

Chapter 5 Application Server Middleware and Connectors



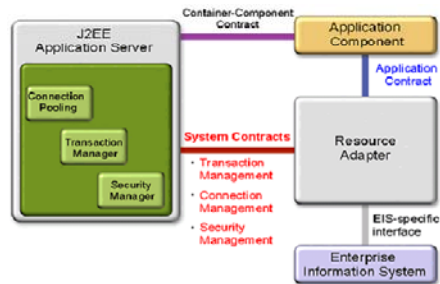
Accessing Enterprise Information Systems

- Accessing (SQL) data bases is based on standardized (DB-gateway) interfaces
 - e.g., SQL + JDBC/SQLJ, or EJB CMP
 - interoperability at the system level supported through well-defined interfaces
 - XXXDataSource for Connection Pooling, transaction coordination, ...
- Accessing/interacting with enterprise information systems?
 - Examples
 - Enterprise Resource Planning (ERP), Customer Relationship Management (CRM)
 - SAP, Baan, Peoplesoft, Siebel, Oracle, ...
 - Transactional systems based on TP-monitors
 - CICS, Encina, Tuxedo, ...
 - Non-relational DBS
 - IMS, ...



J2EE Connector Architecture (JCA)

- Standardized Interoperability with EIS
- Resource Adapter (Connector)
 - EIS-specific component
 - implements client interface (application contract) for EIS, used by EJBs, web components
 - either standardized (Common Client Interface, CCI)
 - or EIS-specific
 - cooperates with J2EE application server via system-level contracts
 - connection management, transactions, security, ...



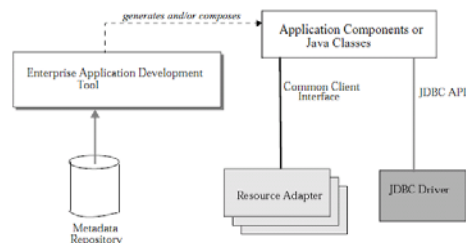
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Enterprise Information Systems

Common Client Interface

- Generic interface for invoking EIS functions (remote function calls)
- Useful for application development tooling, EAI frameworks
 - generating EJB wrapper classes for EIS functions (similar to EJB CMP tooling)
 - requires standardized representation of EIS meta data, in addition to CCI
 - not defined as part of the JCA

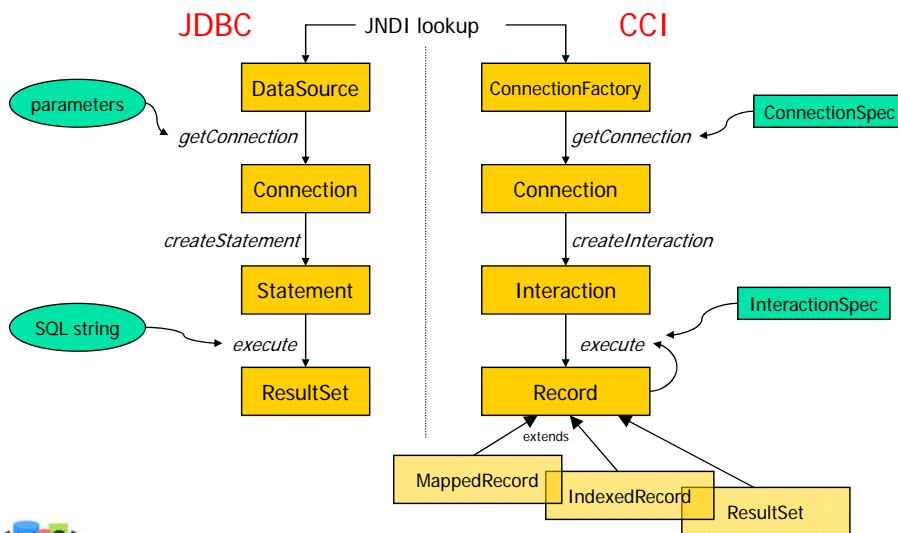


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Enterprise Information Systems

CCI vs. JDBC Interfaces



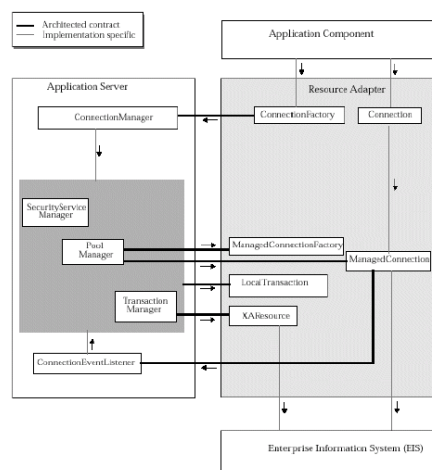
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Enterprise Information Systems

JCA System-Level Contracts

- Application server implements ConnectionManager
 - generic, for arbitrary EIS connections
 - interacts with other AS services
 - connection pooling, transactions, security
- Resource Adapter (RA) creates connections (ConnectionFactory)
- Application connection request flows via ConnectionFactory to ConnectionManager
 - PoolManager selects suitable connection in the pool or initiates creation of a new connection
 - RA helps with selection process
 - RA informs ConnectionManager about connection state (ConnectionEventListener)



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Enterprise Information Systems

JCA – Transaction Management

- Resource Adapter (or RM of EIS) may support
 - global transactions
 - coordinated by TA manager of application server
 - XA-compliant (RA implements XAResource interface)
 - one-phase optimization possible, if only one resource is involved
 - local transactions
 - permits bypassing global TA manager for performance reasons, if it is known at deployment time that global TAs are not required
 - no transactions



JCA – Security

- Security architecture supports alternatives for determining the so-called *resource principal*
 - component-managed sign-on
 - application component determines resource principal (e.g. dynamically)
 - container-managed sign-on
 - resource principal, sign-on information (e.g. userid, password) defined for EIS at deployment time
 - configured identity: resource principal fixed, independent of initiating principal
 - principal mapping: resource principal determined based on initiating principal through a mapping, does not inherit any additional security attributes from initiating principal
 - caller impersonation: identity, credentials of caller are delegated to EIS
 - credentials mapping: mapping across security domains
- Choice of authentication mechanisms
 - BasicPassword, KerbV5, ...
- Access control can be performed by EIS or application server
- Secure communication supported by establishing security association with RA



Connectors - Summary

- Goal: Integration of existing EIS as additional resource managers in distributed component-based environments through a so-called resource adapter
 - unified connection/security model for calling application components
 - uniform interface to arbitrary EIS
 - tooling support, combined with meta data management
- Standardized interfaces, interactions
 - same RA can be installed in any J2EE-conforming server implementation
 - J2EE server realizes the required infrastructure only once, for arbitrary EIS
- Important architecture concept for Enterprise Application Integration
 - numerous J2EE connectors are commercially available

