Operating the EA Repository

Having a common and consistent understanding of the composition and state of your enterprise is the basis for making sound decisions regarding it. It is what brings trust to the **Enterprise Architecture** (**EA**) practice. Indeed, you should encourage reusing the information in your repository whenever possible.

Sharing a repository, however, presents another set of challenges. For anyone who has worked within or managed a development environment or any other shared resource, these challenges may seem familiar. Managing or operating an EA as a shared resource is the subject of this chapter. In this chapter, we will review three topics related to operating the EA repository. Those topics are as follows:

- Sharing repositories
- Managing a shared repository
- Repository governance

This chapter discusses repositories deployed on a commercially available relational database engine such as **Oracle**, **SQL Server**, or **MySQL**. If you have no intention of doing so, you can skip this chapter.

Important Note

You will need administrator privileges on your repository to take full advantage of this chapter.

Sharing repositories

The most effective way to share repository access is to maintain your repository in a form that is easily shared – a **relational database**. Even if your repository is an `.eap` file on your desktop, it's already in a relational database. Sparx uses a JET database to store local repositories. While that's fine for local access, sharing repository access among five or more users is best accomplished using Oracle, Microsoft SQL Server, MySQL, or a similar database engine to house your repository on a shared remote server.

Sparx provides two ways to connect to such a remote repository:

- Using a native database connection method
- Via an HTTP server called **Pro Cloud Server**

There are benefits and drawbacks to either choice:

- Connecting via the direct database connection is the fastest, but it requires a database user account for each user. It also requires that each user has network access to the server on which the database engine is deployed. This may not always be the case.
- Pro Cloud Server acts as a proxy and removes the need for a direct connection to the database engine. Communication with Pro Cloud Server is via HTTP, which is ubiquitous.
- The downside is that Pro Cloud Server adds another layer of administration and a very small amount of performance overhead to translate from HTTP.

It suffices to say that you need your enterprise repository stored in a relational database that you can share. Whichever method you choose, you must also consider how you will support multiple parallel tracks of model development.

Organizing and reorganizing the repository

Sharing and reusing model information requires that the modeler be able to find that information. The structure of your repository is critical to finding information. As your repository grows, its structure becomes even more important. Without a proper structure, the repository will become a tangled mess that is of little use to anyone. There is no single layout that is appropriate for all repositories, nor is one structure appropriate for any given repository over its entire lifespan. Analyzing, assessing, and reorganizing a repository needs to happen often. You should create a process for reorganizing as part of your EA practice.

As you begin the process of modeling, whether in a new repository or on a new subject area, it's often fine to simply place all elements and diagrams for the model into a single package. As you add models and subject areas to your model, you need to consider how you will reference your new models or subjects. When the number of items in a package begins to make it difficult to find things, it's time to reorganize.

The first thing to consider in organizing your repository is what areas modelers are most likely to reuse. They are more likely to reuse elements than diagrams. Diagrams represent a view of a subject from a specific viewpoint. The model element represents the facts that are often immutable. Separating model elements from the views that use those elements is usually the first level of organization.

Once the number of elements in a package starts to become unwieldy, you should consider organizing the elements by element types. You can use the ArchiMate® stereotypes for this purpose. This has the added advantage of allowing you to easily perform enterprise-wide operations on the repository based on the element type.

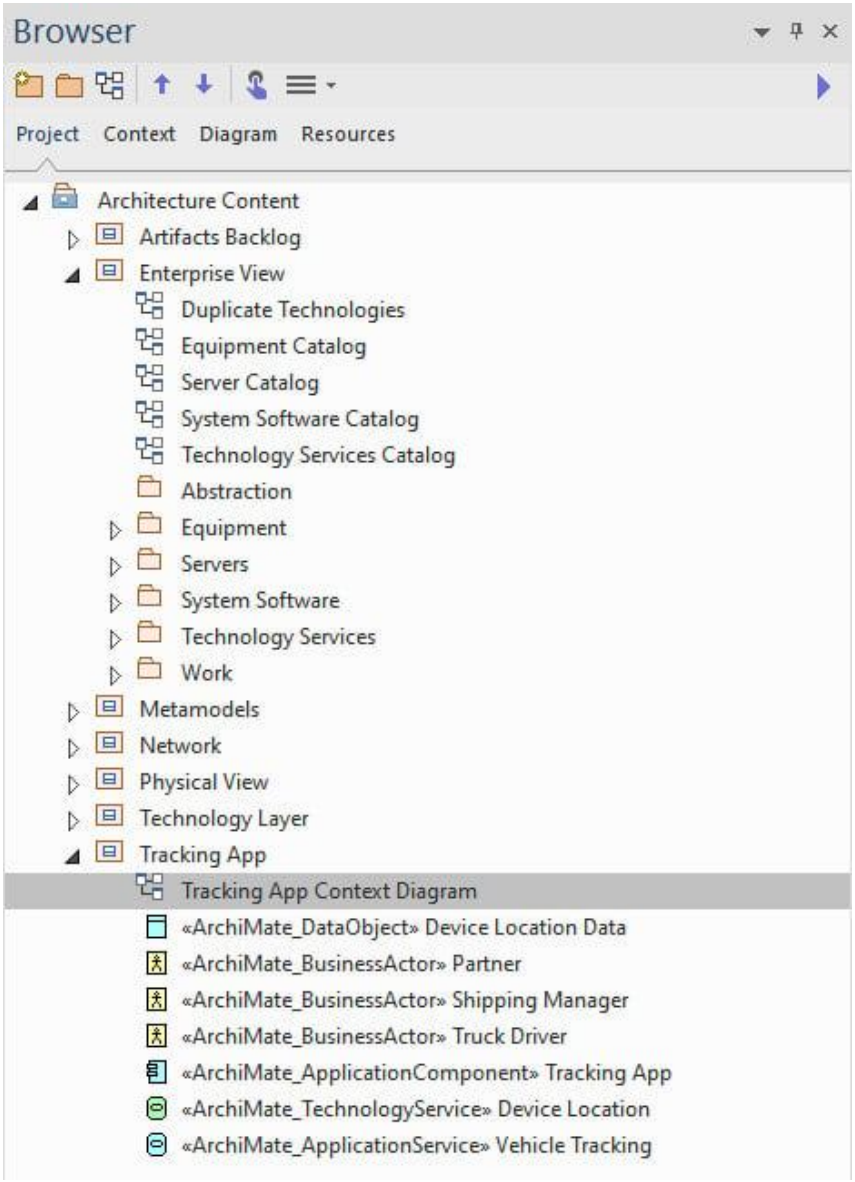


Figure – A repository structure

With all of your elements organized by element type, you may be wondering what happens when you need to reference these same elements in other ways, such as from the context of an application or a business process. This is where a diagram comes into play. A diagram that contains elements from several packages serves as an index to those elements. Sparx even provides a way to open the diagram as a list. From any open diagram, right-click inside it and select **Switch View**, and then select **Switch to List View**, as shown in the following figure:

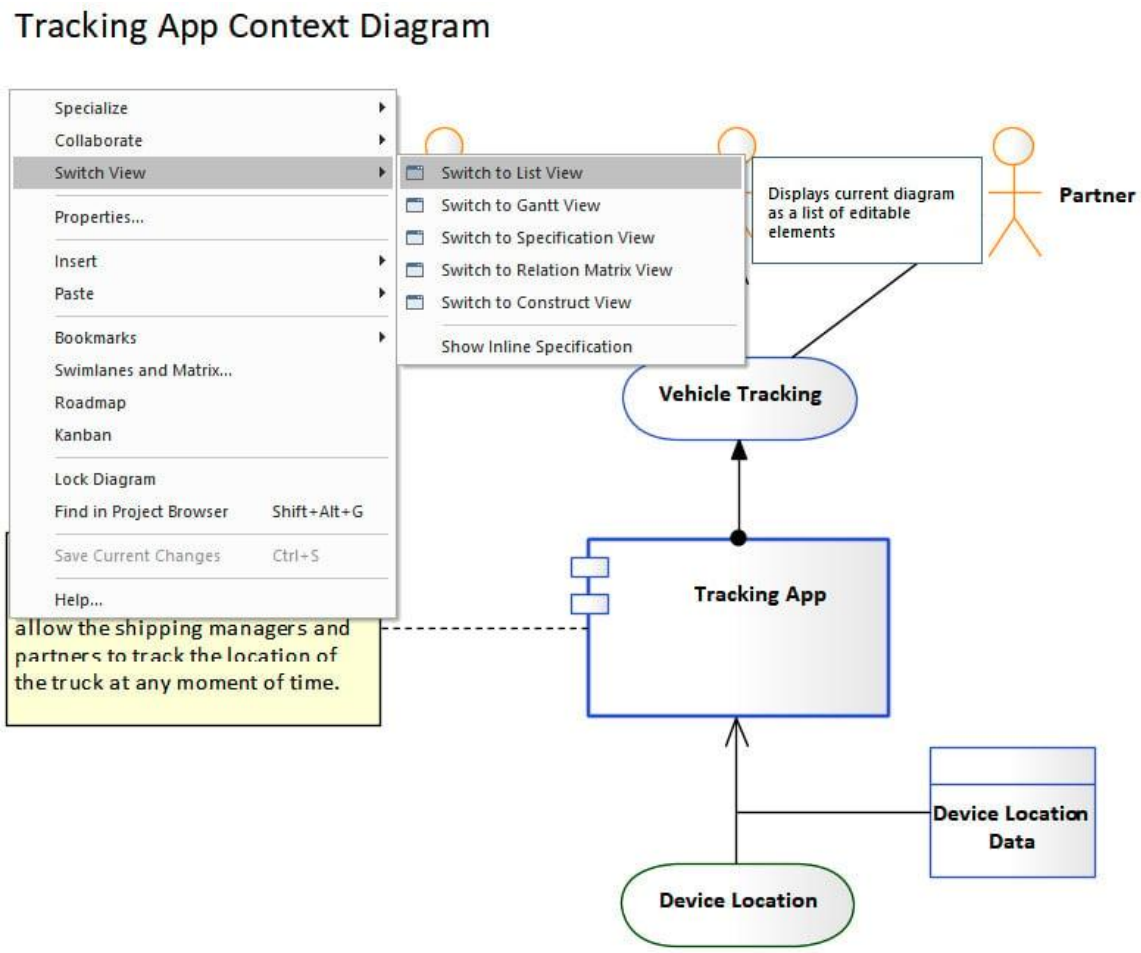
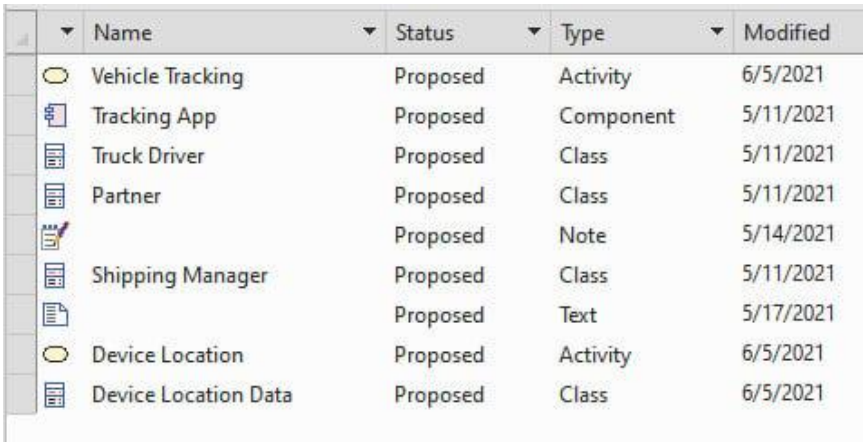


Figure – Switching views from the Tracking App Context diagram

The result is a neat list of elements, as shown in the following diagram:



Name	Status	Type	Modified
Vehicle Tracking	Proposed	Activity	6/5/2021
Tracking App	Proposed	Component	5/11/2021
Truck Driver	Proposed	Class	5/11/2021
Partner	Proposed	Class	5/11/2021
	Proposed	Note	5/14/2021
Shipping Manager	Proposed	Class	5/11/2021
	Proposed	Text	5/17/2021
Device Location	Proposed	Activity	6/5/2021
Device Location Data	Proposed	Class	6/5/2021

Figure – A list view

While this approach to structuring a repository has served us well, it's not the only way. Our intent is not to be prescriptive in the structure you choose but rather to encourage you to apply some time and thought to the subject of repository organization. Now, let's look at other important considerations for sharing repositories.

Model abstraction

As you model various aspects of your enterprise, the number of connections among elements increases dramatically. This is especially the case when you increase the number of modelers working concurrently. These connections can often become troublesome. Consider the following scenario.

One of your architects, who we'll call *Sam*, is in the process of modeling a new inventory management system called `ATC-INSTOCK`. You, on the other hand, are responsible for identifying critical changes to the enterprise accounting system, `ATC-GL`. The `ATC-GL` model is comprised of 17 different elements, representing the components that make up the accounting system. One of these elements is the `ATC-API1` component, which provides the API for external systems to add ledger transactions. *Sam* models the interaction for adding inventory by linking `ATC-INSTOCK` to `ATC-API1`. You realize that you need to replace the `ATC-API1` component with a new type of element. Because `ATC-GL` has been around for years, there are dozens or even hundreds of links to `ATC-API1`. How do you reconcile these links with the latest version of `ATC-GL`?

There are issues with this scenario that would justify objection, not the least of which is the question of why two enterprise architects are working at such a low level. why there is no abstract element to represent the entire `ATC-GL` system. There need to be abstract representations in the model for all major information systems. *Sam* needs to reference the enterprise accounting system, not the `ATC-API1` component. You can change all of the components or elements that make up the accounting system, but you should never remove or delete the abstract element that represents the entire enterprise accounting system.

Model replication

One of the primary tenets of a good data management or data architecture strategy is to eliminate redundant data whenever possible, except for backups. This is no different for model data. Replicating models is not a good practice. If you replicate a model to allow parallel model development, inevitably, both models will become inaccurate or incomplete over time. Reconciling the differences between replicated models can become a huge task. Our recommendation is to not go there. One exception to this rule involves the use of a version management tool.

Version management

Sparx interfaces with various version management systems to manage parallel model development. This feature can be convenient in allowing for offline model work. It does, however, require effort when bringing two parallel development streams back together. As with any source management tool, when checking-in offline work, conflicts can occur.

You must reconcile those conflicts manually before merging the two branches. This process is similar to merging two branches of source code using a version management system. The only difference is that the content you are merging with may not be as familiar to you as the source code is unless you've worked with Sparx for a while.

Sandboxes

One method of supporting parallel model development that has worked quite well for us in the past is the employment of what we call sandboxes. A **sandbox** is simply another model root in the same repository, dedicated to a project that will change the

enterprise. We name these sandboxes according to the project they represent. The following diagram depicts a new sandbox to support the new inventory management system at *ABC Trading*:

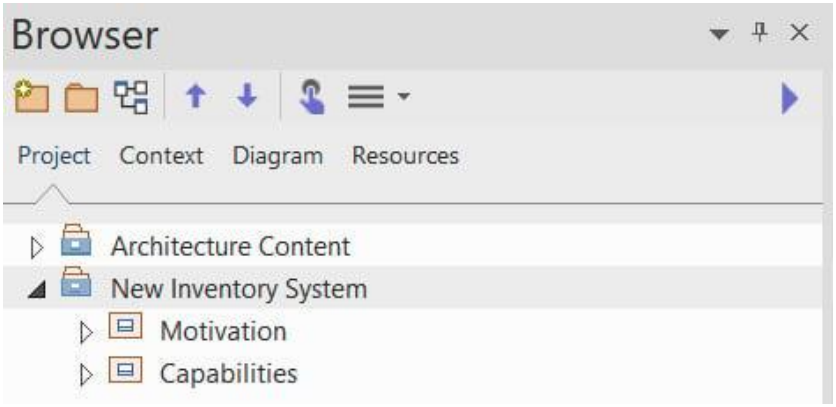


Figure – A new sandbox for the inventory system

Naming a Sandbox

Although the name *sandbox* implies a play area, we avoid naming these new model roots after a person, as we've found that it tends to encourage experimentation in the shared repository. It's best to leave experimentation to a local repository; otherwise, these *sandboxes* tend to turn into *cat boxes*, if you know what we mean.

The use of sandboxes in the shared repository provides us with the means to represent the potential or proposed future state of the enterprise while leaving our original model root to represent the current state of the enterprise. This is an important capability. We need to always maintain the ability to know and report on the current state of the enterprise. Keeping new or proposed changes in a separate area is one measure to ensure that you always have that ability. Now, we'll look at another necessary measure – maintaining status.

Element status

One of the advantages of using a sandbox in a shared repository is that we can still reference the existing architectural elements. Sparx allows us to establish links from elements in one model root to elements in another. To do this safely, however, we must employ a means of identifying our sandbox elements as *new*; otherwise, we could run into a situation where reports run against the existing model root may unintentionally include new elements from a sandbox. For now, we just need the

means to distinguish elements other than by their location. This calls for the use of the element **Status** field.

When you create a new element in Sparx, the default behavior sets the element's status to **Proposed**. This is the perfect status for working in a sandbox. Sparx comes preconfigured with a set of status values. To see the configured status values, navigate to **Configure** > **Reference Data** > **Model Types** > **General Types** and select **Status** from the left panel of the dialog, as follows:

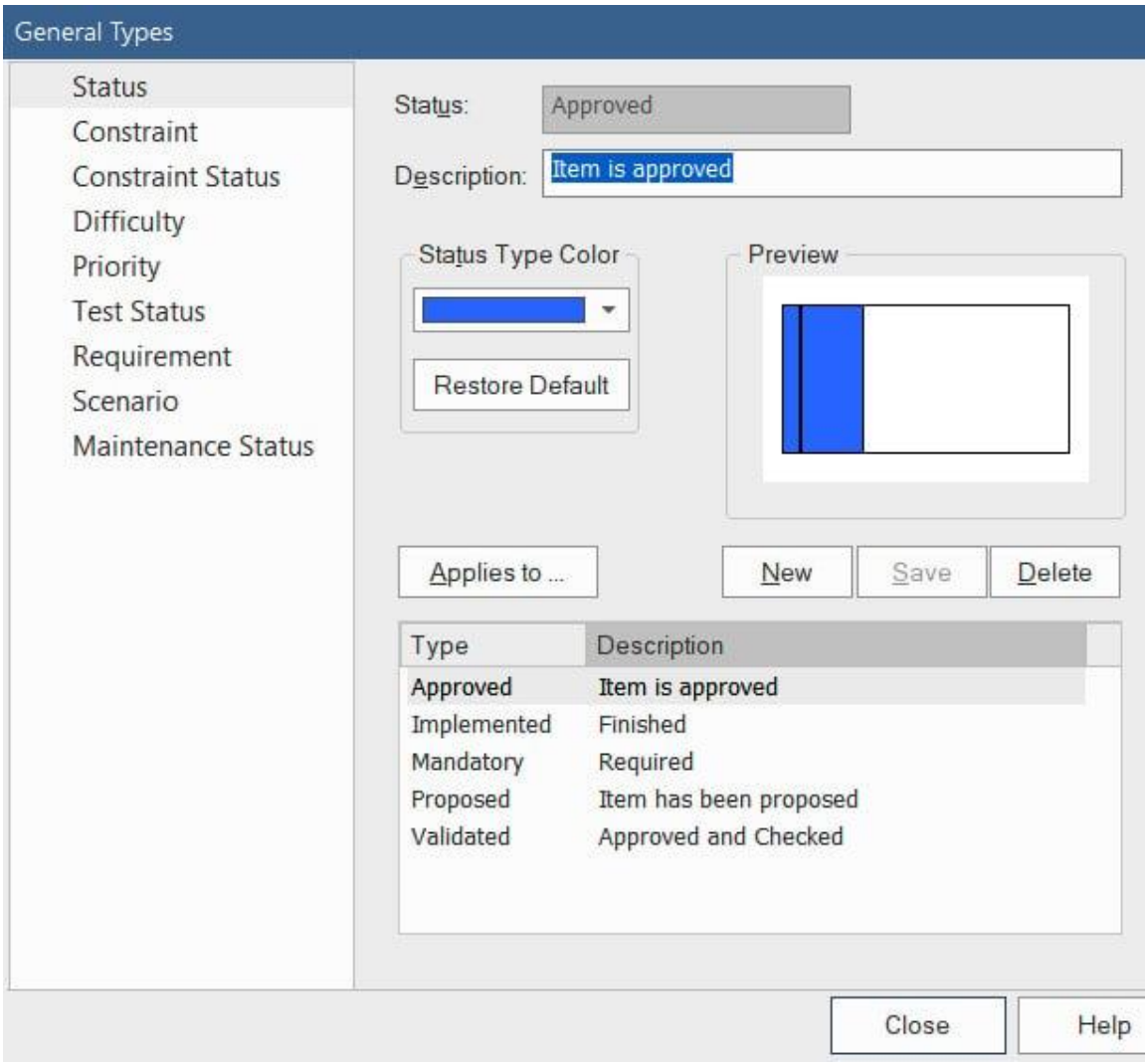


Figure – The element status value configuration

To distinguish those elements that represent the current state of the enterprise, we set their status to **Implemented**. Before you go and open the properties dialog for each element in your repository, Sparx provides a quick and convenient way to update the status for an entire package, or even an entire model. Simply select the package level for the elements you want to update, and then navigate

to **Design** > **Model** > **Manage** > **Package** > **Update Status**. The following dialog will appear:

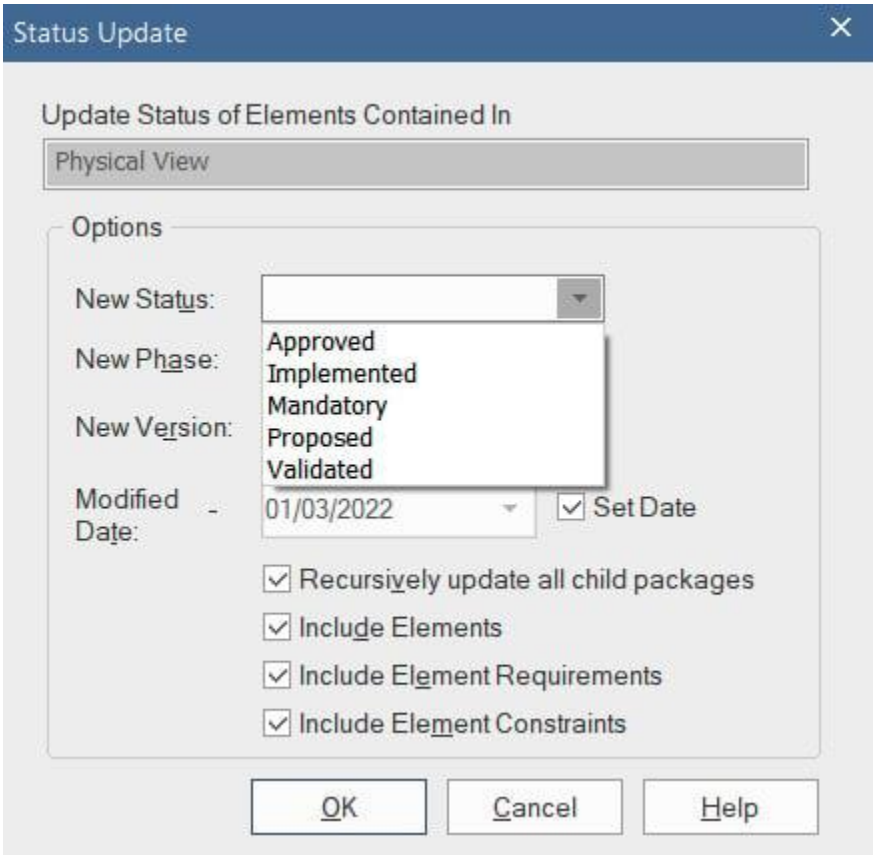


Figure – The Status Update dialog

Select the status you want to change to and click **OK**. As you can see, this dialog can change the values for the **New Status**, **New Phase**, **New Version**, and **Modified Date** fields.

The use of the element **Status** field implies a process behind the creation of elements and their promotion from a sandbox into the core model. Before you begin using the **Status** field, it's best to define and document the process of promoting elements from the sandbox. One way to do this is through the use of a UML state machine diagram, as depicted in the following figure:

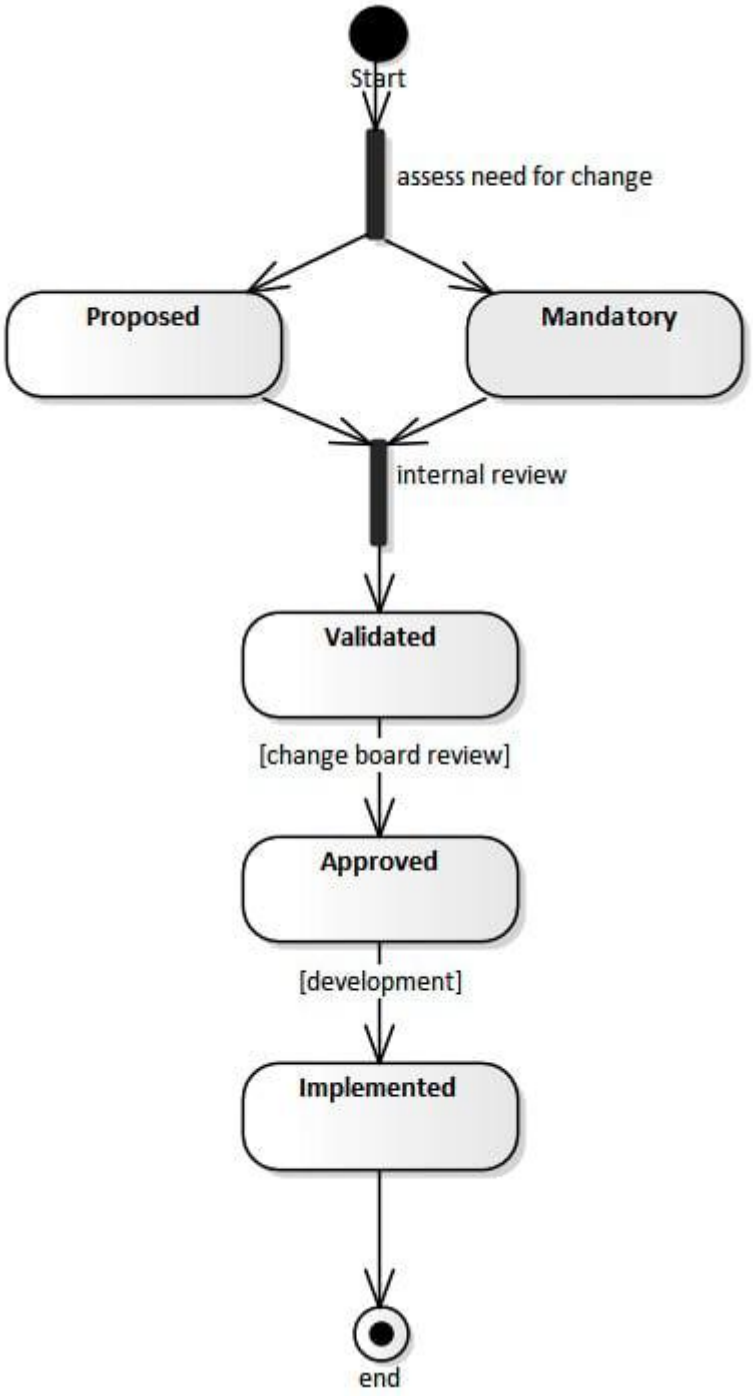


Figure – A state machine diagram

A **state machine** diagram describes how an entity, such as an element, responds to input, processes, the current state, and events that occur by showing the resulting state of that entity. In our example, state is analogous to status. We can show how the status of an element changes based on its current status and what process has occurred. The links between statuses are the processes or activities that take place to change the element from one status to another.

Managing the shared repository

As the use of the shared repository grows, so grows the need to manage and care for it. Almost immediately on implementation, the shared repository needs an administrator or manager. In the beginning, we've usually relied on one or more knowledgeable users to perform administration and configuration tasks. As the use and number of users grow, you may find that this needs to change. In this section, we will take a look at the most common administrator tasks and functions. The topics we will cover in this section include the following:

- Configuration management
- Implementing security
- Deleting and merging elements
- Backup and restore
- Automation

Configuration management

Many of the Sparx administration tasks can be found in the **Configure** tab, as depicted in the following screenshot:

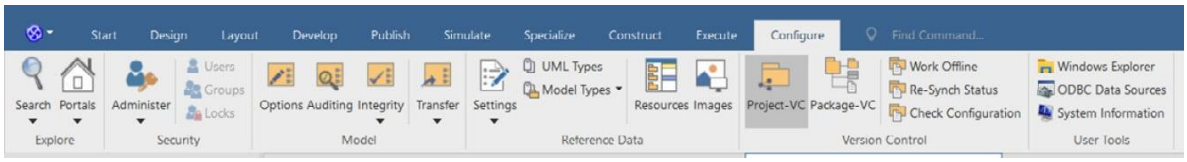


Figure – The Sparx Configure tab

As you can see, the functions on this tab relate to enterprise-wide settings or the health of the repository. From here, you can configure security, version control, status values, authors, data sources, and other similar functions.

Often, the administrator is responsible for creating report templates and publishing reports and HTML content. These functions can be restricted to a Sparx user with administrative privileges only.

Implementing security

The default configuration of a Sparx repository has security turned off. You must be a registered user to turn security on. You won't be able to do it by using a trial version of Sparx. To turn security on, you must obtain an access key from the Sparx Registered User web pages at https://sparxsystems.com/registered/reg_ea_down.html#RoleSecurity. You then enter this access key into the dialog that appears when you select the **Enable Security** option from **Configure** > **Security** > **Administer** > **Enable Security**:

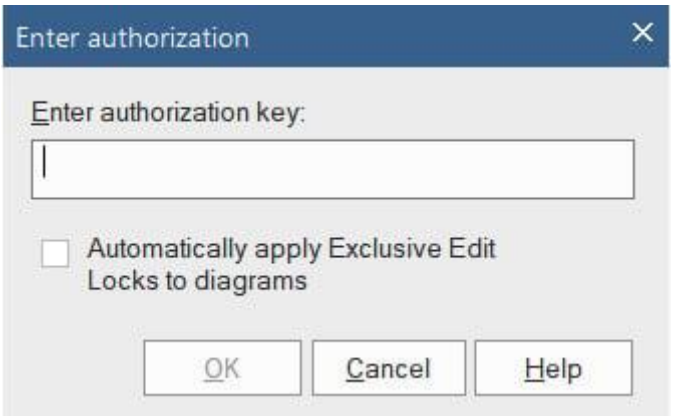


Figure – The authorization key entry dialog

Sparx provides the ability to set up permission for a single user or a group. Setting up groups allows you to specify permissions at the group level and then assign individuals to the appropriate group. You can import users into a new group from a **Windows Active Directory group**. This works for the initial setup of the group only. After that, you'll need to add each user manually. You can also implement a single sign-on from the user permissions configuration dialog by selecting either **Accept Windows Authentication** or **Accept OpenID Authentication**. The following screenshot depicts the **Security Users** permissions dialog:

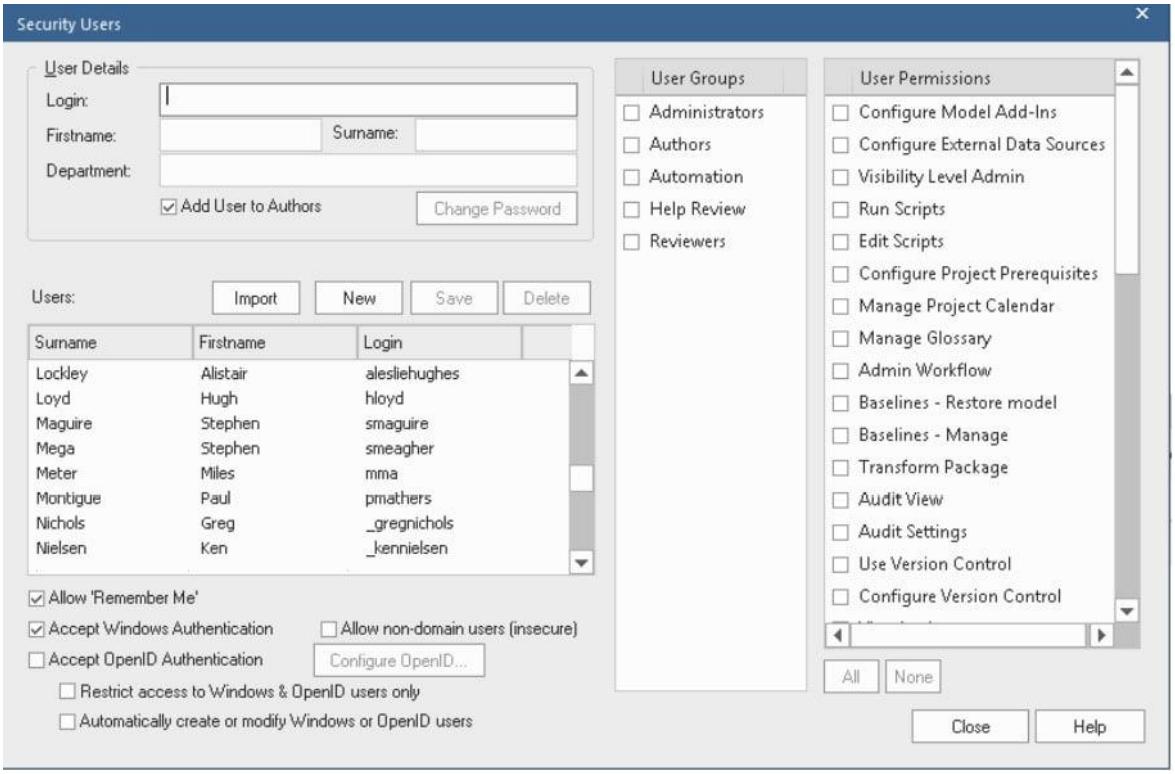


Figure – The Security Users permissions configuration dialog

Model locks

If a user has the **Lock Elements** permission granted, they can lock or unlock elements, diagrams, or packages from getting updated by other users. It's also possible to set group-level locks that prevent updates from anyone outside of that group. To set a lock, select the element, diagram, or package in the project browser, and then right-click and select **Lock** from the context menu.

The browser window indicates when the current user has established a lock on an element, package, or diagram by placing a blue-colored exclamation point next to the locked element. It identifies locks established by other users with a *red exclamation point*, as shown in the following screenshot:

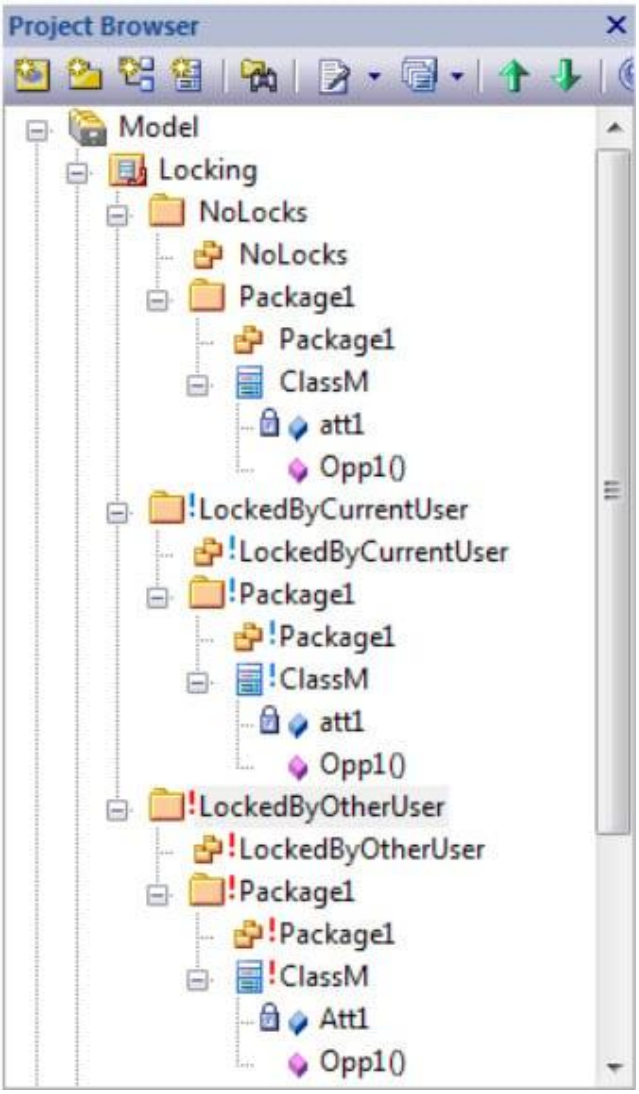


Figure – The browser window lock indicators

On occasion, locks can become stranded. When this occurs, the administrator can clear those locks by accessing **Configure** > **Security** > **Locks**.

Deleting and merging elements

Deleting elements from the repository can be a risky activity. An element can have dozens or even hundreds of links to other elements in the repository. The element can appear on any number of diagrams. These links and diagrams are not readily apparent unless you look for them. There is no *undo* function in Sparx. When you delete an element from the project browser, it's gone.

The only way to get it back is by restoring it from a backup or recreating it. For these reasons, you need to take extra care when deleting elements. In this section, we will

show you three ways to check for links and whether the element appears in any diagrams. The method you choose will often depend on how many elements you need to delete.

When deleting a single element, the following steps describe the simplest method to check for usage in a diagram:

1. In the **Project** browser, select the element and right-click on it:

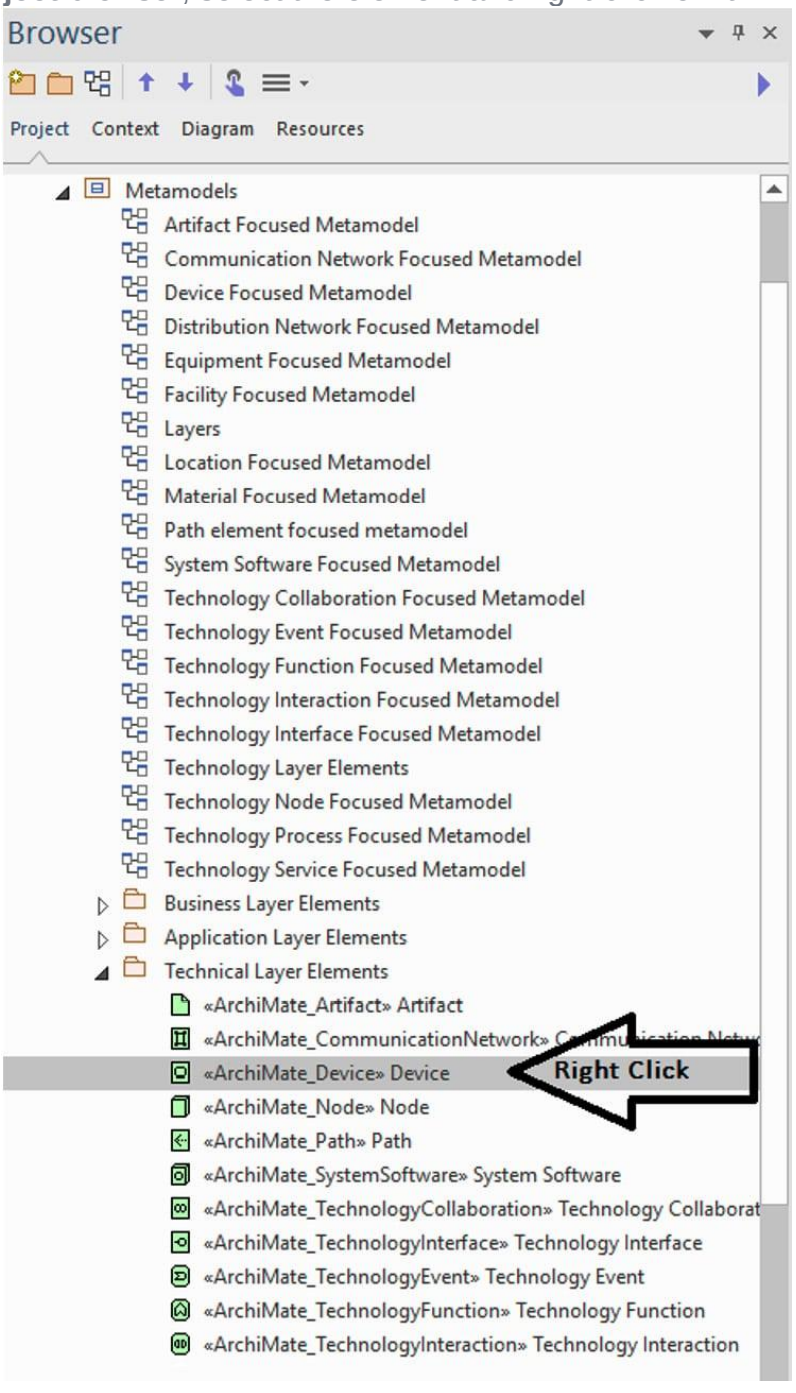


Figure – Right-clicking on an element

2. After that, from the right-click menu, select **Find in all Diagrams...**:

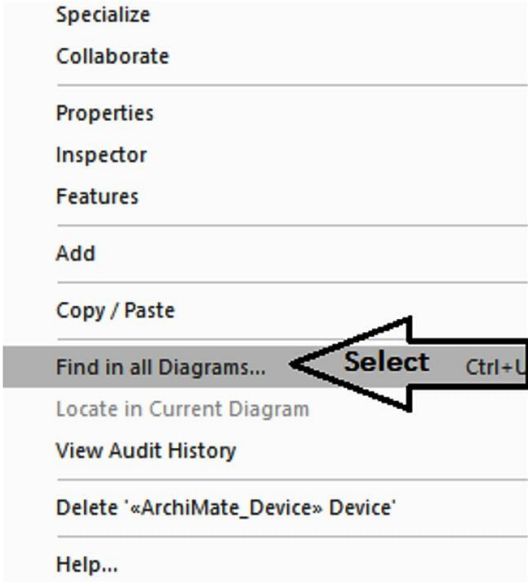


Figure – Find in all Diagrams… from the right-click menu

The following window will open after we click on **Find in all Diagrams...**:

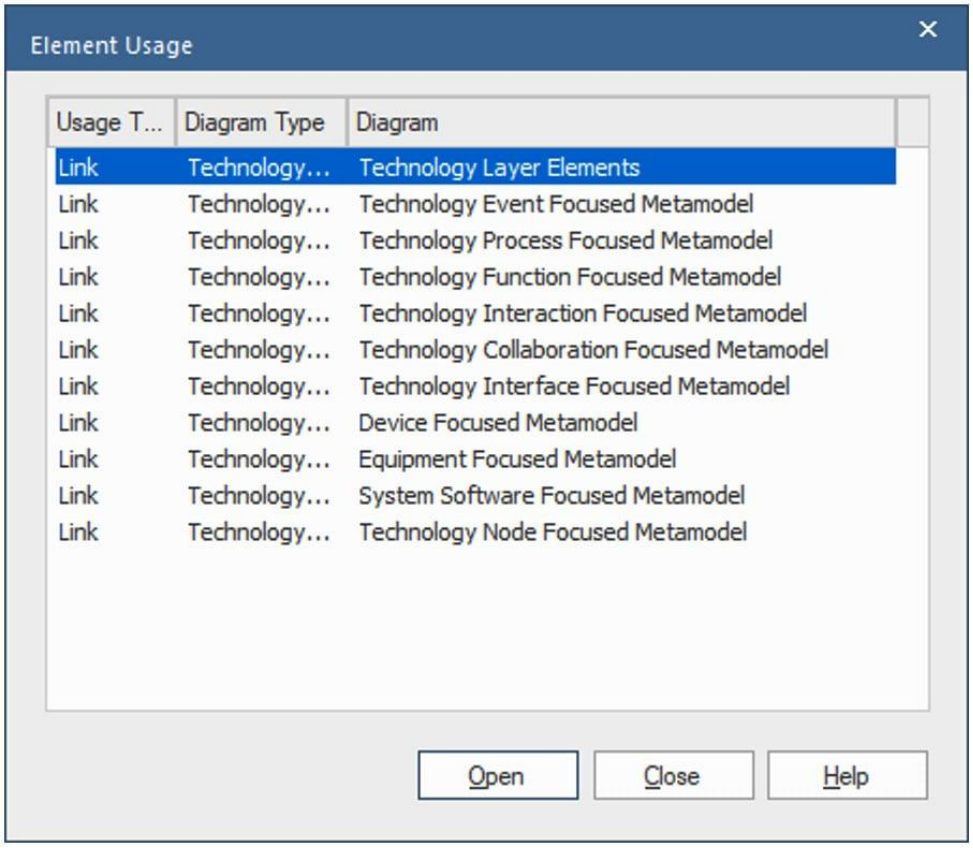


Figure – Element Usage

The prior example indicates that the element in question appears in 11 diagrams. From this dialog, you can open each diagram. To check for links, open the element's **Properties** dialog and select the **Links** option from the leftmost panel. As the following example shows, the element in question links to 14 other elements:

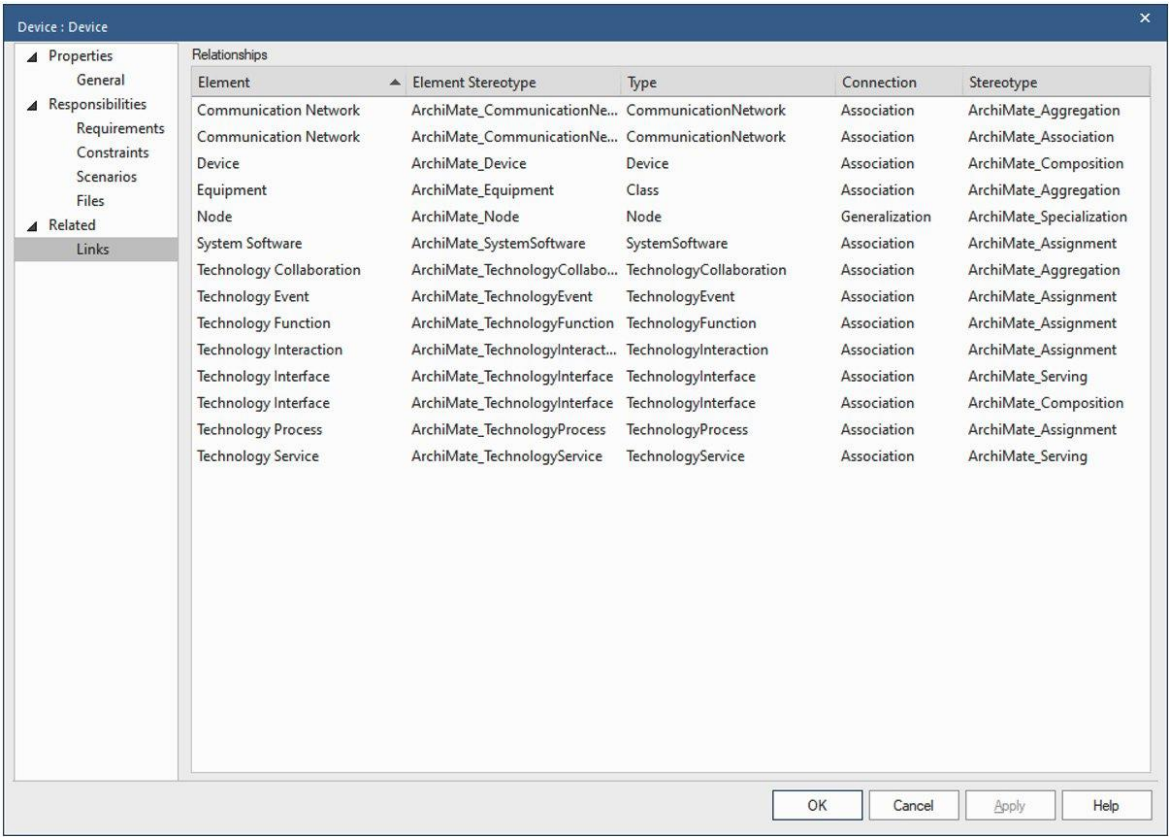


Figure – The element links in the Properties dialog

When you need to delete several elements, the following process might be a bit easier:

1. Select the first element in the **Project** browser.
2. Open the **Traceability** panel by selecting **Design** > **Impact** > **Trace**.-
3. The **Traceability** panel displays all links to and from the selected element.
4. To see a list of diagrams that the element appears in, click on the **Usage** button, as shown in the following screenshot of the **Traceability** panel:

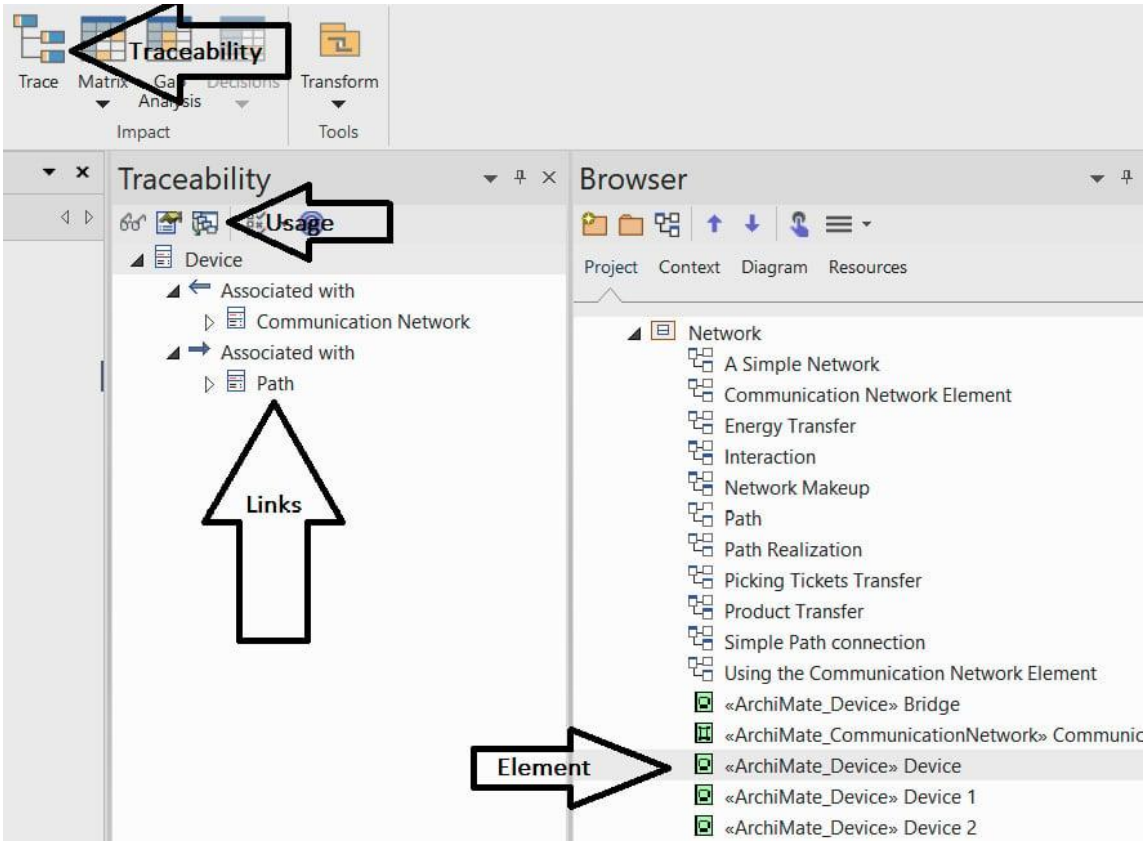


Figure – The Traceability panel display method

5. Select the next element to research in the **Project** browser and repeat from *step 3*.

Merging elements

Sometimes, the need to delete an element arises because someone inadvertently created an extra version of an element. In such a case, it's necessary to move all the links from one of the extra elements, which we call the source, to the other, which we call the target. We also need to replace the source element with the target in any diagram. We call this process **merging**. The following steps describe the best way to accomplish this:

1. Create a new temporary work diagram.
2. Drag both source and target elements onto the diagram.
3. Select the source element on the diagram.
4. Right-click and select **Insert Related Elements…**.
5. Repeat *step 3* and *step 4* for the target element.
6. Select a link endpoint on the source element.

7. Drag the link to the target element.
8. Repeat *step 6* and *step 7* for all remaining links on the source element.
9. Check for usage of the source element. Replace all occurrences of the source element with the target element in any diagram.
10. When clear, delete the source element.

As you can see, this process is a bit more involved than simply deleting the element. This is necessary because there is a great deal of information packed into the elements of a model.

Of course, if you do accidentally delete an element, you can always restore that element from a backup. We'll cover that topic next.

Backup and restore

There are many advantages to using a shared repository. Here, we will focus on one advantage, which is the opportunity to use the backup processes that are already in place. If you're deploying to a relational database platform that your organization already uses for other systems, you likely have database administrators and backup cycles in place that can cover the Sparx repository. If so, you're in luck. If not, you will need to create them.

In addition to database backups, you can also use a feature of Sparx called **Controlled Packages** to export portions of a repository for storing offline or to a version control system. Sparx stores the exported information in XML format.

Automation

Automation is what Sparx calls the facility for providing scripting access to its object model. You can use the automation interface to provide functionality that Sparx doesn't provide out of the box.

The automation interface is great for making changes to large numbers of elements. In one case, we needed to change the stereotype applied to hundreds of elements in a model. Without automation, we would have had to open the properties dialog for each element.

On another occasion, in a model that contained elements with long and complex chains of relationships, we needed to identify elements of one type that had indirect

(12 elements deep) relationships to elements of another type. While we could do this for an individual element by navigating the **Traceability UI**, in this case, the stakeholder didn't have Sparx, and there were hundreds of these elements. In both cases, we used **JScript** to make the change and produce a report.

Repository governance

Our primary intent is to make a distinction between architecture governance and repository governance.

Architecture governance

Architecture governance is about making architectural decisions. This subject usually includes such areas as the following:

- Governing boards
- Principles and policies around architecture
- Governance review processes and documentation

The best information makes for the best decisions. Some organizations entrust us, as architects, with making the architectural decisions for their enterprise, but that's not always the case. The larger or more complex the environment, the more people are often involved in the decision-making process. Regardless of whether we or an architecture board make the decisions, we are always responsible for the information on which those decisions are based.

Repository governance

Repository governance is a less lofty subject than architecture governance. This is all about making decisions about the use and maintenance of the shared repository. As you acquire more Sparx users, repository governance becomes more important. In this case, the decision-makers are well known.

Those who use the repository should have a say in how it's used. If the number of architects using the shared repository is so large that they can't all be involved in the decision-making process, then you'll need to establish a decision-making board to do

it. More likely, you are just starting out with your shared repository. Here are the areas in which you may need to employ a small governance process:

- Repository structure or restructuring
- Configuration settings and changes
- Sandbox creation and maintenance
- Diagram and element styles, including which colors and fonts to use
- Standard report templates and template structures

This doesn't need to be formal. Quite often, this can be done as a discussion point after a regular weekly architecture meeting.