed to SDK/J

CONTACT US

Postal Address	Select Technology Ltd Basepoint Enterprise Centre Stroudley Road Basingstoke Hampshire RG24 8UP UK
Telephone and Fax	+44(0)1256 246970
Product Website	http://www.m3interconnect.com
Support Email	support@m3interconnect.com
Support Website	http://selectec.helpserve.com