blueprism

Software Robots - the Virtual Workforce

Blue Prism Learning

OBJECT DESIGN GUIDE

VERSION: 1.2

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Contents

1. Introduction

This guide will outline how to ensure Business Objects are designed to be efficient, scalable and re-useable. The guide will compare a single object per application design against a multi-object per application design and highlight the advantages and disadvantages of each approach.

The guide is aimed at Blue Prism Developers and Solution Architects who have completed the Blue Prism Foundation Course.

After reading this guide you should be able to:

- Describe the advantages and disadvantages of single-object and multi-object designs.
- Design an efficient, scalable and re-useable object layer for any application.

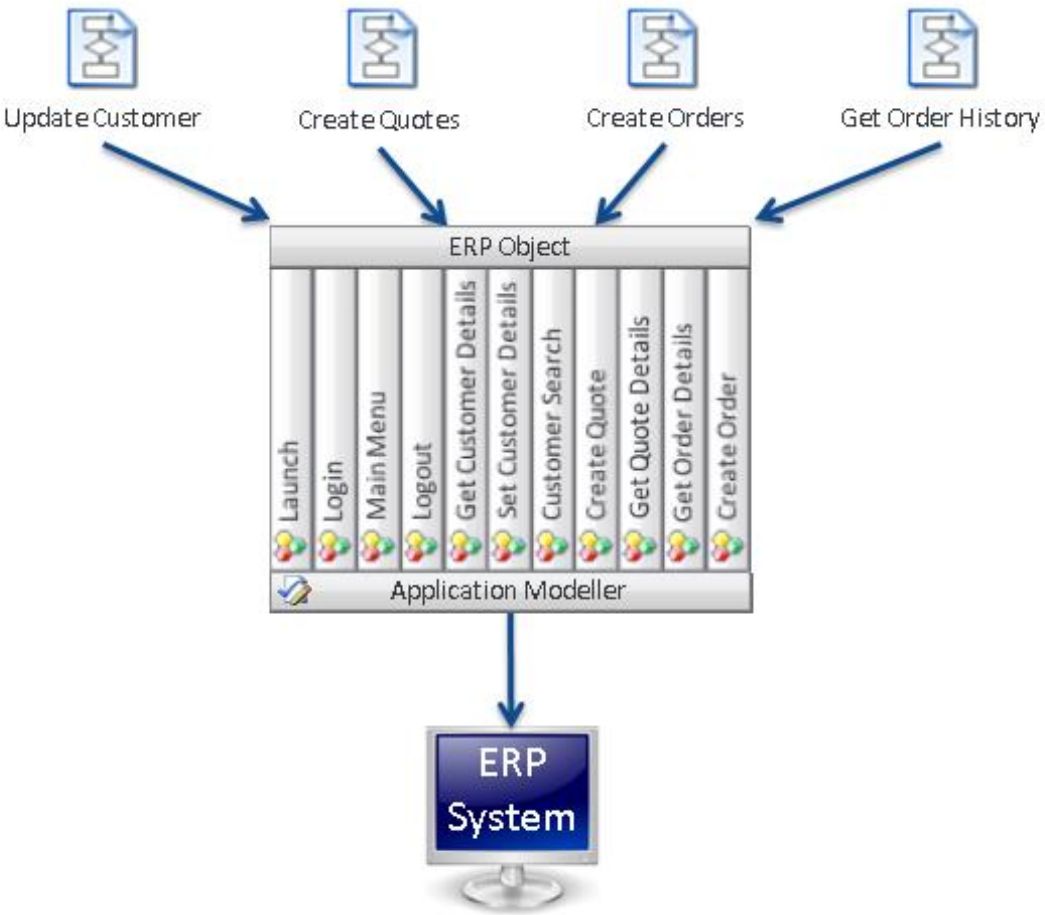
2. Business Objects

A business object is the instrument that a process uses to control an application. The object layer is for application logic only and actions should be small, generic and re-useable. Business objects should not contain any business logic or process rules.

Ideally an object should offer a set of simple functions that a process can orchestrate into a complex sequence. By absolving the object of responsibility for business rules and decision making, the aim is to enable the objects to be reused by many different processes and for an object 'library' to be built up. And as the diversity of the object library increases, the effort to deliver an automated solution should decrease.

3. Single-Object Designs

By single object design we mean that one object is built for an entire application. An example of this is illustrated below:



In the diagram above, we have

- A business application, the ERP System
- A single object, ERP object, to automate the ERP System
- Four processes, Update Customer, Create Quotes, Create Orders and Get Order History, which call the ERP object to perform automated tasks against the ERP System.

Whilst this design will work, it provides some challenges and risks:

- Only 1 developer can work on the ERP object at a time.
- Any process which automates the ERP System must consume into memory all the actions within ERP object, including the actions it doesn't use.

- Any change to the ERP object is effectively a change to any process that calls it
- The ERP object will be larger and less efficient than necessary.

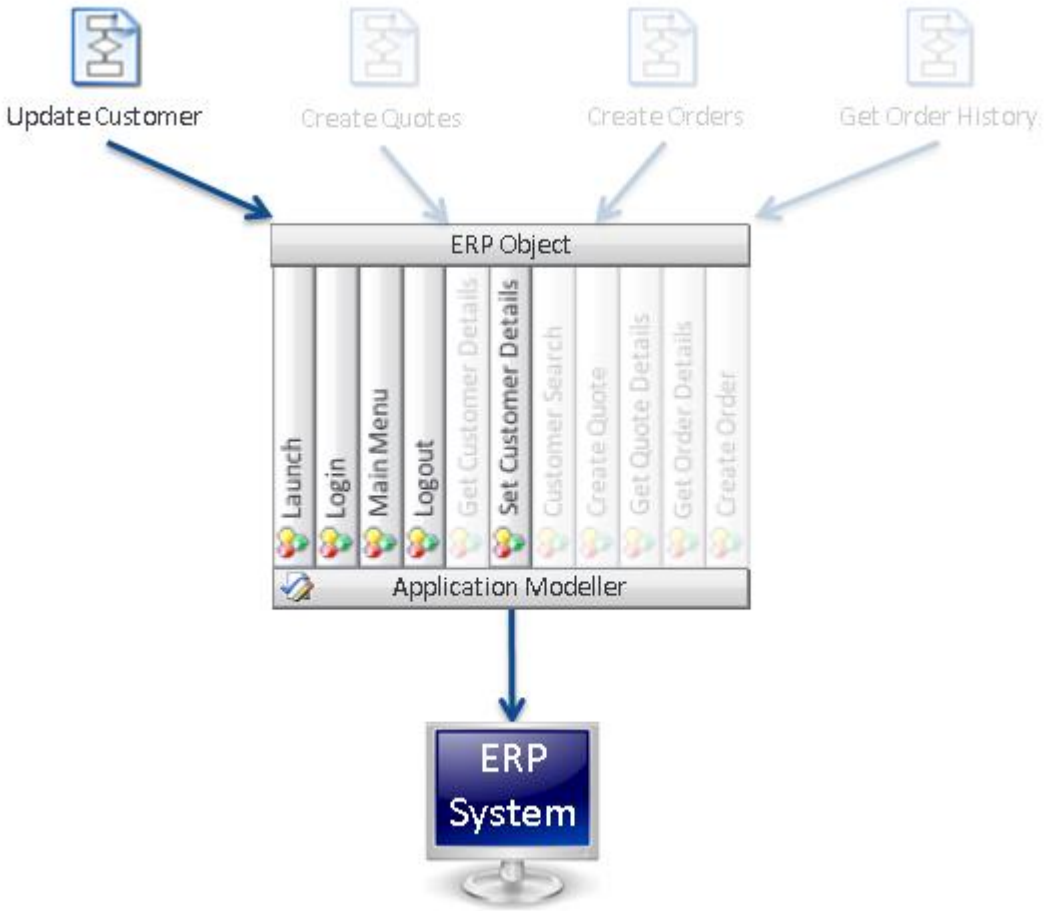
3.1. Only 1 developer can work on the ERP object at a time

Blue Prism only allows one developer to work on an object at the same time. With the single-object design above, this means that only one developer can be working on the entire ERP system interface at a time. Where there is a need for multiple developers to build actions to automate different areas of the ERP System, the single-object design will slow down the development phase.

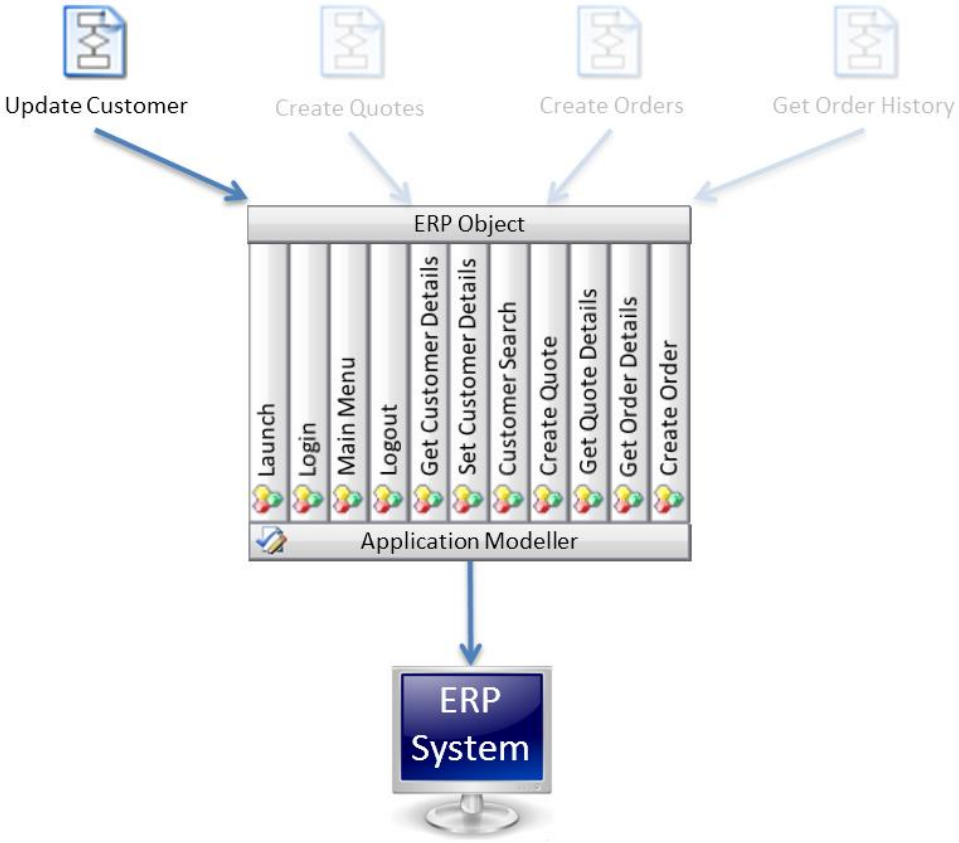
3.2. Any process which automates the ERP System must consume into memory all the actions within ERP object, including the actions it doesn't use.

The diagram below illustrates how the Update Customer process only uses 5 actions namely

- Launch
- Login
- Main Menu
- Logout
- Set Customer Details

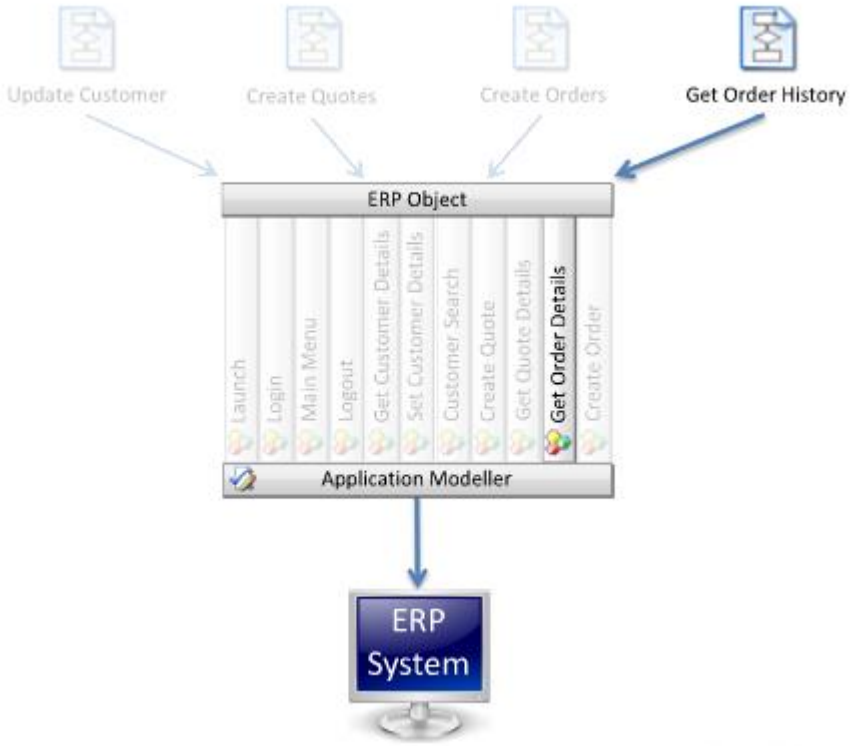


However, with the single-object design, all the actions are consumed into memory when the Update Customer process runs as the entire object is consumed.

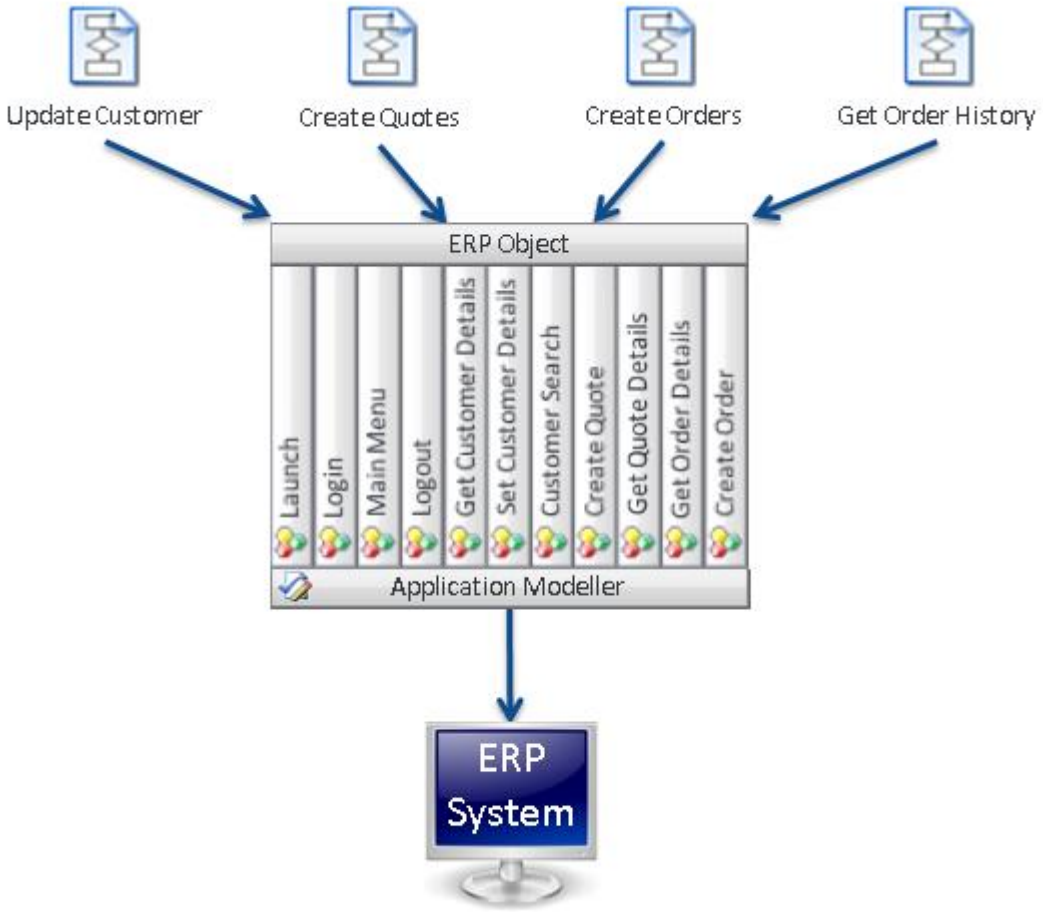


3.3. Any change to the ERP object is effectively a change to any process that calls it

Suppose the Get Order History process requires a change to be made to the Get Order Details action. The Get Order Details action is only used in the Get Order History process.



However, with the single-object design, a change to the Get Order Details action impacts any process calling the ERP object. It exposes a risk of latent errors that could affect processes that don't need to be changed. Any change to the ERP object is effectively a change to any process that uses it.



Although this risk can be mitigated through regression testing, the bigger the ERP object grows and the more processes that use it, the more regression testing is required for even the smallest of changes to the ERP object.

3.4. The ERP object will be larger and less efficient that necessary

As a single-object, the ERP object will contain all the required elements in the application model and all the actions required to automate the ERP system. This will result in a large file being held on the Blue Prism database. Section 2.2 has described how this large object will be consumed into the memory of any resource pc that is running any process that automates the ERP system, but there is also an impact on the Blue Prism database size.

Each time the ERP object is changed, even if only a single action, a new version of the large object is saved to the database with the older version being kept in the object history. The performance of the interactive client machine when developing against a large object will also be adversely impacted.

As a single-object, the ERP object will have a large Application Model, which can be difficult to navigate and pose an increased risk of the wrong element being changed.

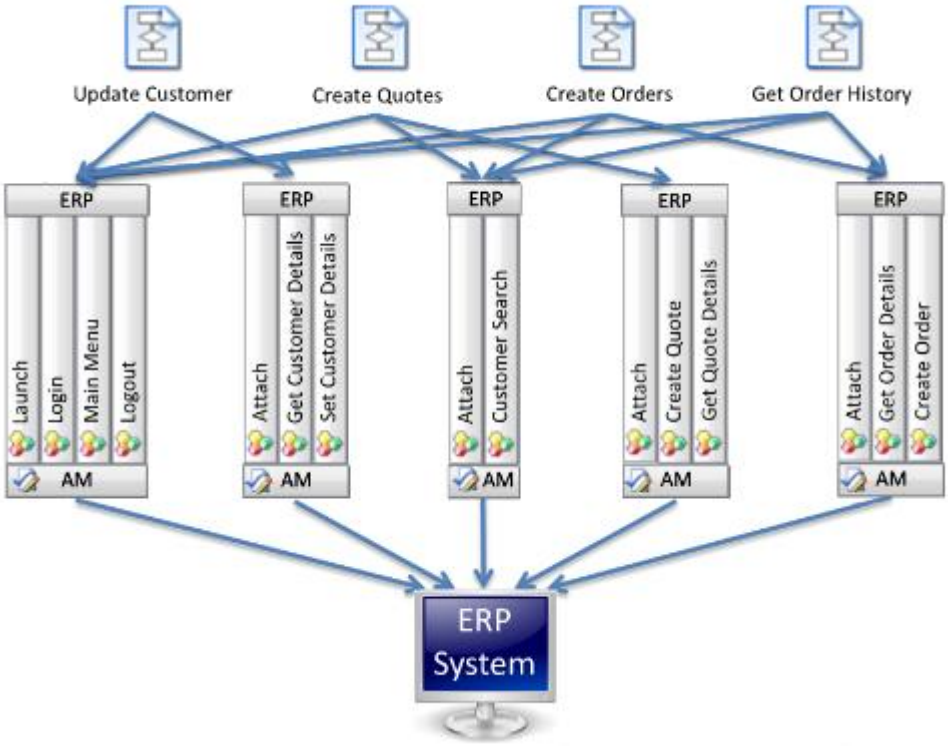
3.5. When is a Single-object design appropriate?

A single-object design is appropriate for a small proof of technology exercise or a proof of concept project where delivery is done by a single developer ***and the object created will not subsequently be promoted to a production environment.*** Additionally, a single-object design is appropriate for objects that do not use an application modeller. These are not affected by changes to the target system and do not use up much memory e.g. Utility objects.

In all other scenarios, a more efficient and scalable design is required using a multi-object design.

4. Multi-Object Designs

By multi-object design we mean that more than one object is built for an application. Although there are no hard and fast rules regarding how many objects are built, a good rule of thumb to work by is to build a single object for each screen that is to be automated. An example of a multi-object design is illustrated below:



In the diagram above, we now have

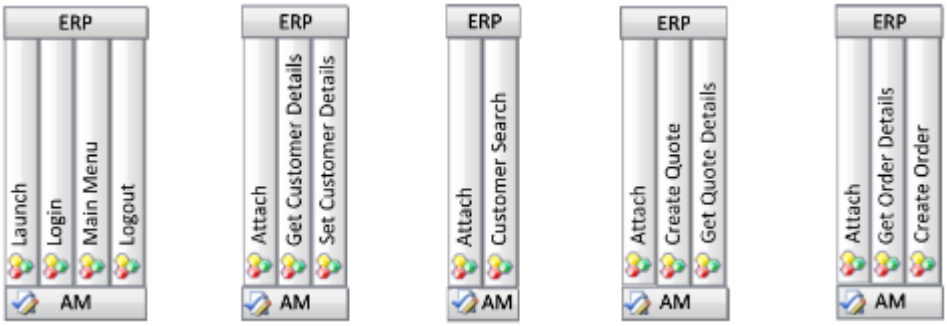
- A business application, the ERP System
- Five business objects to automate the ERP System
- Four processes, Update Customer, Create Quotes, Create Orders and Get Order History, which call the required objects to perform the relevant automated tasks against the ERP System

This design is more scalable and efficient because:

- 5 developers can now build objects that automate the ERP System at the same time

- Any process which automates the ERP System only consumes less actions into memory
- A change to the actions within the ERP object will impact less processes
- The individual objects will be smaller and more efficient with a smaller Application Model

4.1. 5 developers can now build objects that automate the ERP System at the same time

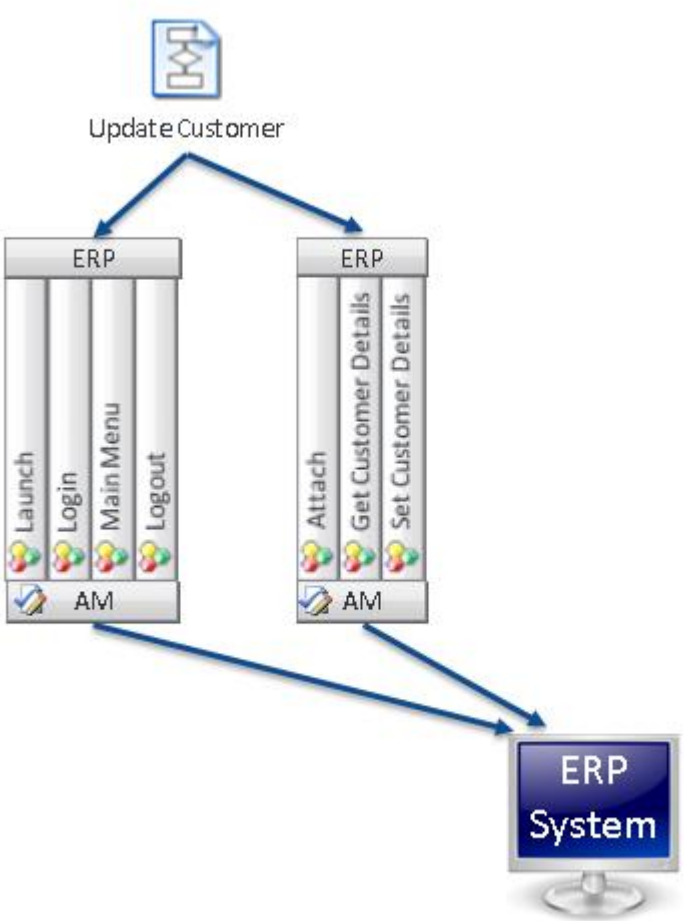


There are now five separate business objects that automate different parts of the ERP system. This enables up to five developers to work on objects automating the ERP system at any time. Over time, as more areas of the ERP system are automated, the multi-object approach will mean additional objects are built thus enabling more developers to work on ERP system object. The multi-object approach is more scalable and facilitates faster development times.

4.2. Any process which automates the ERP System only consumes less actions into memory

Section 2.2 discussed how the Update Customer process only uses 5 actions namely

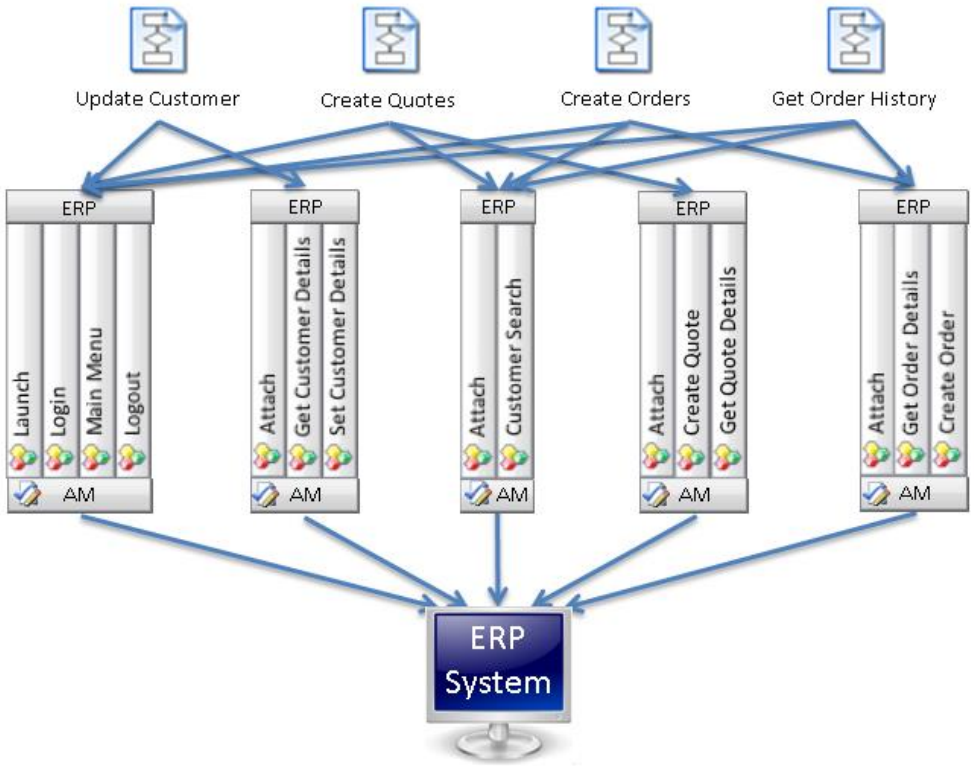
- Launch
- Login
- Main Menu
- Logout
- Set Customer Details



With the multi-object design approach, the Update Customer process now consumes much fewer actions into memory at run time.

4.3. A change to the actions within the ERP object will impact less processes

In section 2.3 we looked at how the Get Order History process requires a change to be made to the Get Order Details action. The Get Order Details action is only used in the Get Order History process.



With the multi-object design approach above, a change to the Get Order Details action, will only impact the Get Order History and Create Order processes as these are the only processes calling the object that contains the Get Order Details action. As a result of adopting the multi-object approach, the amount of regression testing required has been reduced by 50%.

4.4. The individual objects will be smaller and more efficient with a smaller application model

Each individual object contains less actions and a smaller application model as only the elements required for the set of actions contained within the objects need to be defined. Subsequently, the individual objects consume less space on the Blue Prism database, the database size grows less when a single action is changed and the application model is more user friendly with less of a risk of the wrong element being amended.

4.5. When is a multi-object design appropriate?

All projects where it is possible that the business objects will end up in production, regardless of the size of the initial development team.

Any proof of concept project whereby multiple developers are required to develop against an individual application.

5. Multi-Object Design Example

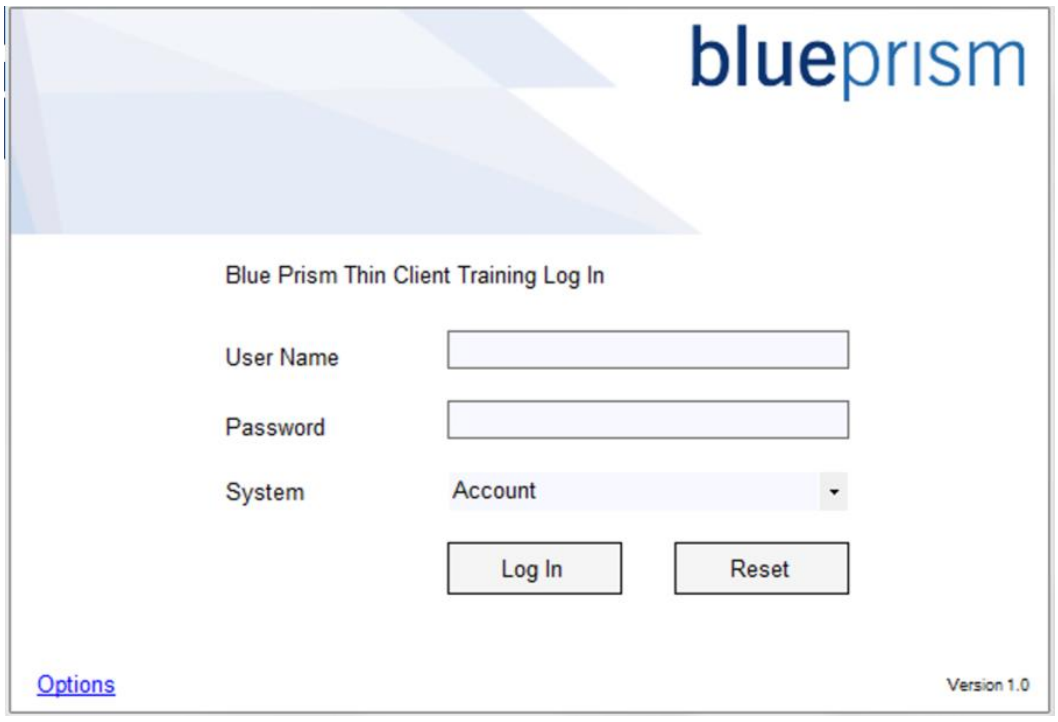
The following example illustrates how to design an efficient, scalable and re-useable object layer.

5.1. Basic Actions - Example

All applications will require a 'Basic Actions' object. This will contain actions for tasks such as launching the application logging in, closing the application and any other actions that not screen-specific such as 'Go Home'. In our example, we have the following actions defined in our 'Basic Actions' object.

Action	Inputs	Outputs
Launch		
Login	Username, Password, System	
Terminate		

The only screen that this object is automating is the Login Screen.



Note how all the possible fields to be completed are driven by Inputs. Even if the first Blue Prism process which calls the object uses the same value for a field, populating that field should still always be driven by an input parameter to facilitate future re-use.

5.2. Other Objects - Examples

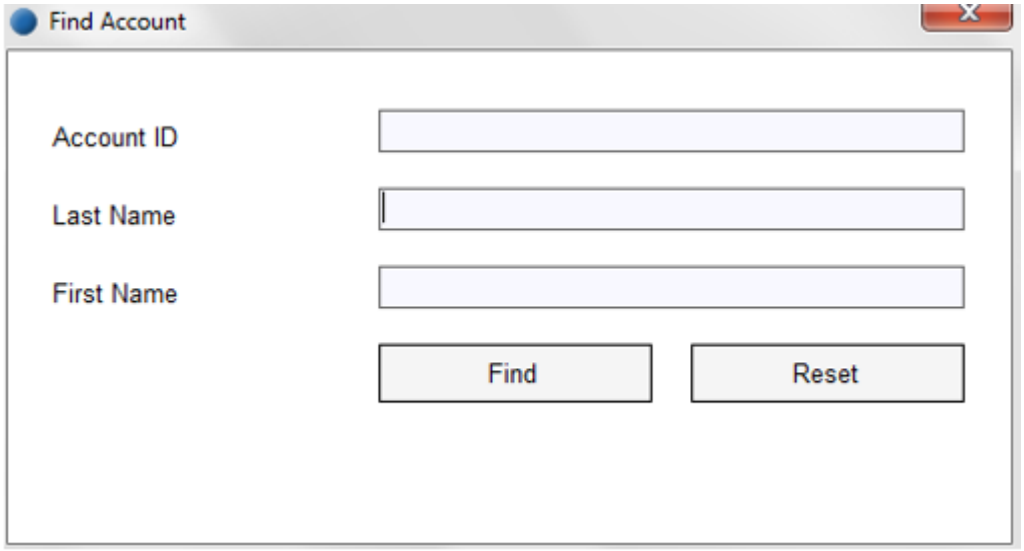
As discussed in section 3, other objects will be typically at an object-per-screen level. Below are some more examples. Note how all the actions that write or set data are 'told' by the calling process what data to write in the form of inputs. There is no need to have a separate action for each data item to be written, all fields can be populated within a single action.

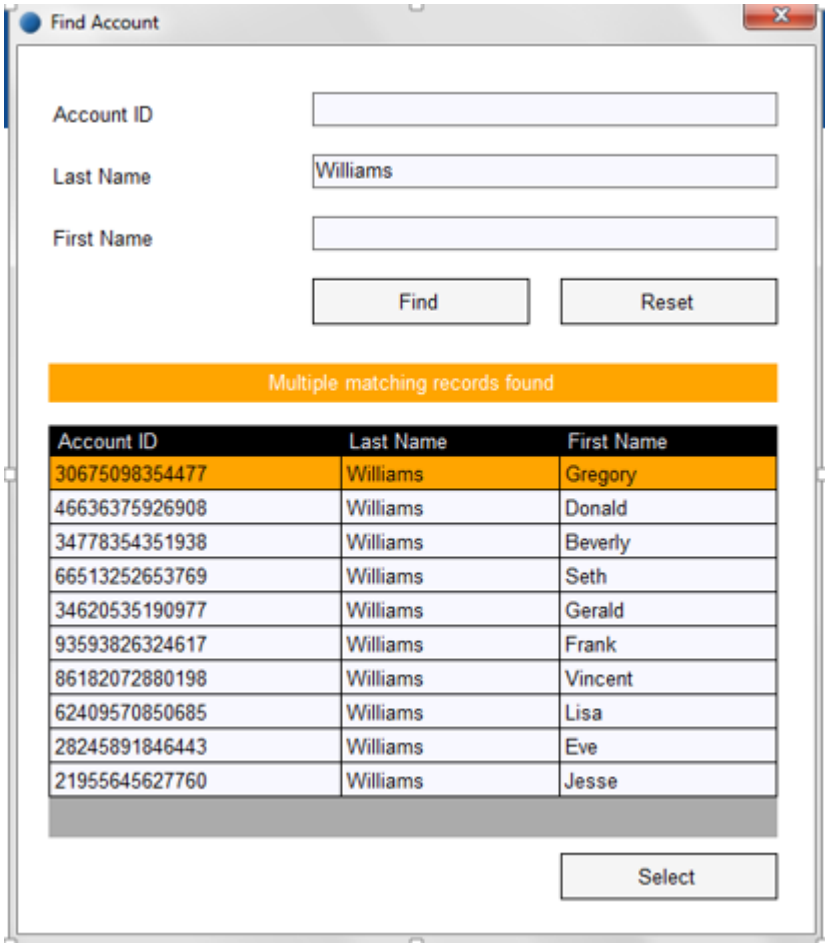
Actions that read or get data should simply read the data from the screen and pass it back to the calling process. The calling process can then apply any process specific business logic to the data. By following this approach and keeping any business logic out of the object layer enables maximum re-use of the object layer. There is no need to have a separate action for each data item to be read, all fields can be read within a single action.

4.2.1 Account Details Screen

Action	Inputs	Outputs
Attach		
Navigate	Find, Save, Close, New, Lock/Unlock	
Get Account Details		Account ID, Last Name, Middle Name, First Name, Title, Gender, House No., Street, City, County, Postcode, Verified.
Set Account Details	Account ID, Last Name, Middle Name, First Name, Title, Gender, House No., Street, City, County, Postcode, Verified.	

4.2.2 Find Account

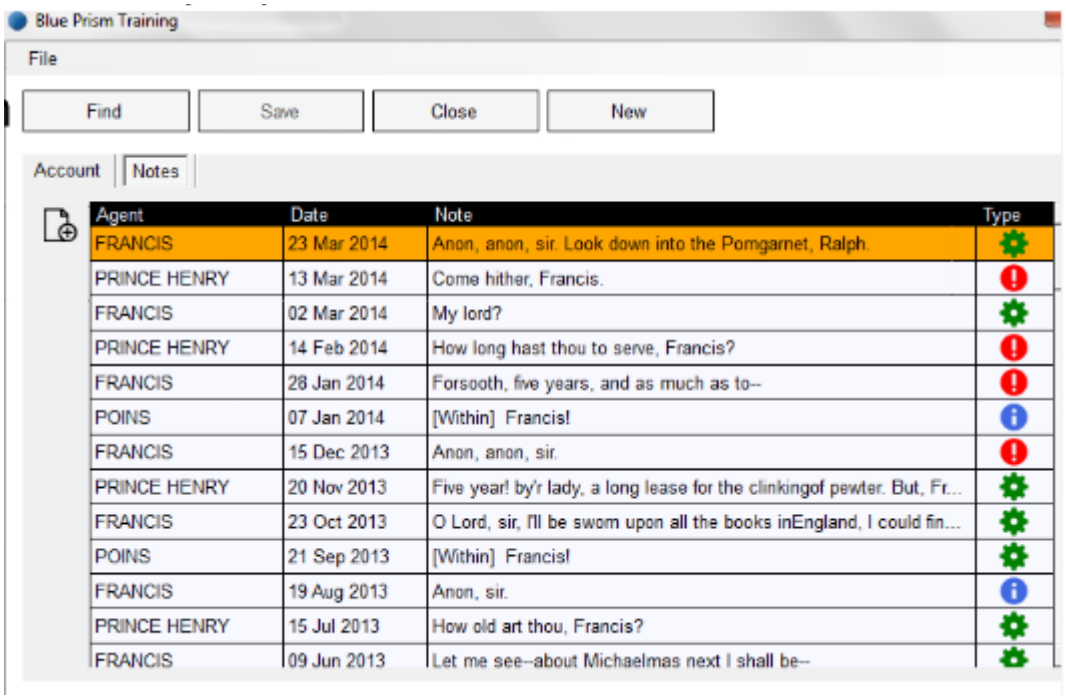




Action	Inputs	Outputs
Attach		
Find Account	Account ID, Last Name, First Name	Found

In this example, the Find Account action will perform a search based on the inputs provided and return to the calling process the results in a collection called Found.

4.2.3 Notes



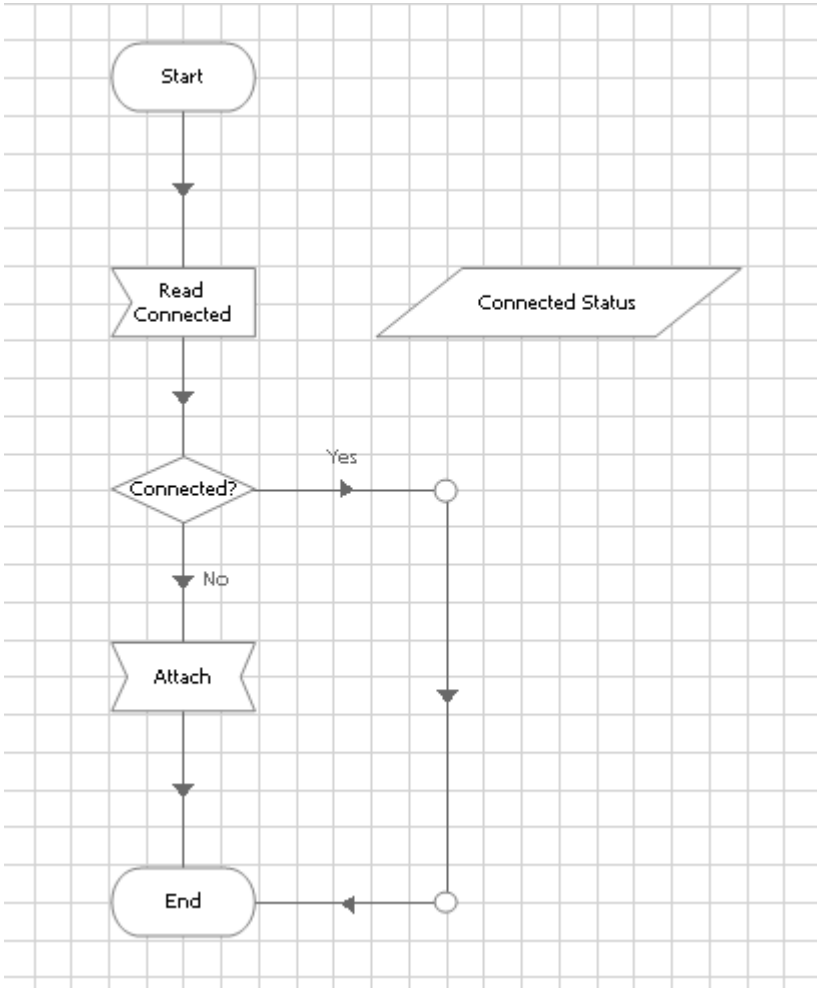
Action	Inputs	Outputs
Attach		
Get Notes		Collection(Agent, Date, Note, Type)

4.2.4 Attaching

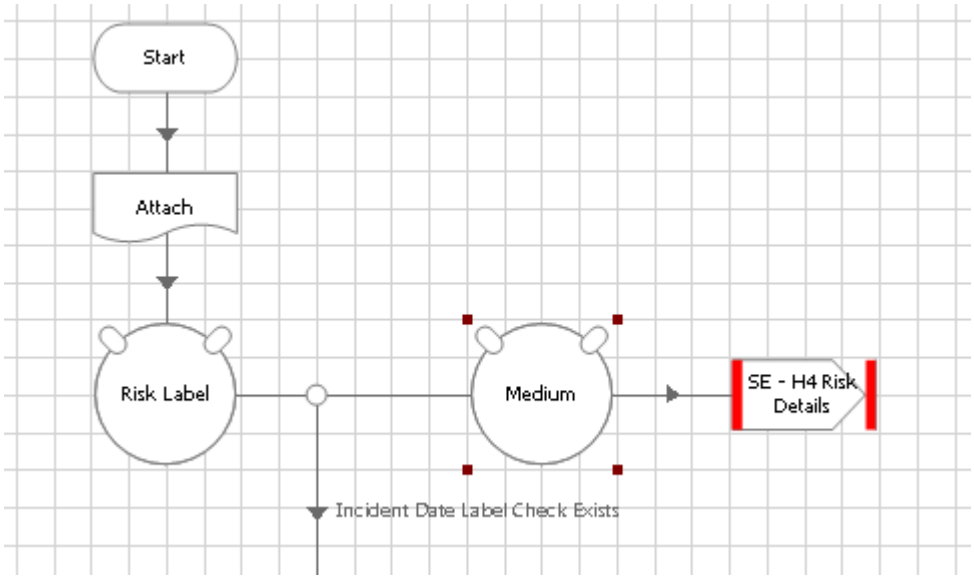
You may have noticed that all objects except for 'Basic Actions' have an action defined called 'Attach'. An object must be attached to the application before it can be used to automate it. When an object launches an application, it is automatically attached to that application. Therefore, the 'Basic Actions' object does not require an 'Attach' action. The remaining objects that wish to work with an application that is already launch must first attach to the application.

5.2.1.1. Attaching Best Practice

If an object attempts to attach to an application when it is already attached, an error will result. Therefore, when building an 'Attach' action, it is best practice to first detect if the object is already attached to the application. A typical 'Attach' action may look like this



By using the approach above, every other action within the object can call the 'Attach' page as is its first stage to ensure the action is ready to work with the application e.g.



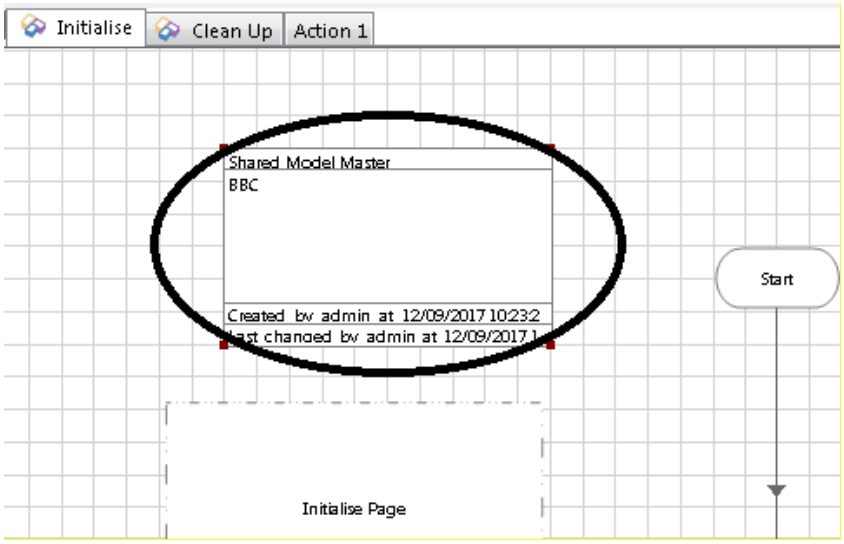
6. Shared Application Models

Occasionally, you may encounter applications where it is not possible to Attach to the target application, making the recommended multi-object design problematic. Fortunately, v5 of Blue Prism introduced the concept of a shared application model to enable a multi-object design approach in such scenarios. When using a shared application model, all the elements are managed within a single object (typically the object that launches the application) and accessed by the other objects. In this scenario, there is no requirement for the other objects to Attach to the target application.

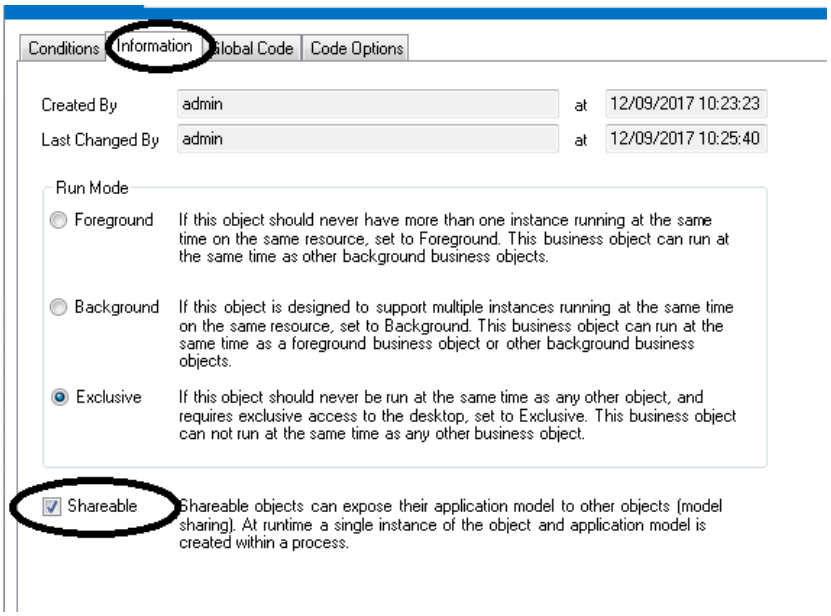
6.1. Making an Application Model Shareable

In the object which owns the Application Model:

- Open the Properties of the Initialise action:



- Select the Information Tab and check the Shareable option

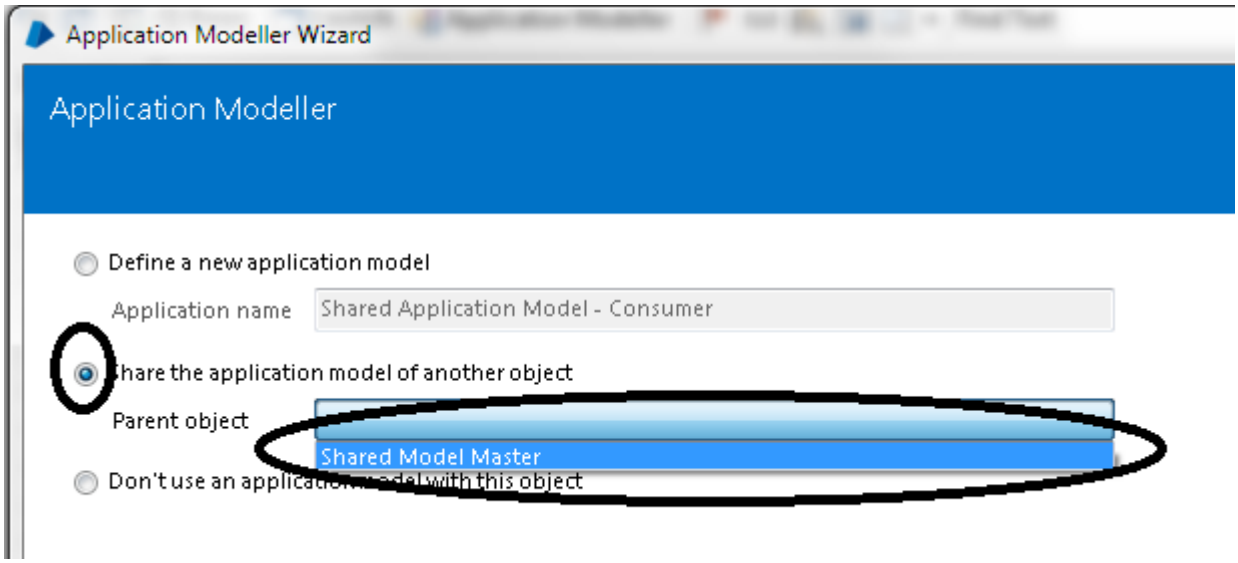


- Build your Application Model

6.2. Using a Shared Application Model

In the object wishing to use a shared model:

- In the Application Modeller Wizard, select the radio button pertaining to 'Share the application model of another object' and select the correct parent object from the drop down.



The elements will be subsequently be available to the object.

7. Naming Conventions

Avoid using terms that are process specific in your objects and actions. Remember an object is an application interface which should be completely independent of any process which may use it.

objects names should be kept to ***{Application Name – Screen Name}*** format for example, PeopleSoft – Employee Details.

Action names should be kept generic and provide an explanation of what the action does for example Write Data, Read Data, Navigate to Salary Details Screen.

Using a combination of the above enables future users of the object to very quickly understand what tasks individual actions perform.

8. Object Design – 5 Golden Rules

- Use a multi-object design approach
- Keep actions small and limited to a single specific task (e.g. read, write, navigate)
- Do not include process specific business logic in an object
- Use input parameters to drive what data is entered into an application and determine the contents of these parameters in the process layer

- Use output parameters to pass back values of fields held on the application. Where a process requires business logic to be applied to data held on the application, apply that logic in the process layer.