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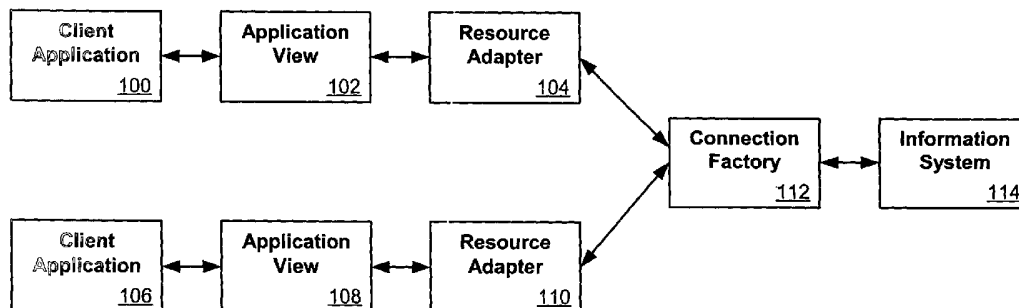
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(54) Title: SHARED COMMON CONNECTION FACTORY



(57) Abstract: Systems that use application view components (102, 108) to allow a user (100, 106) to exploit functionality in an EIS (114) can utilize a shareable connection factory (112). Instead of having a connection factory for each application view, a single connection factory (112) can be used that is simply referenced by each application view (102, 108). Users (100, 106) can then choose to associate an application view (102, 108) with any available connection factory (112) on the system, or can choose to create a new connection factory (112) that can be available to any other application view (102, 108) or resource adapter (104, 110). This description is not intended to be a complete description of, or limit the scope of, the invention. Other features, aspects, and objects of the invention can be obtained from a review of the specification, the figures, and the claims.



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SHARED COMMON CONNECTION FACTORY

CLAIM OF PRIORITY

5 This application claims priority from U.S. provisional patent Application No. 60/377,353 entitled " SHARED COMMON CONNECTION FACTORY ", filed May 2, 2002, incorporated herein by reference.

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CROSS-REFERENCED CASES

The following applications are cross-referenced and incorporated herein by reference:

20 U.S. Provisional Application No. 60/377,322 entitled "Application View Transactions," by Timothy Potter et al., filed May 2, 2002 (Attorney Docket No.: BEAS-01268US0).

 U.S. Provisional Application No. 60/377,303 entitled "Adapter Deployment Without Recycle," by Timothy Potter et al., filed May 2, 2002 (Attorney Docket No.: BEAS-01266US0).

25 U.S. Provisional Application No. 60/377,354 entitled "Modular Deployment of Components," by Timothy Potter et al., filed May 2, 2002 (Attorney Docket No.: BEAS-01265US0).

 U.S. Provisional Application No. 10/271,194 entitled "Application View," by Mitch Upton et al., filed October 15, 2002.

30

FIELD OF THE INVENTION

The present invention relates to connections in application integration systems.

BACKGROUND

Existing application integration (AI) systems can utilize application views to simplify the way in which adapters are accessed in an enterprise. Application views provide a layer of abstraction between an adapter and any Enterprise Information System (EIS) functions exposed by that adapter. Instead of accessing an EIS by directly programming the EIS, a user can simply edit an application view for the adapter, create a new application view, or delete an obsolete application view. This layer of abstraction, formed by application views, makes it easy for non-programmers to maintain the services and events exposed by the adapter.

Each application view is specific to one adapter and can define a set of business functions on the EIS for that adapter. After an adapter is created, a Web-based interface for that adapter can be used to define application views. Such application views provide a view of the application capabilities exposed by an adapter. An application view can be used to hide as many of the system details from clients as possible. These details can include functionality for doing integration and interacting with enterprise information. The more system level details that are hidden from clients, the greater the chance of changing those details without affecting the clients. This is one reason for using an abstraction layer. If things that may change are abstracted, anything depending on those things may not need to change.

An application view can take advantage of a connection factory. A connection factory is an interface to a pool of connections for an information system. In present AI systems there is a one to one correspondence between application views and connection factories, such that when an application view is defined it is necessary to also define and deploy a connection factory to handle service invocations through a connector for that application view. This requirement of a one-to-one correspondence between application views and resources leads to undesirable definition and deployment repetition, as well as an undesirable consumption of resources.

BRIEF SUMMARY

Systems and methods in accordance with embodiments of the

present invention can overcome deficiencies in existing information systems by changing the way in which information system is accessed. A resource adapter can expose certain capabilities in an information system, such as an Enterprise Information System (EIS). An application view that is specific to the resource adapter can be used to allow a user or client application to access the capabilities exposed by the resource adapter. Instead of having a connection factory for each application view, a shareable connection factory can be used to provide a connection between the resource adapter for the application view and the information system. An application-programming interface can be used to provide the functionality that allows the connection factory to be shareable. The shareable connection factory can provide connections to the information system for multiple application views. A user can designate an application view to use a shareable connection factory by referencing the connection factory at application view design time.

Other features, aspects, and objects of the invention can be obtained from a review of the specification, the figures, and the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a diagram of a system in accordance with one embodiment of the present invention.

Figure 2 is a flowchart showing a method that can be used with the system of Figure 1.

DETAILED DESCRIPTION

Systems and methods in accordance with embodiments of the present invention can allow multiple application views to share a common connection factory. One such system is shown in the diagram of **Figure 1**. A user may only wish to define and maintain a single pool of connections in a server for a given information system **114** or EIS. A user can set up a shareable connection factory **112**, and can have an application view **102**, **108** reference that connection factory **112** when the user defines the application view **102**, **108**. Multiple application views **102**, **108** can then share the connection factory **112** to provide access to the information

system **114** through the appropriate resource adapter **104, 110** to multiple client applications **100, 106**.

Figure 2 shows a method for using such a system. A resource adapter can be provided that exposes certain capabilities in an information system, such as an Enterprise Information System (EIS) **200**. An adapter-specific application view can be provided that allows a user or client application to access the exposed capabilities **202**. Instead of having a connection factory for each application view, a shareable connection factory can be used to provide a connection between the resource adapter and the information system **204**. An application-programming interface can be used to provide the functionality that allows the connection factory to be shareable, and the shareable connection factory can provide connections to the information system for multiple application views. A user can designate an application view to use a shareable connection factory by referencing the connection factory at application view design time **206**. A user can associate an existing, shareable connection factory deployment with an application view, and can associate multiple application views to reference the shared connection factory. A user can provide a list of deployed connection factories for a specific adapter, and can leverage this functionality in a design time interface for a resource adapter.

An AI application programming interface (API) can be used to support shared connection factories. Such APIs can contain shareable connection functionality to allow multiple application views to share a connection factory. An application integration system may only make owned connection factories available to a user, but can expose any existing connection factories. These connection factories can be sharable among newly created application views. Owned connection factories can still be created when a user defines a new application view.

Changes to an existing AI system can be required, such as the way in which users interface with system, to integrate shareable connection factories into the design-time interfaces. A user may wish to be able to select the type of connection for an application view, such as a 'shareable' connection or an 'owned' connection. A user may also wish to see a list of available connection factories, as well as the properties of those connection

factories. In one example, multiple pages of a user interface can be used to show connection factory properties, such as a summary of attributes from a shareable connection factory. In addition, an AI console can be used that implements a new page to display references to a shareable connection factory. A reference page can display any application view currently using a shareable connection factory, and can allow the client to un-deploy all referenced application views.

Shareable connection factories can be determined by using connector component managed beans (MBeans). These MBeans can also be used to determine the Java Naming and Directory Interface (JNDI) locations of those connections. The JNDI specification is published by Sun Microsystems, Inc., of Santa Clara, CA. The JNDI location of a connection can be set into an application view property, such as "connectionFactoryJNDIName." An application view deployer can use this property to later deploy the application view. Since a connection factory can be deployed into any JNDI location, there may be no need to identify owned connection factories. Owned connection factories can be determined by a lookup in the repository. If the connection factory exists in the repository, the factory may be unable to be shared.

In some embodiments, the only object having knowledge of an adapter logical name is the connection factory. This name can be used to uniquely identify an adapter and any associated resources. This attribute may not be available to design-time interfaces if the application view uses a shareable connection factory. This attribute can be added to an application descriptor interface, such as "ApplicationDescriptor." In addition, any methods in an administration deployer extracting administration information objects may need to be reviewed for usage of the logical name.

A connection factory selection page can be the first page that a user sees after defining an application view. The selection page can allow the user to select the type of connection factory to associate with the new application view. If a shareable connection factory is being used, the user can select a specific connection factory. If the user selects an owned connection factory, the next page displayed to the user can contain connection configuration information. If the user selects a shareable

connection, the next page can include administration information.

There can be a field, such as a check box or radio button, displayed to a user for each existing connection factory. There can be a field for each shareable connection factory, as well as a field for a new connection
5 factory. In addition to a field, a reference link can be displayed next to each shareable connection factory. This reference link can allow a user to view application views that are deployed with the shareable connection factory.

One system can allow a user to navigate to either a 'select connection' or 'connection configuration' page at any time during an
10 application view definition process. The user can switch connection types at any time in the application view definition process prior to deployment.

An application view deploy page can display shareable connection factory properties and relevant application view properties when the application view contains a reference to a shareable connection factory. A
15 deploy page can use the current managed connection factory to extract the relevant attributes to allow a user to identify which connection factory is being used.

In an application view, options such as a deploy tab and a connection tab can be used to display shareable connection factory
20 properties when an application view references a shareable connection factory. In addition, both tabs can contain a references link to allow a user to view deployed application views referencing the selected connection factory.

A reference page can be a child window that displays the fully
25 qualified name for any deployed application view currently referencing the connection factory. A reference page can be accessed from a page such as a connection selection page or an application view summary page. Undeploying a shareable connection factory that has application view references can be catastrophic in certain circumstances. A reference page
30 can allow the user to undeploy any deployed application views currently referencing the shareable connection factory.

An AI deployment engine may not identify the connection factory that each application view references without extracting the descriptors from an AI repository. Such functionality may not meet the requirements

for identifying and persisting this information into JNDI. The deployment interfaces can maintain a JNDI repository for each shareable connection factory. Connection factory instances can be stored in a connection factory JNDI (sub-)context, for example. This context can contain two new
5 contexts, such as 'shared' and 'references'. The shared context can contain the references sub-context, and the references sub-context can contain a sub-context for each shareable connection factory having outstanding references. The references contained in the shared context can be string objects containing the fully qualified name of an application
10 view. The name can reference the connection factory identified by the sub-context.

For each connection factory deployed, a repository can be created in the references context. The Repository can be named using the user defined connection factory name concatenated with an identifier, such as
15 '_connectionFactoryReferences'. The repository can contain the fully qualified name for every application view that has a reference to the connection factory.

When an application view that uses a shareable connection is deployed, the application view deployer can add a fully-qualified application view name to the references repository. Similarly, when an application view containing a reference to a shared connection factory is undeployed, an application view deployer can be responsible for removing the JNDI reference in the reference repository for the connection factory. If the application view is the only or last reference, the connection factory sub-
20 context can be removed as well.

All shareable connection factories can be re-referenced in an AI startup process. A user can ensure that the connection factories deployed through a system console are available for the deployment process. If a connection factory is not found, the application view deployment can fail.

30 New interfaces can be added to an XCCI layer. XCCI, or XML-CCI, is a dialect of the common client interface (CCI) that uses XML-based record formats to represent data. XCCI provides the tools and framework for supporting such a record format. There are two primary components of XCCI: services and document records. Interfaces can be added, such as

“ProxiedMarker” and “ProxiedConnection.” An interface such as ProxiedMarker can be implemented by a in implementation class such as “com.adapter.cci.ConnectionFactoryImpl.” The marker can be used to determine whether the associated connection is a proxy object. An
5 interface such as ProxiedConnection can be implemented by an abstract connection class, such as “com.adapter.cci.AbstractConnection”, and can be used to return the real connection associated with the proxy. A ProxiedConnection interface can have a single method to get an adapter connection, such as a getAdapterConnection() interface. A method such
10 as getAdapterConnection() can be defined in the abstract connection class, which can return a pointer such as a “this” pointer. A proxied connection interface can be necessary, as a proxy can only return interfaces that the proxy implements. The proxy cannot distinguish class objects in its derivation tree.

15 To accommodate migration, certain properties can be added to an adapter properties file. Certain properties, such as navigation or “nav” properties for example, can correspond to toolbar items displayed in an application integration console. The remainder of the properties can be used as labels for the shareable connection displays. To utilize the
20 shareable connection functionality, the adapter developer can use the latest ADK and design-time interfaces.

The foregoing description of preferred embodiments of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise
25 forms disclosed. Many modifications and variations will be apparent to one of ordinary skill in the art. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, thereby enabling others skilled in the art to understand the invention for various embodiments and with various modifications that are
30 suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims and their equivalence.

CLAIMS

What is claimed is:

1. A system for sharing connections to an information system, comprising:
5 a resource adapter for exposing capabilities in the information system;
an application view specific to the resource adapter, the application view allowing a user to access the capabilities exposed by the resource adapter; and
10 a shareable connection factory adapted to provide a connection between the resource adapter and the information system.
2. A system according to claim 1, further comprising:
15 an application programming interface providing functionality allowing the connection factory to be shareable.
3. A system according to claim 1, wherein:
20 the shareable connection factory is further adapted to provide a connection between any additional resource adapter and the information system.
4. A system according to claim 1, further comprising:
25 a managed bean for determining whether the shareable connection factory is available to a resource adapter.
5. A system according to claim 1, further comprising:
30 a managed bean for determining the location of the shareable connection factory.
6. A system according to claim 1, further comprising:
a user interface allowing the shareable connection factory to be associated with the application view.
7. A system according to claim 1, further comprising:
a user interface allowing an additional shareable connection factory

to be created and associated with the application view.

8. A system according to claim 1, further comprising:

5 a repository for storing location information for each connection instance of the connection factory.

9. A system according to claim 1, further comprising:

a deployment engine for deploying the application view.

10 10. A method for sharing connections to an information system, comprising:

setting up a shareable connection factory to manage connections to an information system; and

referencing the shareable connection factory when defining an application view to provide a user with access to the information system.

15

11. A system for sharing connections to an information system, comprising:

means for setting up a shareable connection factory to manage connections to an information system; and

20 means for referencing the shareable connection factory when defining an application view to provide a user with access to the information system.

12. A computer-readable medium, comprising:

25 means for setting up a shareable connection factory to manage connections to an information system; and

means for referencing the shareable connection factory when defining an application view to provide a user with access to the information system.

30 13. A computer program product for execution by a server computer for sharing connections to an information system, comprising:

computer code for setting up a shareable connection factory to manage connections to an information system; and

computer code for referencing the shareable connection factory

when defining an application view to provide a user with access to the information system.

14. A computer system comprising:

- 5 a processor;
- object code executed by said processor, said object code configured to:
- set up a shareable connection factory to manage connections to an information system; and
- 10 reference the shareable connection factory when defining an application view to provide a user with access to the information system.

15. A computer data signal embodied in a transmission medium, comprising:

- 15 a code segment including instructions to set up a shareable connection factory to manage connections to an information system; and
- a code segment including instructions to reference the shareable connection factory when defining an application view to provide a user with
- 20 access to the information system.

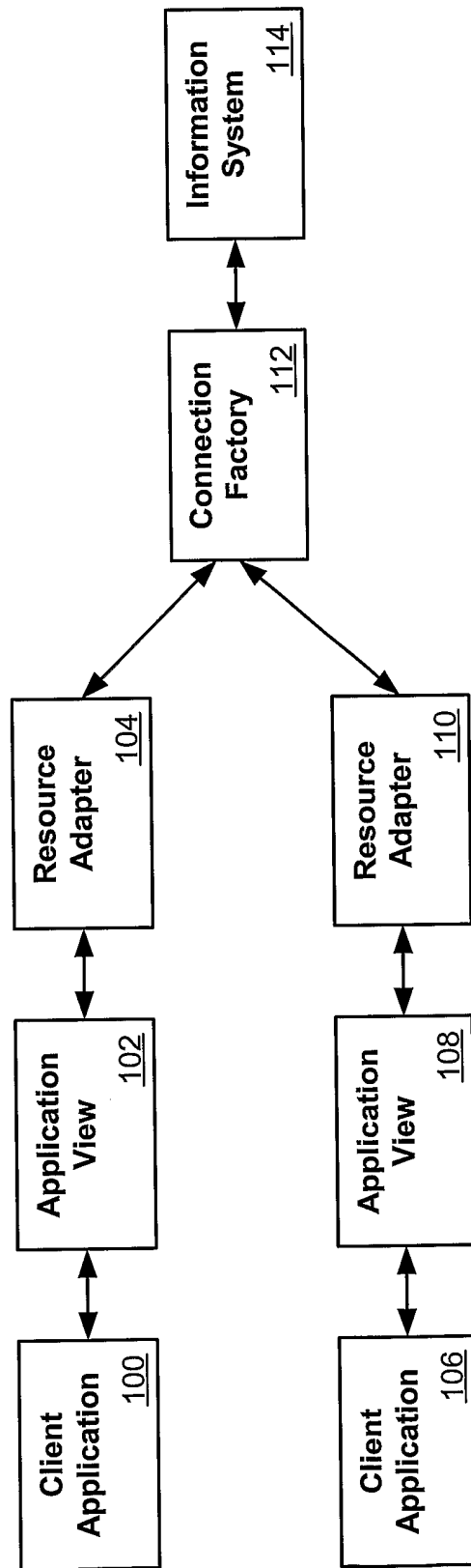


Figure 1

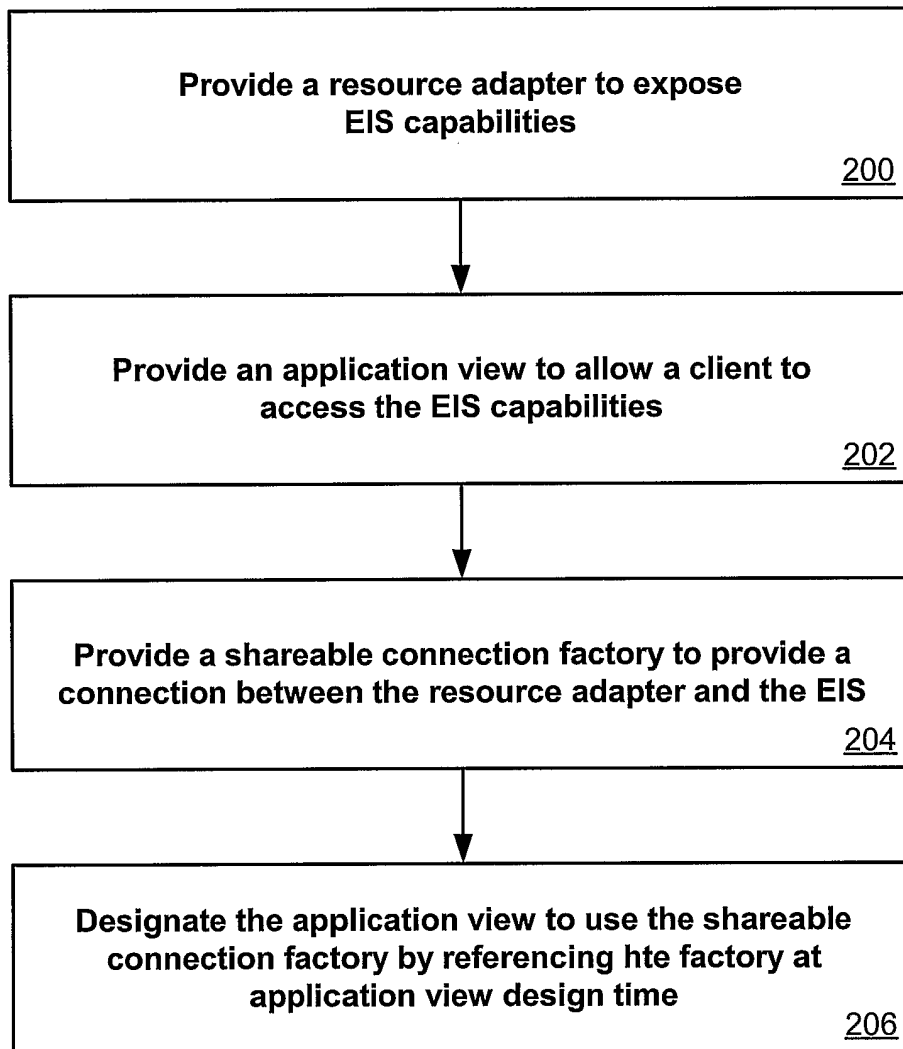


Figure 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/13868

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G 06 F 15/16
 US CL : 709/246

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 U.S. : 709/246, 102, 104

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,256,676 B1 (TAYLOR et al) 03 July 2001 (03.07.2001), column 13, lines 6-43.	1-15
Y	US 6,282,561 B1 (JONES et al) 28 August 2001 (28.08.2001), column 5, lines 11-58.	1-15

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:			
"A"	document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier application or patent published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

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