Introduction to Purchase Flow

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Agenda

- Commerce Business Layer
- Pipelines and Repository

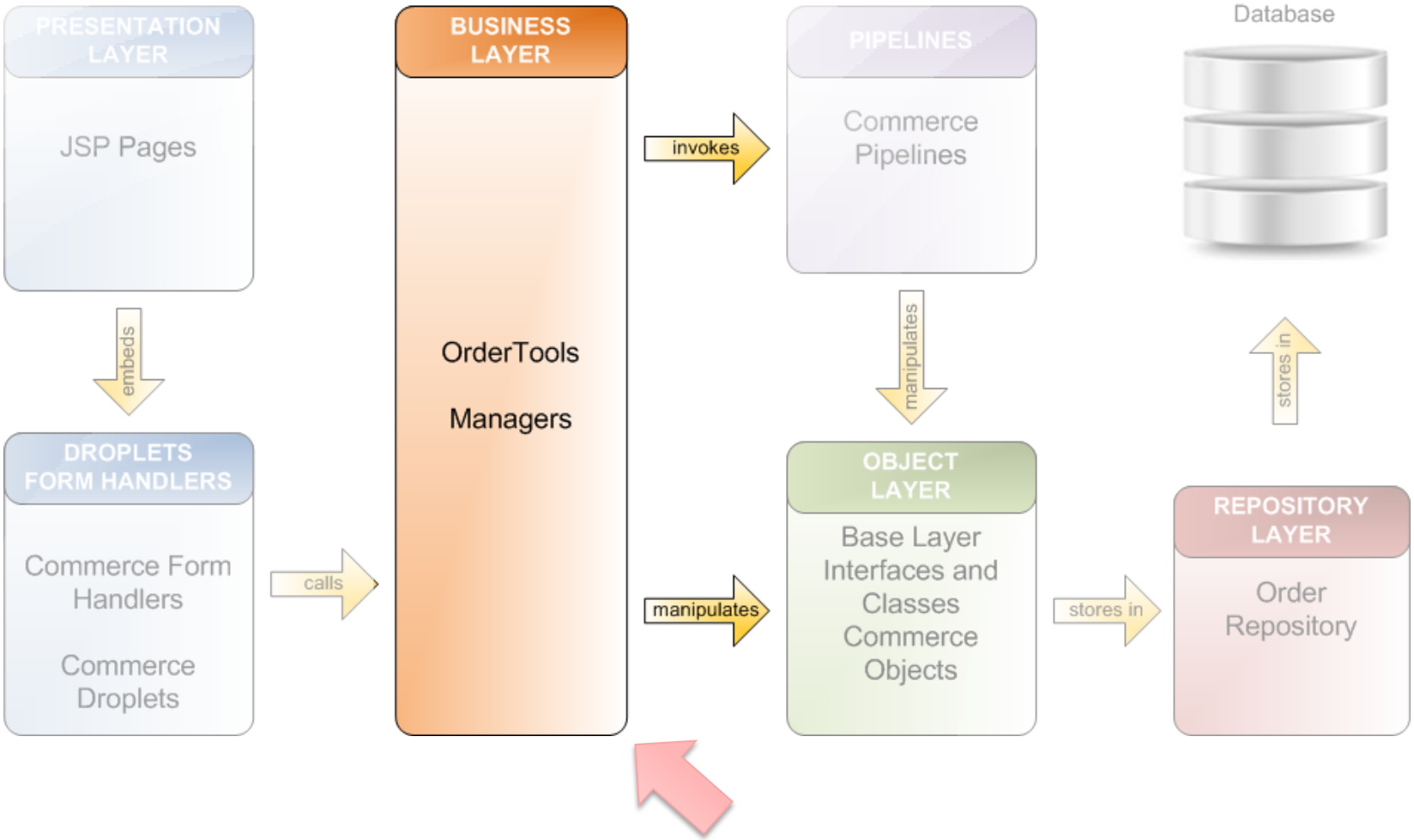
Learning Objectives

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

- Learn about the Business Layer Classes in ATG Commerce
- Use Order Tools and Manager Classes to manipulate commerce objects
- Use and extend the ATG Commerce pipeline to meet application requirements.
- Understand the various states of order object
- Learn about the order repository

Section 1:
Commerce Business Layer

BUSINESS LAYER



Business Layer Classes (1)

- The business layer classes contain the implementation of business rules for purchase process.
- These methods contain logic that alters the order's data structure and maintains its accuracy.
- All calls to alter an order should be made through these classes.
- They are globally scoped components.
- In general, the main classes consists of OrderTools and managers for order, CommerceItem, Shipping, Payment, and HandlingInstructions.
- These classes are typically called by the commerce form handlers.

Business Layer Classes (2)

- The main components of business layer are:
  - **OrderTools** is a low level interface for editing the order data structure.
  - **OrderManager** contains most of the functionality for working with the order.
  - **SimpleOrderManager** extends OrderManager and provides a very high-level interface for altering an order.
  - **Managers** for CommerceItem, Shipping and Payment, and HandlingInstructions which provide functionality for working with the corresponding commerce objects.
  - **OrderQueries** contains methods for looking up the order.

OrderTools

- OrderTools is a low level interface containing the logic for editing an order data structure.
- It is not meant to contain business logic or to be used directly.
- Developers must use:
  - OrderManager, or
  - SimpleOrderManager.
- These managers simplify access to the OrderTools and provide higher level methods than the OrderTools.
- OrderTools contains a set of properties that you can use to customize the purchase process.
- The default property settings should be suitable for most sites, but can be changed.

OrderManager Component

- OrderManager component is the business layer object for managing and manipulating orders.
- It holds all the business logic for manipulating an order.
- The various types of methods in this class are used for:
  - Creating objects,
  - Adding objects to an order,
  - Adding objects to other objects,
  - Removing objects from other objects.

SimpleOrderManager Component

- SimpleOrderManager component is a simple business layer object for order manipulation.
- Use of this class eliminates the need to know about relationships and only requires basic knowledge of the commerce class hierarchy.
- Logically, this class is one level above the OrderManager class and attempts to do as much as possible for the user.
- The methods in the class allow CommerceItems to be added to or removed from an order and ShippingGroup with a single call.
- It also allows movement of CommerceItems between ShippingGroups.

Example: Using OrderManager and SimpleOrderManager

- Using OrderManager to create an order:

```
// Get a reference to the OrderManager
OrderManager orderManager =
       (OrderManager) request.resolveName
                     ("/atg/commerce/order/OrderManager");
// Create the Order
Order order = orderManager.createOrder(profileId);
```

- Using a SimpleOrderManager to add items to shipping group:

```
// Get a reference to the SimpleOrderManager

SimpleOrderManager simpleOrderManager =
       (SimpleOrderManager) request.resolveName
              ("/atg/commerce/order/SimpleOrderManager");

simpleOrderManager.addItemToShippingGroup (
        order, skuId, productId, quantity, shippingGroup);
```

Business Layer Manager

- Other manager classes used are:
  - **CommerceItemManager** is used for creating and modifying CommerceItems, adding them to orders, etc.
  - **ShippingGroupManager** is used for creating and modifying ShippingGroups, creating relationships, etc.
  - **PaymentGroupManager** is used for creating and modifying PaymentGroups, creating relationships, etc.
  - **HandlingInstructionManager** contains functionality for working with handling instructions including methods to create and remove them.
- OrderQueries contain lookup methods for the order.

Example using CommerceItemManager

- Follow these steps to create a new CommerceItem and associate it with an order:
  - Call CommerceItemManager.createCommerceItem().
  - Make any changes to the CommerceItem.
  - Call CommerceItemManager.addItemToOrder(pOrder, pCommerceItem) to add the CommerceItem to the order.

```
// Get a reference to the OrderManager
OrderManager orderManager = (OrderManager)
    request.resolveName("/atg/commerce/order/OrderManager");

// Create the CommerceItem
CommerceItem commerceItem =
     commerceItemManager.createCommerceItem(pCatalogRefId);
commerceItem.setQuantity(3);

// Add the CommerceItem to the Order
commereceItemManager.addItemToOrder(pOrder, commerceItem);
```

Example of ShippingGroupManager

- Follow these steps to create a new ShippingGroup and add it to an order:
  - Call ShippingGroupManager.createShippingGroup().
  - Make any changes to the ShippingGroup.
  - Call addShippingGroupToOrder to add the ShippingGroup to the order.

```
// Get a reference to the OrderManager
OrderManager orderManager = (OrderManager)
    request.resolveName("/atg/commerce/order/OrderManager");

// Create the ShippingGroup
ShippingGroup shippingGroup =
           shippingGroupManager.createShippingGroup();

// Add the ShippingGroup to the Order
shippingGroup.addShippingGroupToOrder (
                      pOrder, shippingGroup);
```

Example of PaymentGroupManager

- Follow these steps to create a new PaymentGroup and add it to an order:
  - Call PaymentGroupManager.createPaymentGroup().
  - Make any changes to the PaymentGroup.
  - Call addPaymentGroupToOrder to add the payment group to the order.

```
// Get a reference to the OrderManager
OrderManager orderManager = (OrderManager)
   request.resolveName("/atg/commerce/order/OrderManager");

// Create the PaymentGroup
PaymentGroup paymentGroup =
         paymentGroupManager.createPaymentGroup();

// Add the PaymentGroup to the Order
paymentGroupManager.addPaymentGroupToOrder
                              (pOrder, paymentGroup);
```

Section 1 ✔
Check Your Understanding

What does OrderQueries business layer class do?

Answer:

OrderQueries contains lookup methods for the order.

Section 1 
Check Your Understanding

What layer should be used to manage commerce objects?

Answer:

The business layer should be used exclusively to manipulate commerce objects.

Section 1 ✔
Check Your Understanding

What is OrderTools?

Answer:

OrderTools is a low level interface containing the logic for editing an order data structure. It is not meant to contain business logic or to be used directly.

Section 1
Check Your Understanding

What are the various types of methods in the OrderManager?

Answer:

Methods for creating objects, adding objects to an order, adding objects to other objects, removing objects from other objects.

Section 1 ✔
Check Your Understanding

What is SimpleOrderManager component used for?

Answer:

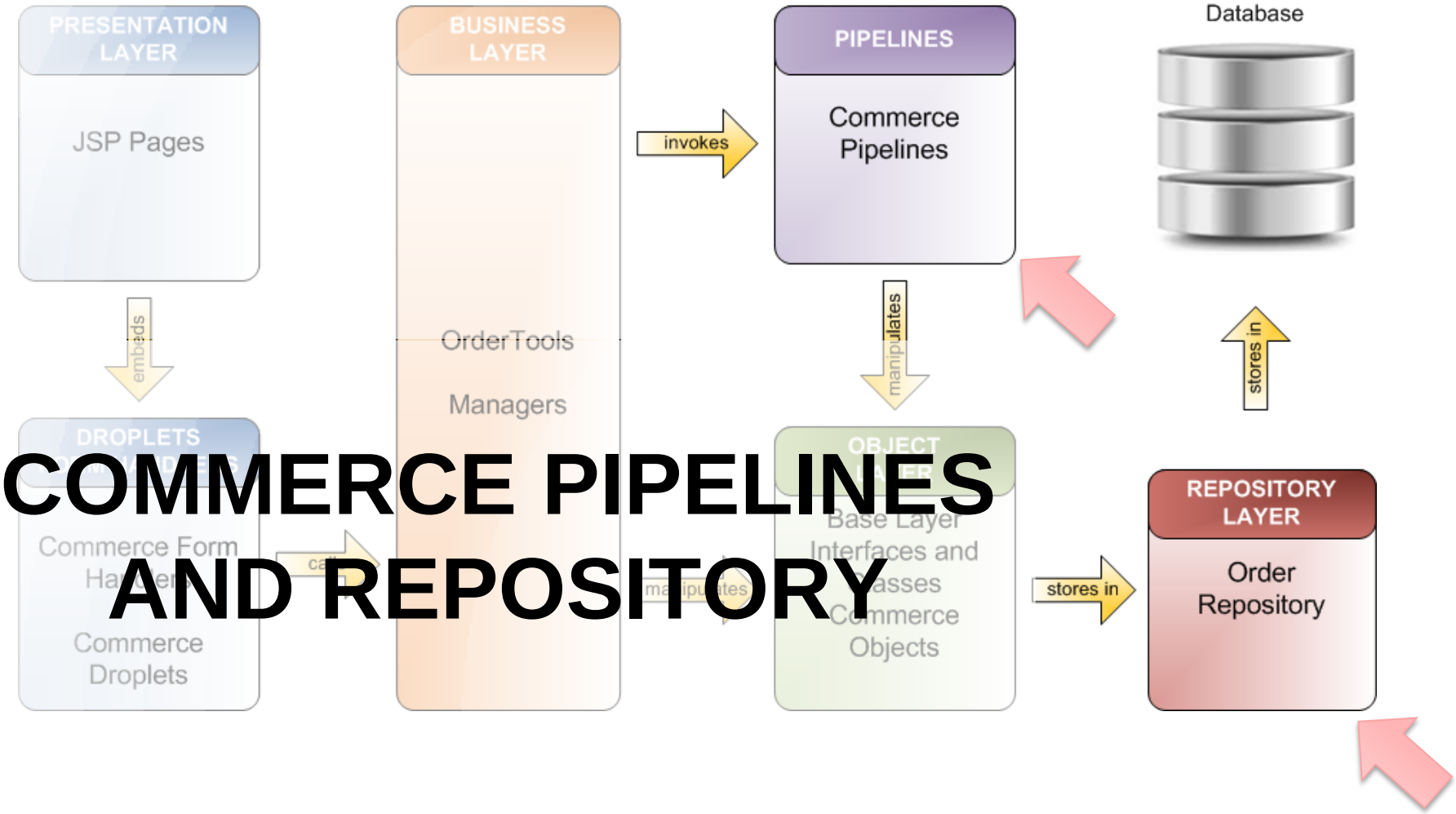
Use of this class eliminates the need to know about relationships and only requires basic knowledge of the commerce class hierarchy.

Summary

- The business layer classes contain the implementation of business rules for the purchase process.
- In general, the main classes consists of OrderTools and managers for Order, CommerceItem, Shipping, Payment, and HandlingInstructions.
- OrderTools is a low level interface for editing the Order data structure.
- OrderManager and SimpleOrderManager provide a high level interface for altering an order.
- CommerceItemManager, ShippingGroupManager, PaymentGroupManager, and HandlingInstructionManager manage the corresponding commerce objects.
- OrderQueries contains lookup methods for the order.

Section 2:
Commerce Pipelines and Repository

COMMERCE PIPELINES AND REPOSITORY



ATG Commerce Pipelines

- A pipeline is an execution mechanism that allows for modular code execution.
- ATG Commerce uses pipelines to execute tasks such as:
  - Loading an order,
  - Saving orders,
  - Checkout orders.
- PipelineManager implements the pipeline execution mechanism.
- It is called by a business layer such as OrderManager, etc.
- It executes a series of operations (processors).

Fundamentals of Pipelines

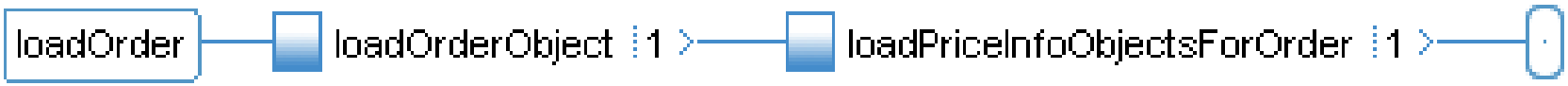
- A pipeline chain is a series of actions to be executed in a sequence.
- Each chain consists of processors, each performing a specific function.
- ATG Commerce has multiple pipeline chains which are executed depending on where the customer is in the purchase process.
- This mechanism allows developers to easily customize the chain by inserting their own processors.
- Pipeline chains are configured in an XML file.
- The PipelineManager component controls processor chains and can be used for customization.

Examples of Core Commerce Pipelines

- Some of the examples of core commerce pipelines are:
  - **loadOrder** pipeline chain loads the order from the repository.
  - **updateOrder** pipeline saves the order.
  - **refreshOrder** pipeline chain reloads an order from the repository.
  - **processOrder** pipeline chain submits the given order for checkout.
  - **repriceOrder** pipeline chain prices the order.
  - **moveToConfirmation** pipeline chain validates the order for order confirmation stage.

Load Order Pipeline Chain

- **LoadOrder** pipeline creates and populates the order object from the repository.
- This pipeline chain is called from the OrderManager's loadOrder() method.
- It contains the following individual processors:
  - **loadOrderObject** : Given an order ID supplied by the PipelineManager, this processor creates an order object and loads its properties from the order repository.
  - **loadPriceInfoObjectsForOrder:** Creates OrderPriceInfo and TaxPriceInfo objects for the given order and loads their properties from the order repository.



ProcessOrder Pipeline Chain

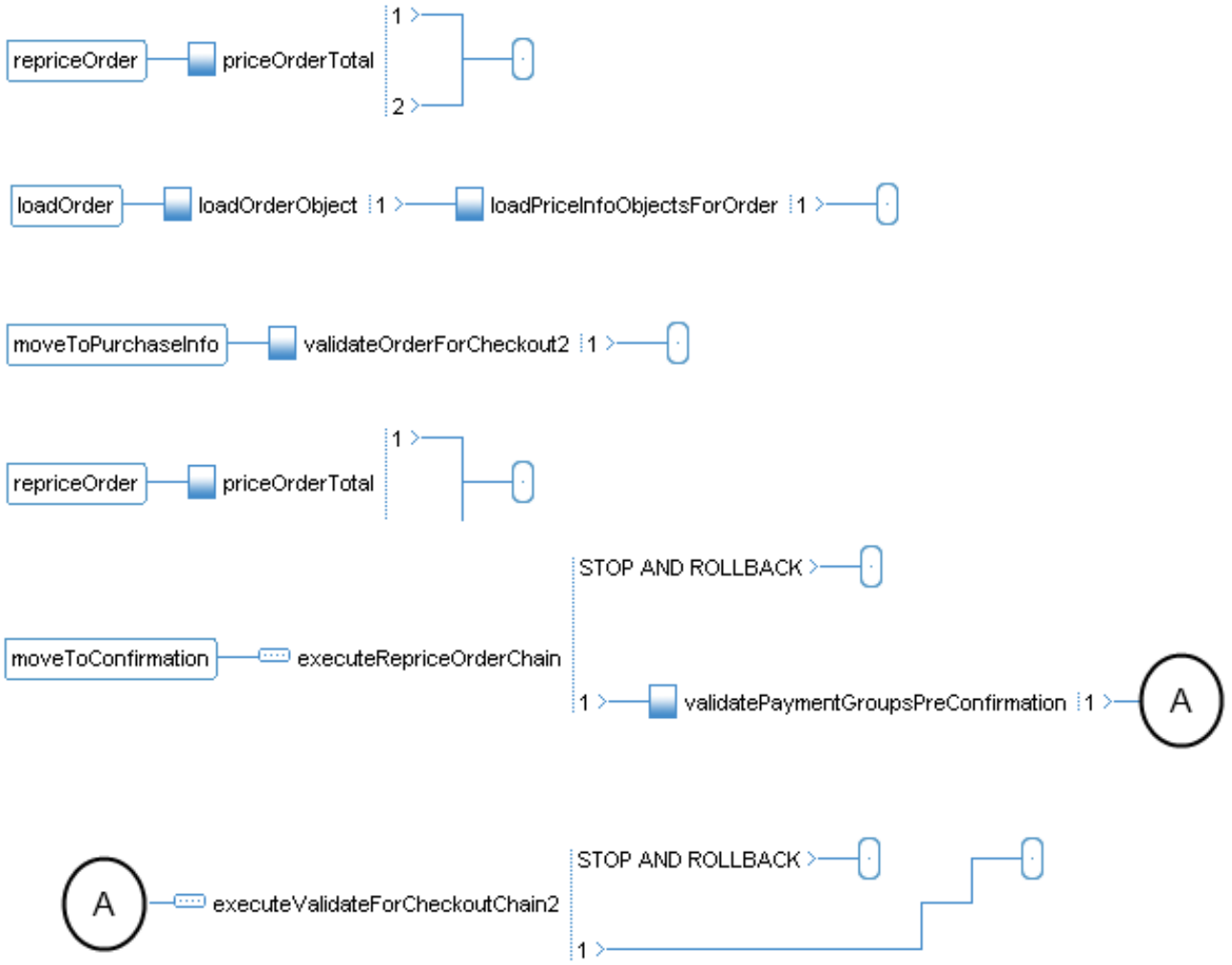
- The process order pipeline chain submits a given order for checkout.
- It is executed by the processOrder() method of the OrderManager.
- This pipeline chain is called when the customer has provided all the methods necessary for checkout and checkouts the order.

Steps in the Process Order Pipeline

- The steps are:
  - **executeValidateForCheckoutChain,**
  - **checkForExpiredPromotions,**
  - removeEmptyShippingGroups,
  - removeEmptyPaymentGroups,
  - createImplicitRelationships,
  - setPaymentGroupAmount,
  - **moveUsedPromotions,**
  - **authorizePayment,**
  - updateGiftRepository,
  - sendGiftPurchasedMessage,
  - setSubmittedSiteId,
  - **addOrderToRepository,**
  - sendPromotionUsedMessage,
  - **sendFulfillmentMessage.**

Process Order Chain

Other Pipeline Examples

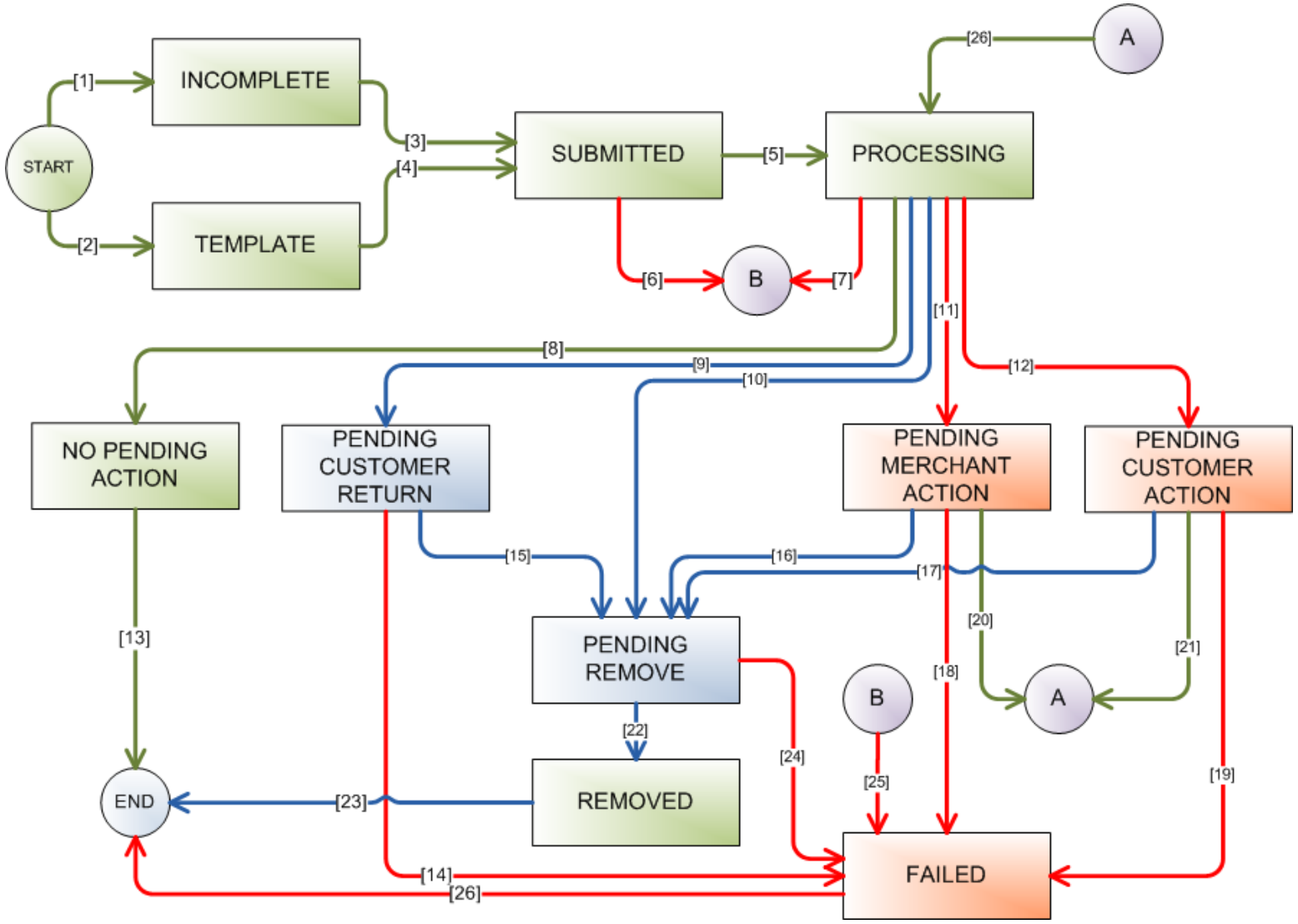


COMMERCE OBJECT STATES

Commerce Object States

- Each commerce object has a set of states that represent the state they are in the processing and fulfillment of an order.
- The objects that have the state are:
  - Order,
  - CommerceItem,
  - ShippingGroup,
  - PaymentGroup,
  - ShippingGroupCommerceItemRelationship.

Order State Transition



Order States Explained (1)

- An order is in INCOMPLETE state when it is created until it is submitted by the user (1).
- When submitted, it is in SUBMITTED state (3).
- A TEMPLATE order (2 and 4) is a scheduled order that can also be SUBMITTED.
- From SUBMITTED state, the order can move to PROCESSING (5) when it is picked up by fulfillment engine.
- From SUBMITTED AND PROCESSING the order could go to FAILED state due to some failures (6 and 7).
- From SUBMITTED the order could go to NO PENDING ACTION (8) and finally end (13). This is the happy path of a successful order.

Order States Explained (2)

- When a customer requests a return and business processes allow it, the order can go to PENDING CUSTOMER RETURN and/or PENDING REMOVE states (9,15 and 10).
- From there an order could go to FAILED (14) or be REMOVED (22).
- When an order cannot be completed without customer interaction such as incomplete address, it goes to PENDING CUSTOMER ACTION state (12).
- Similarly, when an order requires merchant action such as no inventory, it goes to PENDING MERCHANT ACTION state (11).

Order States Explained (3)

- From PENDING MERCHANT ACTION and PENDING CUSTOMER ACTION, the order could go to FAILED (18 and 19) or PENDING REMOVE (16 and 17).
- More commonly, the order would go back to PROCESSING (20 and 21) to resume its processing.
- Typically, not all states are supported or implemented in an eCommerce site.
- Developers customize these states to represent business processes of the merchant.
- Each commerce object has their own states.
- New states can be added as needed.

ORDER REPOSITORY

Order Repository

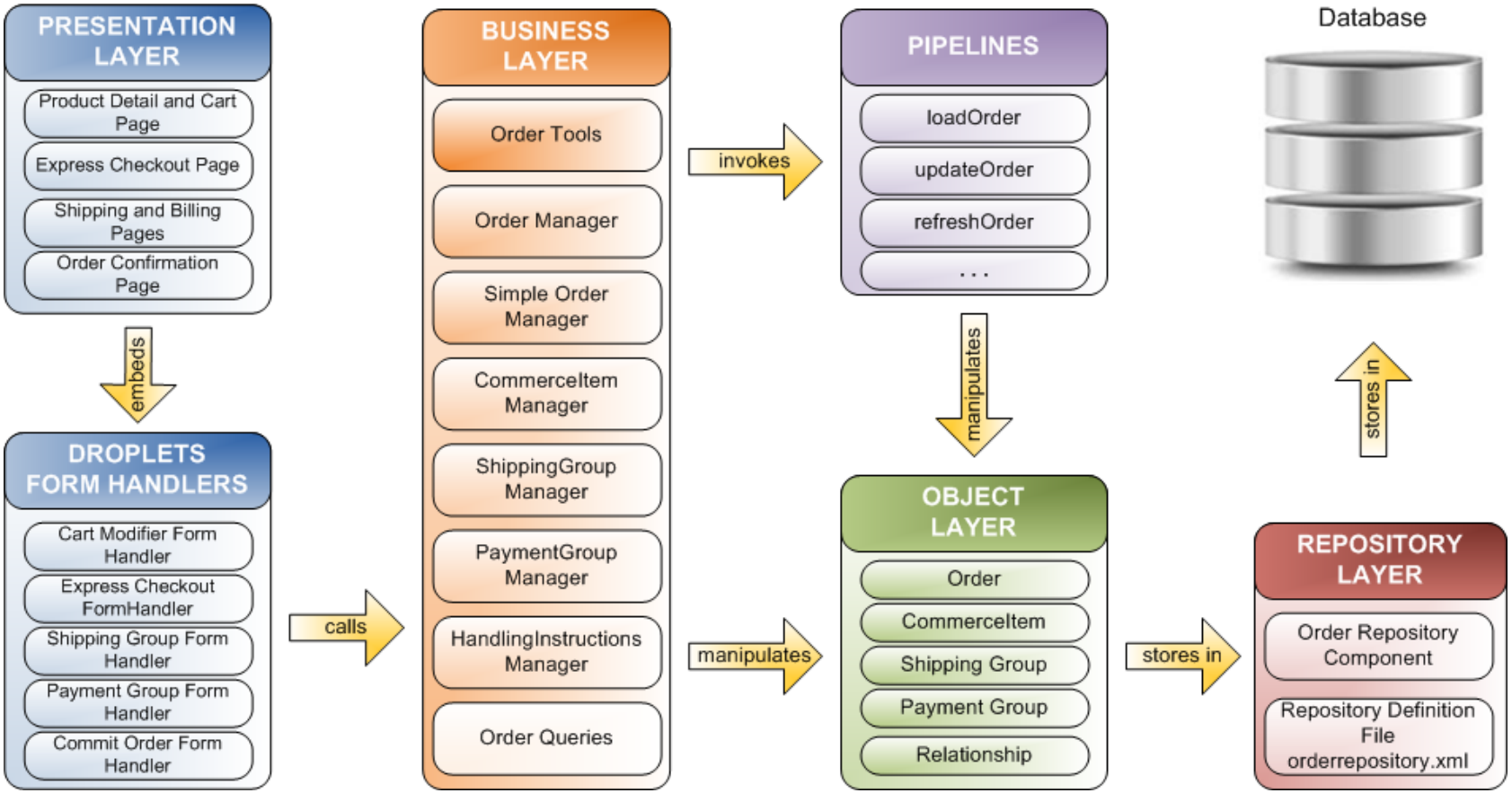
- The order repository is the layer between ATG Commerce and the database server.
- It is a repository where orders in various states are stored. It is implemented as a SQL repository.
- An order object is not a repository item and does not implement the RepositoryItem interface.
- The beanNameToItemDescriptorMap property of the OrderTools component maps the order repository item descriptor to bean names.
- The processors that save and load the order look for this mapping and mapping of corresponding commerce object classes to do their work.
- Order repository is defined in config/atg/commerce/order/orderrepository.xml.

PUTTING IT ALL TOGETHER

The Purchase Process Subsystems

- As you will recall, the purchase process is made of the following subsystems:
  - Base commerce classes and interfaces,
  - Commerce form handlers,
  - Business layer classes,
  - Pipelines,
  - Order repository.
- Each part can be used as is or extended to meet specific business requirements.

Purchase Process Subsystems



Extending the Order Processing System

- Developers may require extensions to the order processing system to handle business requirements unique to their customers.
- Any extensions may change any one of the order processing subsystems:
  - Base layer interfaces,
  - Commerce form handlers,
  - Business layer manager classes,
  - Pipelines,
  - Order repository.
- Extension to all of the above are fairly typical in a commerce implementation.

Extending the Order Repository

- To extend the order repository:
  - Using XML combine, add, modify, or remove properties from the order repository items.
  - Add or change tables and columns in the underlying database definition.
  - Extend the requisite processor that needs the new attributes.
  - Configure the mapping between repository and commerce object bean properties in the OrderTools component.
- Extensions to order repository are common and are no more difficult than extending any other repository in ATG.

Customizing a Pipeline (1)

- The commerce pipeline is defined in the XML definition files **`commercepipeline.xml`**.
- The following steps are required to customize a pipeline chain:
  - Create a processor.
  - Create a nucleus component for the processor.
  - Create or edit the pipeline chain XML file.
  - Register the pipeline chain XML file with the PipelineManager.
- Creating the processor:
  - Implement the interface atg.service.pipeline.PipelineProcessor.
  - The runProcess() method should execute and return a status code.
- Create a nucleus component for your processor element:
  - Register the processor created as a nucleus component.

Customizing a Pipeline (2)

- Name the pipeline processor chain and refer to component in a new or existing XML file.

```
<processor
      jndi="/atg/commerce/order/processor/ABCProcessor"/>
<pipelinelink name="ABCChain">
```

- If you are creating a new chain via an XML file above, register the file with the PipelineManager.

```
definitionFile=/atg/commerce/mycommercepipeline.xml
```

Section 1 
Check Your Understanding

Which relationship commerce object can have a state?

Answer: ShippingGroupCommerceItemRelationship.

Section 1 ✔
Check Your Understanding

What does the process order pipeline do?

Answer:

Validates, authorizes payment, sends to fulfillment, etc.

Section 1 ✔
Check Your Understanding

What is the state of a new order that has not been placed by the customer?

Answer:

INCOMPLETE.

Section 1 ✔
Check Your Understanding

What are the states that require either customer or merchant action?

Answer:

PENDING MERCHANT ACTION and PENDING CUSTOMER ACTION

Section 1 
Check Your Understanding

Where is the commerce pipeline defined?

Answer:

The XML definition files commercepipeline.xml.

Summary

- ATG Commerce uses pipelines to execute tasks such as loading an order, saving orders, check out orders, etc.
- A pipeline chain is a series of actions to be executed in a sequence. Each chain consists of processors, each performing a specific function.
- The PipelineManager component controls processor chains and can be used for customization.
- Each commerce object such as order, commerceitem, shippinggroup, paymentgroup have a state.
- The order goes from INCOMPLETE to SUBMITTED, PROCESSING, and then NO_PENDING_ACTION.

Q&A

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