Introduction to ATG Repositories

Presenter’s Name
Presenter’s Title

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Agenda

- ATG Repository Overview
- SQL Repository Architecture

Learning Objectives

At the end of this lesson you should be able to:

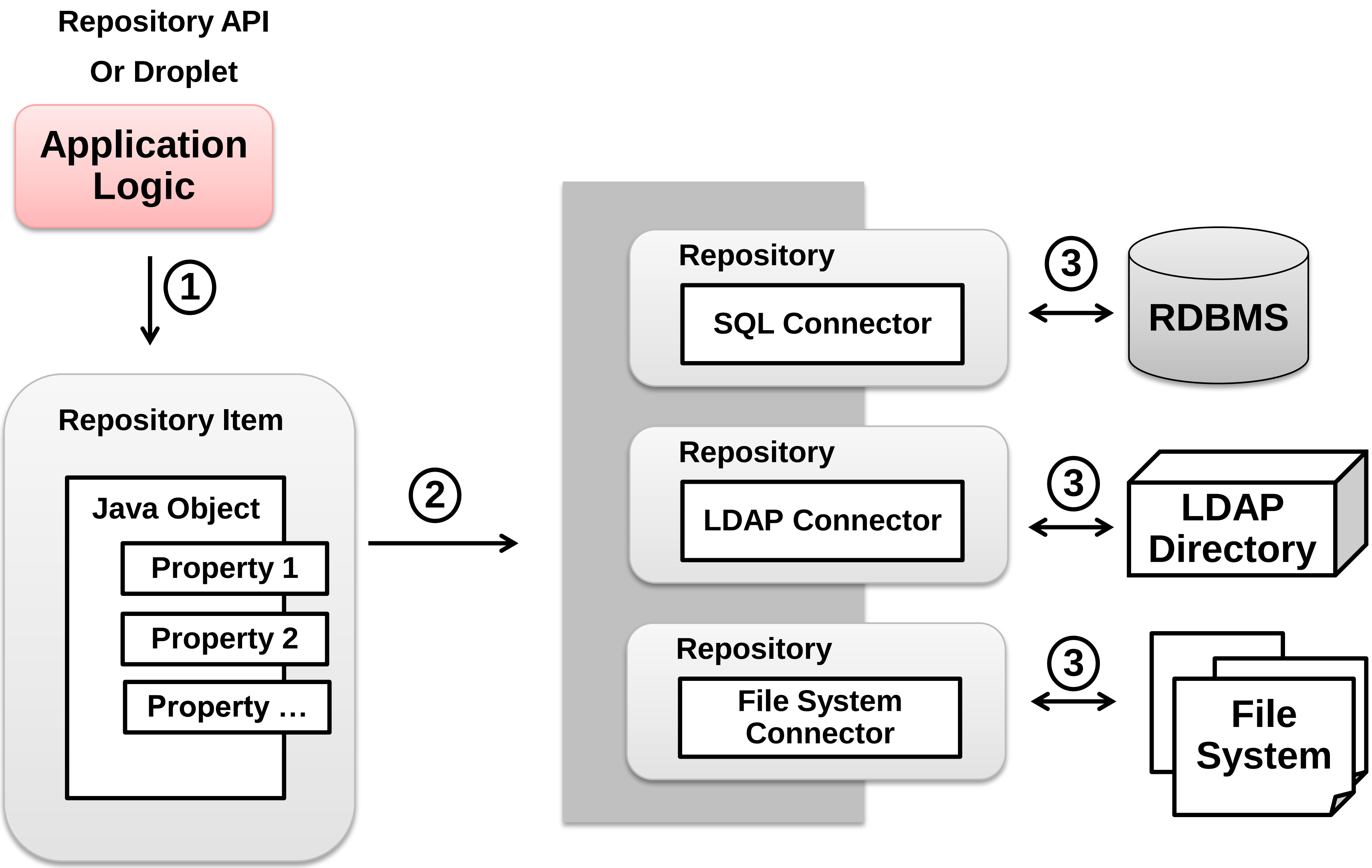
- Explain and list the advantages of the ATG Data Anywhere Architecture
- Understand the various models of ATG Repositories
- Explain the SQL Repository Architecture
- Create an item descriptor of for a new repository item
- Explain the relationships between repository items

Section 1:
ATG Repository Overview

ATG Data Anywhere Architecture

- Data access is a large part of most internet applications.
- ATG Data Anywhere provides a unified view of content and data:
  - Including SQL databases, LDAP directories, content management systems, and file systems.
- The source of the data is hidden behind the ATG Repository abstraction:
  - Easy to change from a relational data source to an LDAP directory.
  - None of the application logic needs to be changed.
- The core of it is the Repository API:
  - Transform data into an object-oriented representation.
  - Repository Query Language.

Data Anywhere Architecture Diagram



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Data Anywhere Architecture Benefits (1)

ATG Data Anywhere offers several benefits:

- Data source independence
  - Provides access to relational database management systems, LDAP directories, and file systems using the same interfaces.
- Fewer lines of Java code
  - Persistent data types are described in an XML file.
  - No Java code required.
- Unified view of all customer interactions
  - Provides a unified view of customer data.
  - Leads to a coherent and consistent customer experience.
- Maximum performance
  - Intelligent caching of data objects.

Data Anywhere Architecture Benefits (2)

- Simplified transaction control
  - Full Java Transaction API (JTA) support.
  - Lets both the page developers and software engineers control the scope of transactions.
- Fine-grained access control
  - Can control who has access to which data at the data type, data object.
  - Down to the individual property with Access Control Lists (ACLs).
- Integration with ATG product suites
  - ATG product suites all make use of repositories for data access.

Object-Relational Mapping

- Object Relational Mapping or ORM refers to mapping data between a relational data store and objects in an object oriented language.
- Object-oriented languages (e.g. Java) contain domain objects.
- Relational databases store data.
- Object-relational mapping tools such as the following connect the two together.
  - ATG Repository
  - OpenJPA
  - Hibernate

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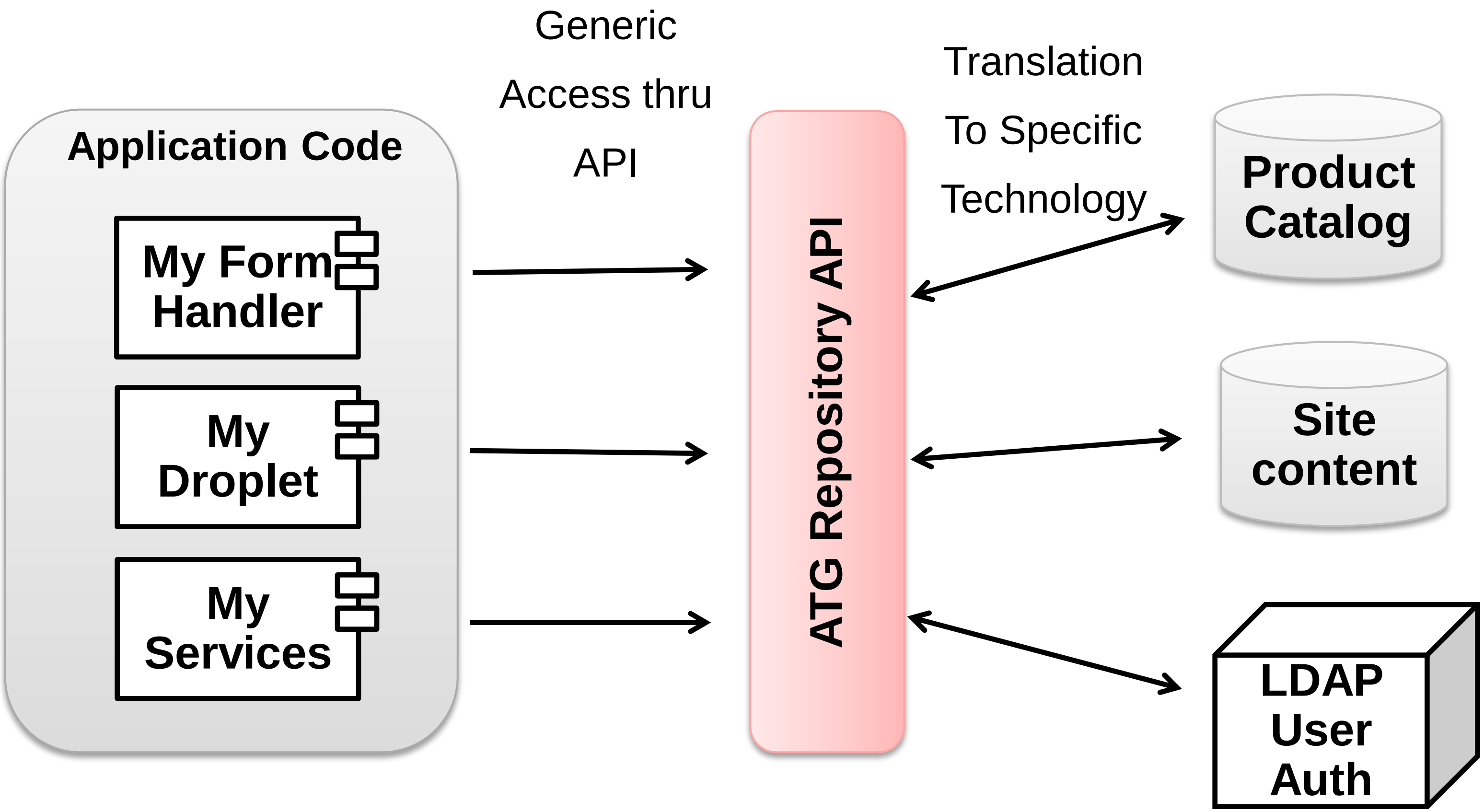
Repository API

- The ATG Repository API is the foundation of persistent object storage.
- The repository is a data access layer that defines a generic representation of a data store.
- Application developers can use the a generic representation to access data independent of where it is present using repository API.
- Repositories access the underlying data through connectors.
- Connectors translate the requests into whatever calls are needed to access that particular data store.
- Applications that use the Repository API can access any number of backend data stores by configuration only.

Repository API



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Models of Repositories

- ATG platform includes the following models of repositories
  - **SQL Repositories**: Map data between ATG and SQL databases.
  - **SQL Profile Repositories**: Map user data in a SQL database.
  - **LDAP Repositories**: Access data in an LDAP directory.
  - **Composite Repositories**: Access multiple data stores as sources for single repository.
  - **Versioned repositories**: Extend SQL repositories to add versioning and used by ATG content administration.

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SQL Repository Overview (1)

- SQL Repositories are an implementation of ATG Repositories using the SQL Database.
- A SQL Database provides fast, scalable storage and retrieval of persistent information.
- A generalized and flexible implementation of the Repository API :
  - Instance of class *atg.adapter.gsa.GSARepository*.
- Application can use it to access data stored in a SQL database:
  - Connect applications to a SQL database.
  - Store objects.
  - Make objects visible inside an application.
  - Can be as varied as the uses of a relational database.

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Commonly Used Repositories in ATG

- ATG SQL repository can be used to connect ATG to SQL Databases.
- The ATG Platform uses SQL Repositories to store:
  - User Profiles,
  - Web site content,
  - Security profiles for Site Administration.
- In addition, ATG Commerce sites use repositories to store:
  - Store catalog,
  - In-process orders,
  - Inventory,
  - Gift lists and wish lists,
  - Pricing and promotions.

Section 1
Check Your Understanding

Name some ORM Tools.

Answer: ATG Repositories, Hibernate, OpenJPA

Section 1
Check Your Understanding

How does ATG simplify data access for your application?

Answer: By providing a generic interface called ATG Data Anywhere to deal with data.

Section 1
Check Your Understanding

What does the repository API do?

Answer: It transforms the data into a object oriented format so developers can handle it.

Section 1
Check Your Understanding

Name a few benefits of ATG Data Anywhere.

Answer: Data source independence, fewer lines of code, performance, transaction, access control, etc.

Section 1 ✓
Check Your Understanding

Name a few models of ATG repositories.

Answer: SQL, LDAP, Composite, Versioned etc.

Section 1 ✔
Check Your Understanding

What are some of the common uses of SQL Repositories in ATG?

Answer: Store Catalog, Inventory, Gift Lists, Pricing, etc.

Summary

- ATG Data Anywhere Architecture provides a unified and generic view of content and data.
- ATG Data Anywhere can result in fewer lines of code, and maximize performance while providing transactional control and fine-grained access control.
- ATG Repositories is an ORM tool much like OpenJPA and Hibernate.
- ATG provides Repository API to handle persistent data.
- Several models of repositories are available such as SQL, LDAP, Composite, etc.
- ATG uses SQL Repositories for a lot of its functionality including commerce and user profiling.

Section 2:
SQL Repository Architecture

Repository Architecture

- A data store such as a SQL Database can contain many types of objects.
- A Repository is a nucleus component which is composed of JavaBeans whose properties can be found and stored in the data store.
- The repository provides a mechanism to retrieve the data element (such as a database row) and creates a run time representation of the object.
- Conceptually, the main parts are:
  - Repository Items,
  - Item descriptors,
  - Repository Queries.

SQL Repository Definition Files

- Each repository can be defined in one or more XML definition files.
- If more than one XML file is defined in the same path in different configuration paths, they are combined using XML combination rules.

```
<gsa-template>
  <item-descriptor name="user" cache-mode="locked"
                                 item-cache-size="500">
    <table name="dps_user">
      <property name="id" column-name="ID"
                         data-type="string" />
      <property name="name" column-name="NEWS_NAME"
                         data-type="string" />
    </table>
  </item-descriptor>
</gsa-template>
```

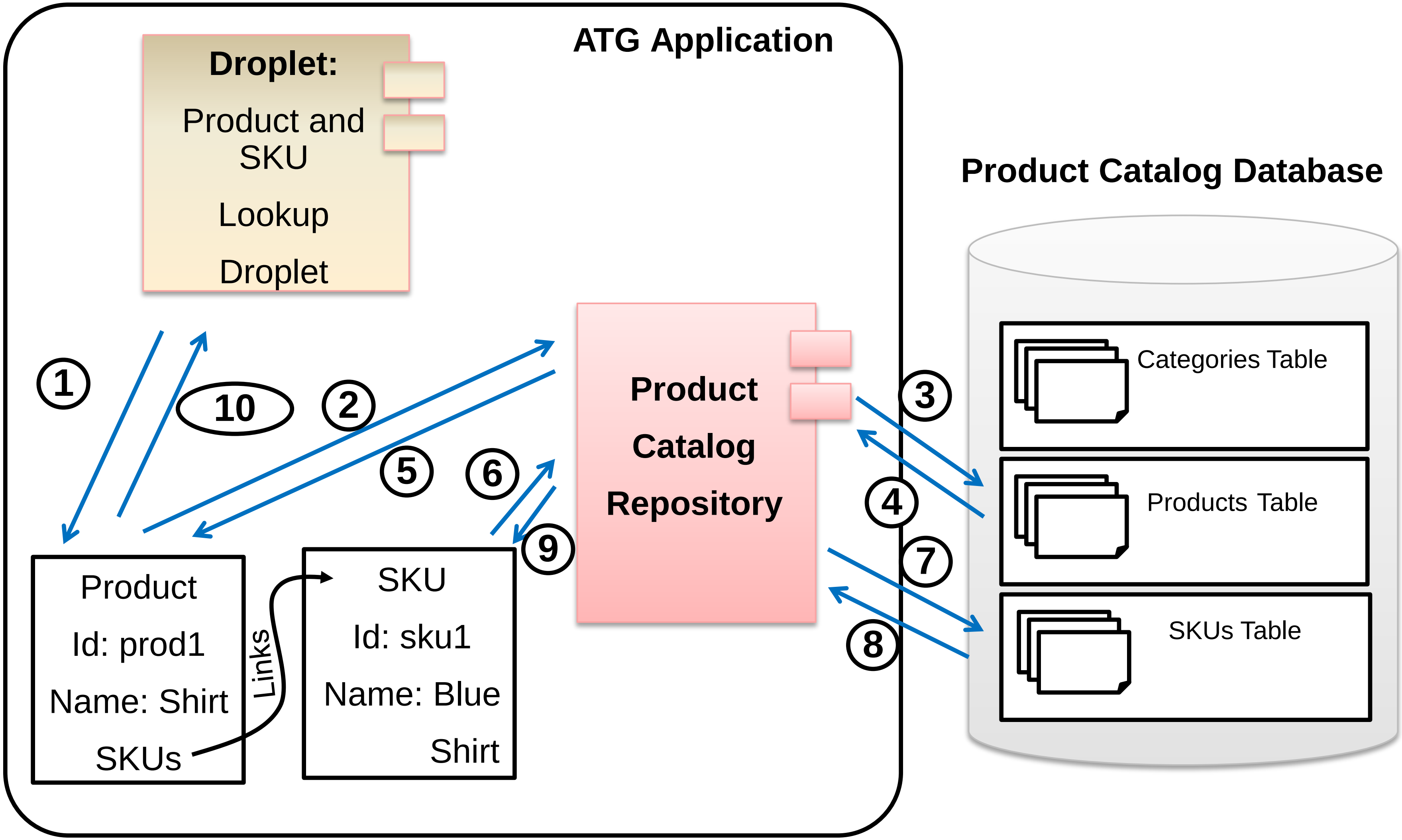
Repository Item

- A collection of repository items constitutes a repository.
- A repository item is a JavaBean component that corresponds to the smallest uniquely identifiable entity in the data store, typically a row in the table.
- For example, if a table contains a list of all stores along with identifying information such as address:
  - Each row would be a repository Item of type StoreInformation.
  - All the repository items together with other repository items would constitute a store repository.
- The ATG commerce platform contains the Product Catalog repository.
  - It contains repository items such as products, categories, skus, etc.
  - A single product or sku would be a repository item.

Properties of a repository item

- Each repository item is composed of named properties that store the item’s data.
- These generally correspond to the table columns.
- For example, the Store Repository contains information on stores:
  - StoreName, Address, City, State, zip would be the properties.
- Repository item properties can be single or multi valued.
  - In SQL Repositories, multi valued items would be represented as a join table.
- Repository ID is a property that uniquely identifies the repository item.
- In SQL Repositories, this ID is typically the primary key of the table.

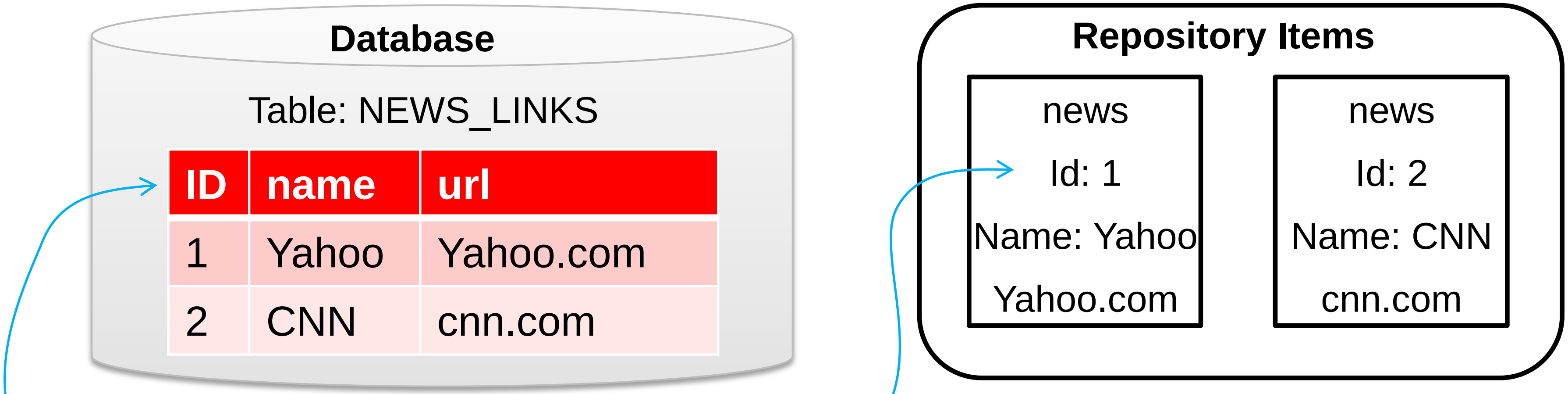
Repository Items



Item Descriptors

- The Repository Item Descriptor defines the item type to which each repository item belongs.
- The item descriptor defines:
  - The item types name,
  - Item types properties,
  - The class of the java object of item properties.
- Item descriptors are defined in XML repository definition file.
- A repository may contain multiple item descriptors.
- Item descriptors are built upon ATG Dynamic Beans system.
- Item descriptors provide a mapping between item/table and item property/column in a SQL Repository.

Item descriptor



Database

Table: NEWS_LINKS

ID	name	url
1	Yahoo	Yahoo.com
2	CNN	cnn.com

Repository Items

news
Id: 1
Name: Yahoo
Yahoo.com

news
Id: 2
Name: CNN
cnn.com

Item Descriptor

```
<item-descriptor name="news" display-property="name">
  <table name="NEWS_LINKS" id-column-name="ID"
                                        type="primary">
    <property name="id" column-name="ID"
                         data-type="string" />
    <property name="name" column-name=“NAME"
                         data-type="string" />
    <property name="url" column-name="URL"
                         data-type="string" />
  </table>
</item-descriptor>
```

Repository Queries

- A repository query defines a request to find all items of a specified item type that fit a set of criteria.
- The criteria is specified in terms of the item type properties.
- Queries can include pattern matching in text, query through collections, or even complex values.
- Some examples are:
  - lastName starts with A,
  - Interests includes biking (Collection),
  - Address property contains an Address item with zipCode set to 90210,
  - Sort results on lastName,
  - Return only items 10-20.

Relationship between Items

- Item types can have relationships between them:
  - One-to-one,
  - One-to-many,
  - Many-to-many.
- Auxiliary tables can segregate data.
  - For example, if each user has a single address, it can be stored in a related table.
  - This results in a clear separation of data.
- One to many relationships can be modeled as Multi-valued properties.
  - Multi valued relationships can be modeled as arrays, sets, maps or lists.
- Many to many relationships can be modeled using intermediate tables.

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Other Features of SQL Repositories

- SQL Repositories can support hierarchical properties using cascade attribute.
  - The supported cascade attribute values are insert, update, and delete.
- SQL Repositories support a simplified form of inheritance.
- SQL Repositories can define derived properties.
  - One property can derive its value from another repository item or from another property in the same item.
- SQL Repositories support transactions.
  - All operations are performed with the current JTA transaction.
  - If one does not exist, each operation is wrapped in its own transaction.

Section 2 ✓
Check Your Understanding

What are database rows represented as in the ATG Repository?

Answer: RepositoryItems which are Dynamic Java Beans.

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Section 2
Check Your Understanding

What file and format are used to provide the mappings between tables/columns and repository items?

Answer: Repository Definition File which is in XML format.

Section 2 ✔
Check Your Understanding

What are properties of a repository item?

Answer: They are data elements like the columns in a table.

Section 2
Check Your Understanding

What is an item descriptor?

Answer: It is the mapping of a Repository Item to the table and column. There are several item descriptors in a repository definition file.

Section 2 ✔
Check Your Understanding

Give an example of a repository Query.

Answer: lastName starts with Joe OR age>10.

Section 2 ✔
Check Your Understanding

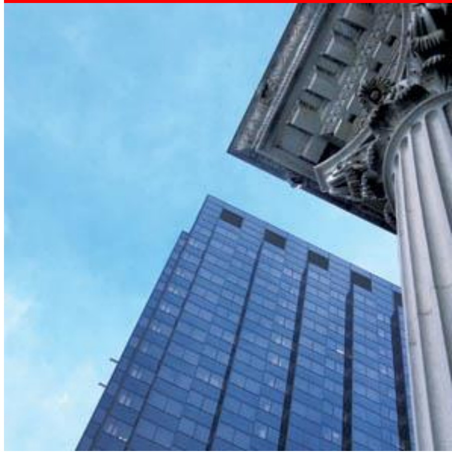
What relationships are supported by SQL Repositories between repository items?

Answer: ATG Repositories support one to one, one to many, many to many, etc.

Summary

- Repository is a nuclues component in ATG. Repository Items are dynamic JavaBeans which developers can use to handle data.
- The Repository converts back-end data to these Repository Items.
- The mapping is performed in an XML file called repository definition file.
- Properties of the Repository items are individual data elements much like columns in a table.
- An Item descriptor is a definition of mapping of column names to item properties.
- Repository Queries allow you to retrieve repository items from the repository by specifying a criterion.
- You can have relationships between items such as one-to-one one-to-many, etc.

Q&A



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