Pathway Builder Guide and Instructions

July 26, 2023

Introduction

Each section of the Pathway Builder Instructions can include Google Slides, recorded videos, and links to additional resources. This information is embedded in the Pathway Builder and available via the Credential Engine website's [Pathway Builder Tool](#) page.

More Information: Visit Credential Engine's Credential Registry Badge Publisher Tool webpage for more information https://credentialengine.org/badge-publisher-tool/.

Contact Us: If you have any questions, please send them to publishing@credentialengine.org. We monitor this email during normal U.S. business hours and typically respond within one business day.

CTDL Pathways and Credential Registry Pathway Builder

Watch the [Building Clear Pathways Video](#).

CTDL Pathways are a means of designing and representing progressions towards specific destinations using Pathway Components. In the context of the Credential Registry Pathway Builder, a Pathway Component refers to any entity such as credentials, courses, competencies, extracurricular, work experience, or jobs that can be included in a pathway. The ultimate goal of a pathway is to reach a destination, which is represented by a Pathway Component that signifies where a person could be upon completing the pathway.

The Credential Registry provides a rich collection of Pathway Components that you can leverage by searching for relevant components and adding them to the Pathway Builder board. In cases where the desired data is not available in the Registry, you have the flexibility to utilize a library of components and combine them with the Registry data.

The Pathway Builder offers a user-friendly drag and drop interface that allows you to visually construct your pathway. By using connectors, you can link the Pathway Components together to depict the progression towards the destination. This intuitive tool enables you to build pathways ranging from simple to complex, seamlessly incorporating data from multiple sources.

Pathway Builder Users: Pathway Builder users include professionals with organizations that are designing or using existing education and career pathways to help people achieve their goals. These users desire the ability to visualize pathways, include a mix of components, and share them as CTDL data in the Credential Registry. Users can include:

● Education, training, and other credentialing organizations
● Employers
● Professional associations
● Other types of organizations designing or housing created pathways

By utilizing the Pathway Builder, these users can effectively design and construct pathways that align with their specific objectives and requirements. The tool provides them with the flexibility to integrate various components,

visualize the pathway progression, and publish the pathways to the Credential Registry for wider accessibility and utilization.

**Key features of the Pathway Builder include:**

- **Pulling in data from the Credential Registry:** You can access the wealth of Pathway Components available in the Credential Registry to populate your pathways.

- **Interactive drag and drop tool:** The Pathway Builder provides an interactive interface where you can easily arrange and organize Pathway Components according to your desired pathway structure.

- **Build simple or complex pathways:** Whether your pathway is straightforward or intricate, the Pathway Builder accommodates pathways of varying complexity.

- **Combine data from multiple sources:** In addition to utilizing the Credential Registry, you have the flexibility to incorporate components from other sources, allowing for comprehensive pathway design. You can even create Registry resources on-the-fly while building your pathway.

- **Publish to the Credential Registry:** Once you have designed your CTDL pathway, you can publish it to the Credential Registry as CTDL linked open data, making it accessible to others.

When constructing a CTDL pathway using the Pathway Builder, you have three levels of expression to consider:

1. **Pathway Components and Connectors:** Pathways are created by linking Pathway Components to the destination using arrow connectors. You can include components that you own or offer, as well as components offered by other organizations. This allows for the integration of various credentials, courses, competencies, jobs, or other components within a single pathway.

2. **Component Conditions (optional):** At the next level of expression, you can specify Component Conditions, which define the required quantities of predetermined Pathway Components. For example, you can set requirements such as completing two courses to progress to the next set of courses or earning a specific credential within the pathway.

3. **Constraints (optional for complex pathways):** For more complex pathways, an additional level of information called Constraints can be included. Constraints allow you to express additional restrictions using CTDL properties. For instance, you can specify that the number of credits earned must be equal to or greater than a

specific quantity, courses must be at a certain level, or the number of hours worked must meet a predetermined threshold.

By leveraging these three levels of expression, you can create dynamic CTDL pathways that precisely reflect the desired progression and requirements for learners or professionals seeking to navigate a specific educational or career pathway.
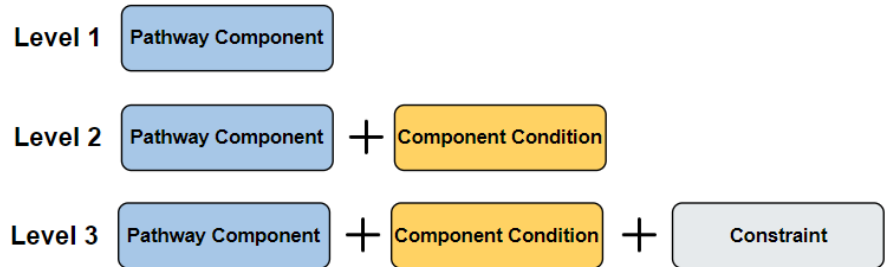
Additional Resources:
- [Pathway Builder Tool Webpage](#)
- [Building Clear Pathways Video](#)
- Complete list of CTDL [Pathway Components](#)
- [Pathways section of the CTDL Handbook](#)
- Essential Reading: Pathways Overview *2022-06-30*
    - CTDL Pathways, Conditions and Constraints: Essential Readiing – CTDL Pathways Overview

CTDL and Pathway Builder Terminology

This information is further expanded with Google slides and an overview video [linked here](#).
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To effectively work with CTDL Pathways and the Pathway Builder, it's important to become familiar with the associated terminology. Here are the key terms you need to know:

CTDL Terminology
- **Pathway:** A structured set of Pathway Components that define points along a route towards fulfilling a goal or objective.
- **Pathway Component:** Resources that serve as defined points along the route of a Pathway to a destination. These can include credentials, courses, competencies, jobs, or other relevant entities.
- **Component Condition:** Describes what must be done to complete a Pathway Component or a part of it. These conditions are determined by the creator of the Pathway and specify the requirements for progression.

- **Constraint:** Identifies the parameters that define a limitation or restriction applicable to a candidate pathway component through a Condition Component. Constraints provide additional specifications or restrictions for the pathway.
- **Progression Model:** Defines the points along a developmental progression, which could be increasing levels of competence, complexity, achievement, or progression over time.
- **Resource:** Data published to the Credential Registry and used for a Pathway Component. Resources can include: assessments, courses, credentials, jobs and more.

Pathway Builder Terminology

By understanding and using this terminology effectively, you can navigate and utilize the CTDL Pathways and the Pathway Builder tool to create dynamic and comprehensive pathways that meet your specific needs.

- **Approve:** After completing your pathway, approve your pathway to be published.
- **Board:** The main area where you construct your pathway. It is located between the left and right rails and below the header.
- **Card:** Represents a pathway component within the Pathway Builder. Cards can include components directly imported from the Credential Registry or blank cards that you can fill in to create custom components. Each card has a "Edit" and "Delete" option. Cards are coded with icons, a type of component, and credentials are color-coded blue and components are color-coded orange.
- **Conflicts:** Visible via "Show Conflicts" in the header, shows error messages that relate to the connections between cards. All conflicts have to be resolved to publish a pathway.
- **Component Library:** Located in the left rail, the Component Library provides ready-to-create cards to drag and drop onto the Board.
- **Connector:** A line with an arrow that connects the pathway components (cards) and indicates the pathway progression. Connectors should consistently point towards the destination.
- **Credential Registry Search:** The Credential Registry Search button is at the top of the Left Rail. Select it to search for Resources in the Registry.
- **Destination:** The card representing the final pathway component, which signifies the ultimate destination of the pathway.
- **Component and Resource Edit Modal:** When you edit or view any component or resource, a modal window opens on the right rail, providing options to modify or review its details.
- **Header:** The top area that spans across the Board, where you can access pathway information, save your progress, view conflicts, approve changes, adjust settings, exit the Pathway Builder, and access help resources.
- **Help**: Located in the header, written instructions and videos are always available.
- **Left Rail:** The section where selected pathway component cards and a library of ready-to-create cards are available for dragging and positioning on the board. This includes cards imported directly from the Credential

Registry and blank cards for custom components. Just above the card library is the Credential Registry search button.

- **Pathway Progression:** If a progression model is included with a pathway, the related levels display below the header along with Destination. Otherwise, Pathway displays along with Destination.
- **Save:** Located in the header, for saving your work.
- **Right Rail:** The section where you can view and edit the details of the selected cards.
- **Selected Resources:** The resources imported from the Credential Registry into the Left Rail.
- **Settings:** Located in the header, users can turn grid lines on, print, and access other pathway board settings.

Planning and Analysis for Building Pathways

This section is further expanded with Google Slides and an overview video linked here.
🟨 ***2 Pathway Planning and Analysis July 26, 2023***

Before you begin using the Pathway Builder, there are a few things you'll need in order to effectively build or design pathways:

1. **Pre-designed Pathway or Framework to Design a New Pathway:** You should have a pre-designed pathway or a general framework for designing a pathway using the Pathway Builder. This will serve as a guide for placing components, connecting them, and adding any necessary conditions or constraints.

2. **Analysis and Planning:** Whether you're building an existing pathway or creating a new one, some analysis and thought are required for planning and constructing your pathways effectively.

3. **Identify Pathway Components and Resources:** If you're designing a new pathway or publishing an existing pathway, you'll need to identify the specific Pathway Components that will be included and plan for how they should be depicted as a progression.

4. **Publish Pathway Resources to the Credential Registry:** If you have existing pathways in various formats such as posters, images, or spreadsheets, the first step is to publish data about the Pathway Components to the Credential Registry. This includes the credentials, courses, competencies, jobs, and other relevant components that are part of the pathway. Make sure to include the final destination component of the pathway. You can use the Credential Registry publishing tool that suits your needs. Once you have published and approved your uploads to the Credential Registry, you can use your existing pathway information as a reference for building your pathway on the Pathway Builder. It's worth noting that in cases where data isn't published to the registry prior to building a pathway, you can also use the pathway builder to publish assessments, courses, and credentials.

5. **Determine if a Progression Model is Needed:** Pathways can involve a progression across grades, levels, stages, or time. In CTDL, this type of progression is referred to as a Progression Model. As part of your analysis, determine if the components of the pathway need to align with specific points in a Progression Model. For example, if there is a progression model across time with intervals of 6 months, 9 months, and 12 months, each component in the pathway should align with one of these three points in the Progression Model. This additional information helps understand not only the progression through components but also how it relates to grades, levels, stages, or time. Knowing that the progression to a destination can occur within 12 months provides valuable information.

By having a pre-designed pathway or framework, publishing pathway components to the Credential Registry, analyzing the progression requirements, and planning accordingly, you'll be well-equipped to effectively build or design pathways using the Pathway Builder.

Pathway Analysis

Whether you're building an existing pathway or creating a new one, some analysis and thought are required for planning and constructing your pathways effectively. Here's some key considerations for pathway construction:

- ✓ **Destination:** Clearly define the ultimate destination of your pathway.
- ✓ **Pathway Components:** Identify the specific components needed to progress towards the destination.
- ✓ **Combination of Resources:** Determine if the components consist of resources offered by your organization or resources offered by others.
- ✓ **Sequence:** Establish the logical sequence for achieving the pathway.
- ✓ **Progression Levels:** Consider if organizing components based on progression levels would enhance the pathway structure.
- ✓ **Completion Requirements:** Define the specific requirements for successfully completing the pathway.
- ✓ **Level of Expression:** Determine the appropriate level of detail to ensure a clear understanding of pathway progression and completion.

This list is not exhaustive but provides a good starting point.

Publish Your Pathway Components

This section is further expanded with Google Slides and an overview video *linked here.*
🔲 ***Publish Your Pathway Components July 26, 2023***

Before building a Pathway, it's important to publish the resources to the Credential Registry that will be your Pathway Components. Examples of resources include: assessments, courses, credentials and jobs. Pathway Components serve as proxies for resources in the Credential Registry, providing rich and actionable information for both humans and machines. By publishing your resources, you can leverage the data already available in the Registry and reuse them to build your pathway. **Alternatively, you can publish assessments, courses, and credentials on-the-fly while building a pathway.**

Publish the following resources that you own or offer to the Credential Registry before building your Pathway. If other organizations own or offer components included in your Pathway, they can publish those as well. The Pathway Builder allows you to access all the resources of these types from the Registry:

- Assessments
- Competencies
- Courses
- Credentials
- Jobs and Occupations
- Progression Model
- Support Services

To publish your resources, follow these steps:

1. Create your Credential Engine Account https://apps.credentialengine.org/accounts/.
2. Log into the Credential Registry Publishing System https://apps.credentialengine.org/publisher.
3. Upload or enter the information about your resources. Make sure to review and approve the information to be published to the Credential Registry. Learn more about publishing options https://credentialengine.org/publishers/getting-started/.
4. Once the information is approved, a Credential Engine team member will conduct a cursory review and publish it. The publishing process typically takes minutes and is usually completed on the same business day. You will be notified by the Credential Engine system as soon as the publishing is completed.
5. You can view all the published data in the Credential Finder (https://credentialfinder.org), a tool that allows you to see all the information available in the Credential Registry.

Now that your Pathway resources are published and available in the Registry, you can Start Your Pathway and Get Pathway Component From the Credential Registry.

Start Building Your Pathway

This section is further expanded with Google Slides and an overview video [***linked here***](#) ***and Pathway Builder: Demo of Building a Pathway video l***[***inked here***](#)***.*** 🔲 ***4 Start Building Your Pathway July 26 2023***

To begin building your pathway, follow these steps:
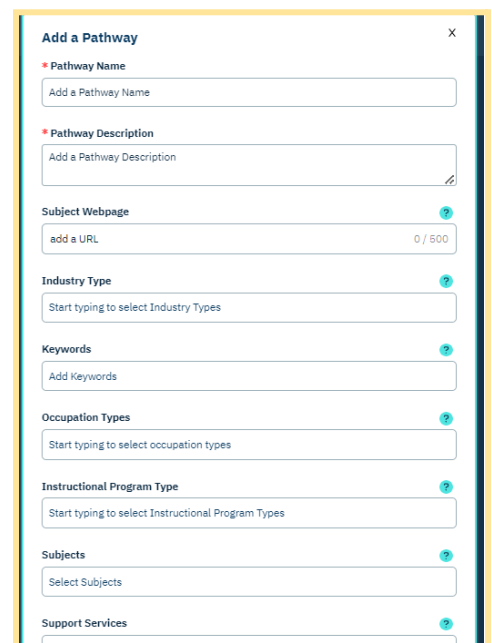
1. **Navigate to the Pathway Builder:** Log into your Credential Engine account https://apps.credentialengine.org/accounts/ and navigate to the Pathway Builder https://apps.credentialengine.org/publisher.
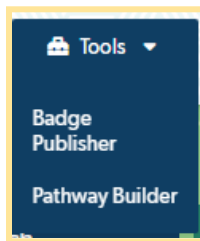
2. **Identify Organization Affiliation:** Select the organization that your account is affiliated with.
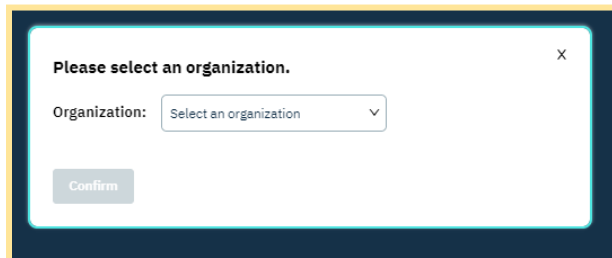
3. **Describe the Pathway:** A modal window will automatically appear where you can provide information about your pathway. Fill in the required fields, such as the Pathway Name and Description. Additionally, you can provide a Subject Webpage URL, specify the Industry Type, add Keywords, identify Occupation Types, Instructional Program Types, and enter relevant Subjects. You can also reference any support services published to the Credential Registry. This information will enhance the discoverability and understanding of your pathway. Select your Progression Model if you have created one for the pathway. This allows you to align your pathway components with specific points in the Progression

Model.
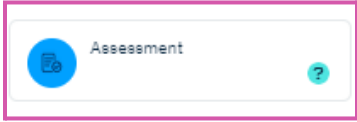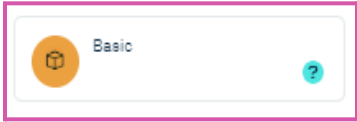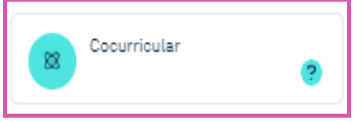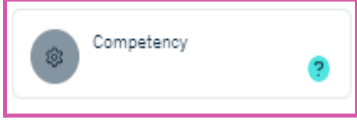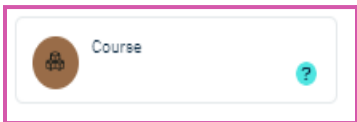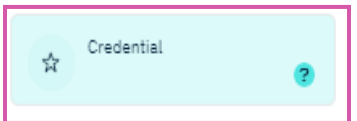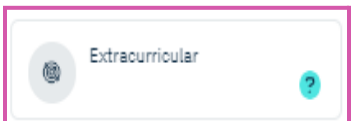
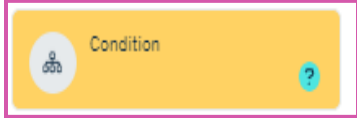For more information select the ? next to each field.

Select "Next" to continue.

4. **Search Credential Registry:** After completing the pathway information, another modal window will automatically appear. Use the keyword search and filters to search the Credential Registry for resources to use as the desired Pathway Components. You can search for components offered by your organization as well as components offered by others. To narrow your search, use the filtering options. To select resources to build your pathway, use the +. To remove them use the -.

    a. Select the components you want to include in your pathway and select "Done Adding" to save them to your board. The selected components will populate the left rail of the Pathway Builder. If you miss any components, you can always access the search again to add more.
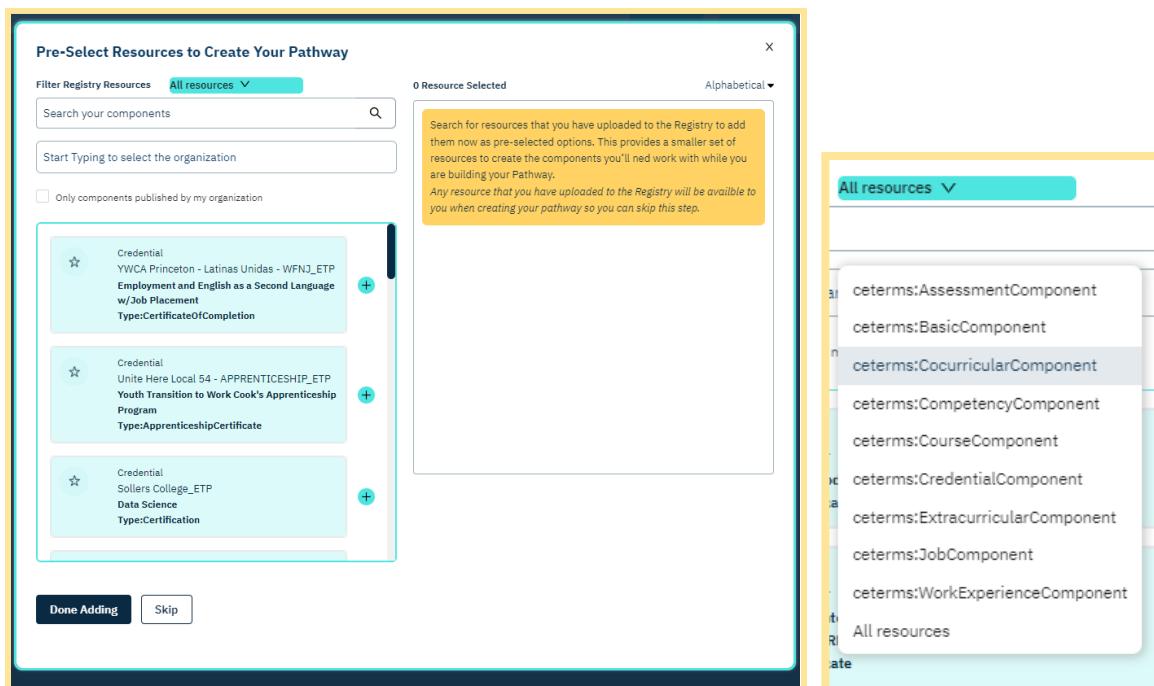
5. **Get familiar with the cards:**

Pathway Component	Definition	Card
Assessment	Identifies a direct, indirect, formative, and summative evaluation or estimation of the nature, ability, or quality of a resource, performance, or outcome of an action.	
Basic	Identifies a resource not otherwise covered by the enumerated Pathway Component subclasses.	
Co-curricular	Identifies an activity, program, or informal learning experience such as a civic or service activity that supplements and complements the curriculum.	
Competency	Identifies a measurable or observable knowledge, skill, or ability necessary to successful performance of a person in a given context.	
Course	Identifies a structured sequence of one or more learning activities that aims to develop a prescribed set of knowledge, skill, or ability of learners.	
Credential	Identifies another resource that describes qualification, achievement, personal or organizational quality, or aspect of an identity typically used to indicate suitability.	
Extracurricular	Identifies an activity, program, or informal learning experience that may be offered or provided by a school, college, or other organization that is not connected to a curriculum.	
Job	Identifies a work position, employment, or occupation.	

Pathway Component	Definition	Card
Work Experience	Identifies an activity or training through which a person gains job experience.	
Condition	Resource that describes what must be done to complete a Pathway Component, or part thereof, as determined by the issuer of the pathway.	

6. **Start with the destination:** Another modal automatically appears. Select "Start With Destination."
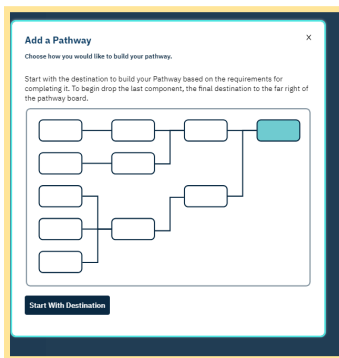
7. **Left Rail:** Under "Selected", the left rail now includes all of your selected resources. Under "Components", there's a library of blank components for data that is not available in the Registry. You can fill in the necessary information for these blank components.
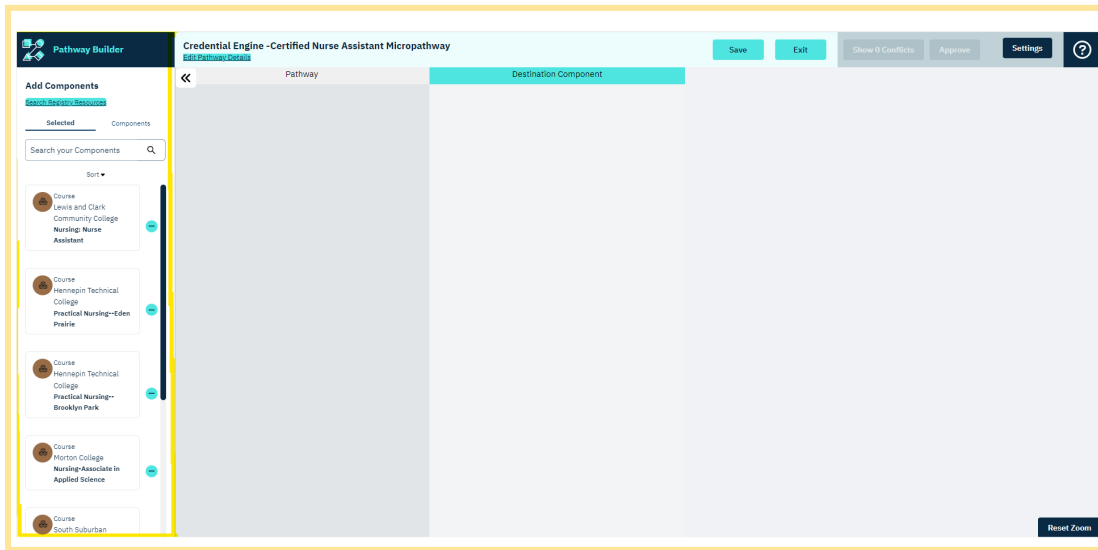
8. **Registry Search:** You can return to the search at any time to add Registry resources via the top of the left rail.

9. **Help Resources:** Utilize the help resources available via the right side of the header if you need further assistance.

10. **Drag and Drop:** Start building your pathway by dragging and dropping the components from the left rail onto the board.
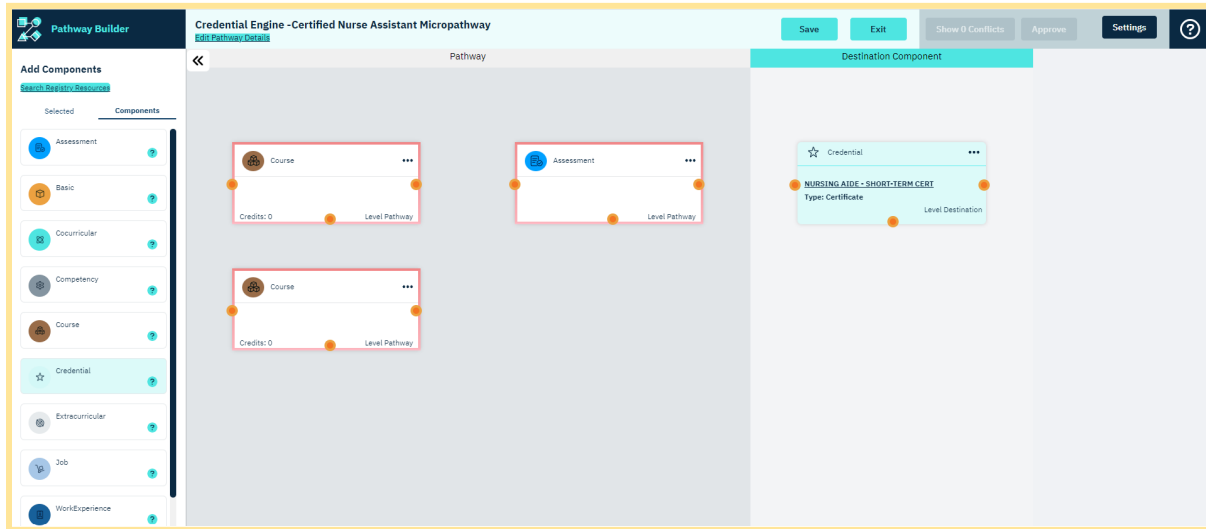
11. **Connect Cards:** Use connectors via the orange circles on the left, right and bottom of cards to indicate the progression towards the destination.
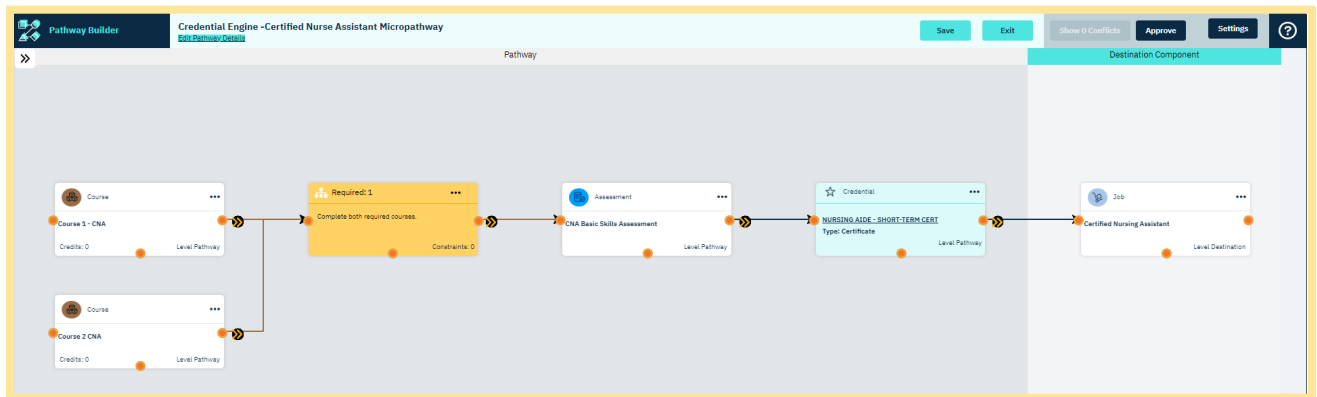
12. **Save:** If you need to pause your work and come back later, make sure to save your progress before exiting the Pathway Builder.

By following these steps, you can start building your pathway using components from the Credential Registry and customize it according to your needs.

Deeper Dive Into Building Your Pathway

This section is further expanded with Google Slides and an overview video [linked here](). ***and Pathway Builder: Demo of Building a Pathway video*** [linked here](). 🔲 ***5 Deeper Dive Into Building Your Pathway***

1. **Pathway Progression:** On the Pathway Builder interface, you will see the points in the progression at the top of the board, if you didn't include a Progression Model, you'll see "Pathway" displayed. To the right is a column for the destination.
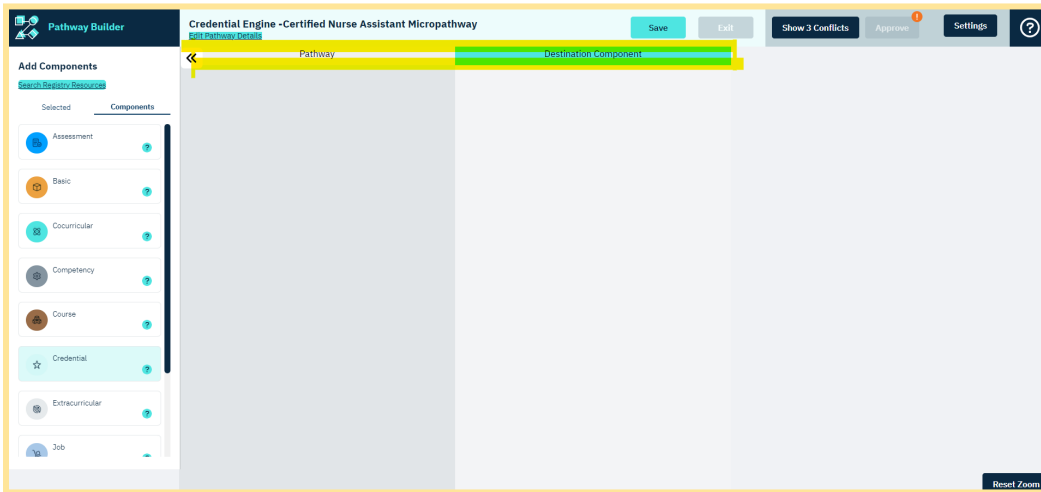
If a Progression Model was included, you'll see the related levels followed by the column for the destination.
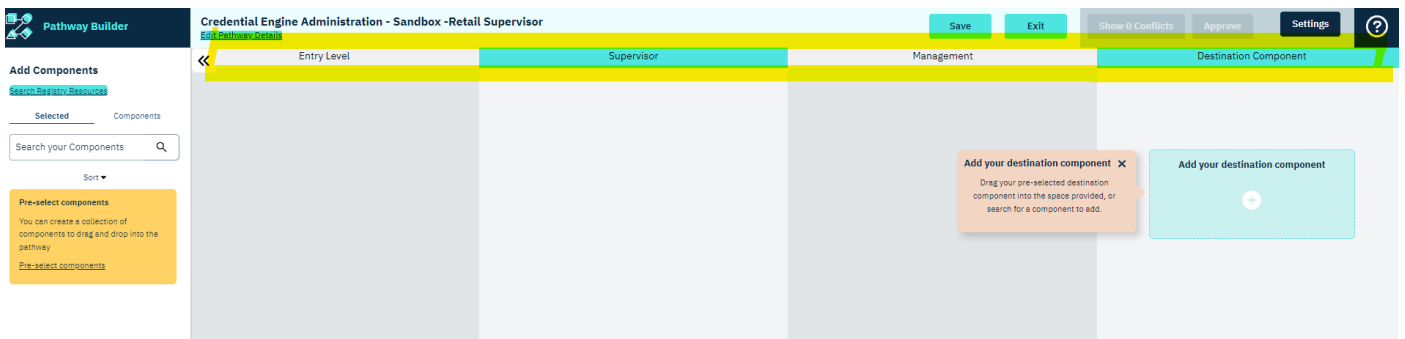
2. **Selected Resources and Components:** The left rail displays all the resource cards you imported from the Credential Registry to build your pathway. It also includes component cards. It's important to understand the distinction between resources and components:
   a. Resources: These are data already published to the Registry and represent the pre-populated pathway components.
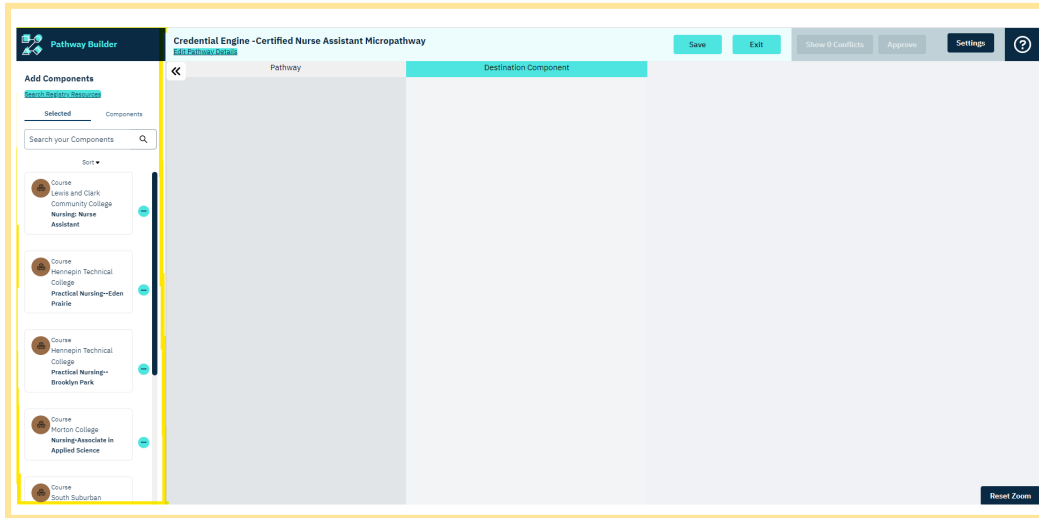
b. Component cards: These are empty containers that need to be filled in. Each component card corresponds to a specific CTDL class. You can use assessment, course, and credential component cards to publish new resources to the Registry on-the-fly. This means you can publish the resource and populate the component card simultaneously.
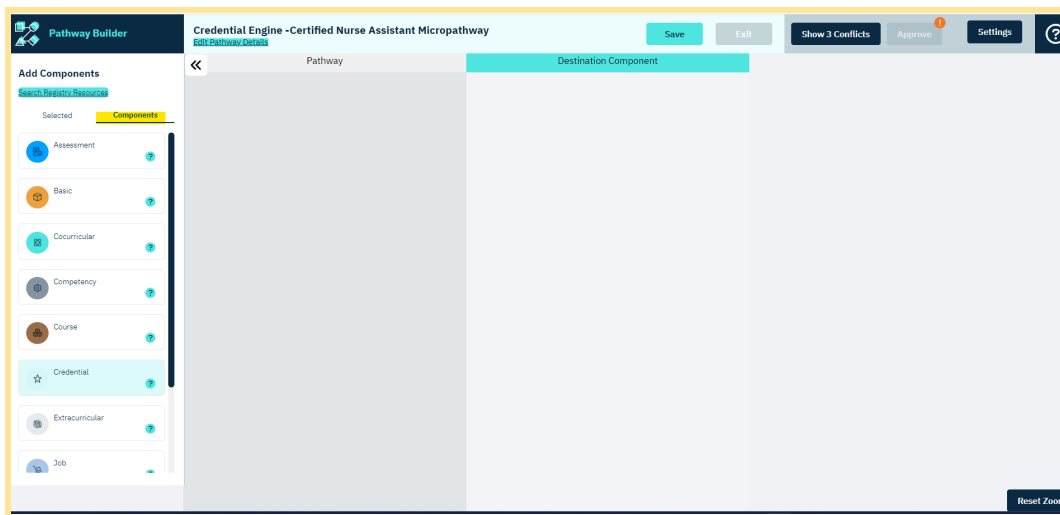

3. **Start with Destination Card:** Begin by selecting the resource or component card from the left rail that represents the end destination of your pathway. Drag and drop it into the destination placeholder. Only one card can be placed in the destination. As you drag component cards onto the board, they will be outlined in red to indicate that they need to be filled in.
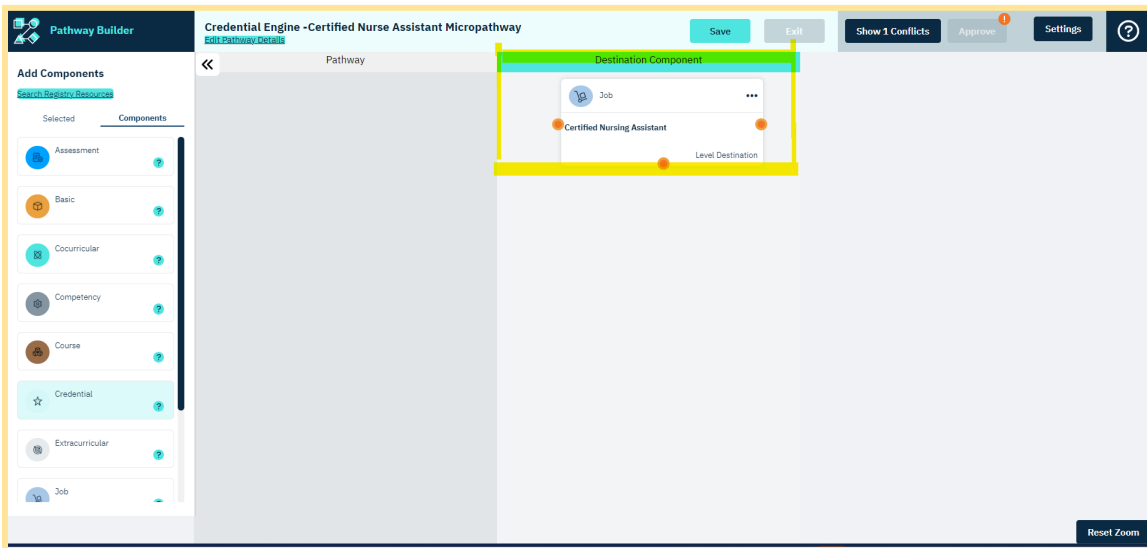
4. **Grid Lines:** If you want to see grid lines to guide component placement, you can enable the grid by accessing the settings in the header and selecting "Grid On." This will display blue guidelines next to each component, helping you align them horizontally and vertically and space them equally apart.
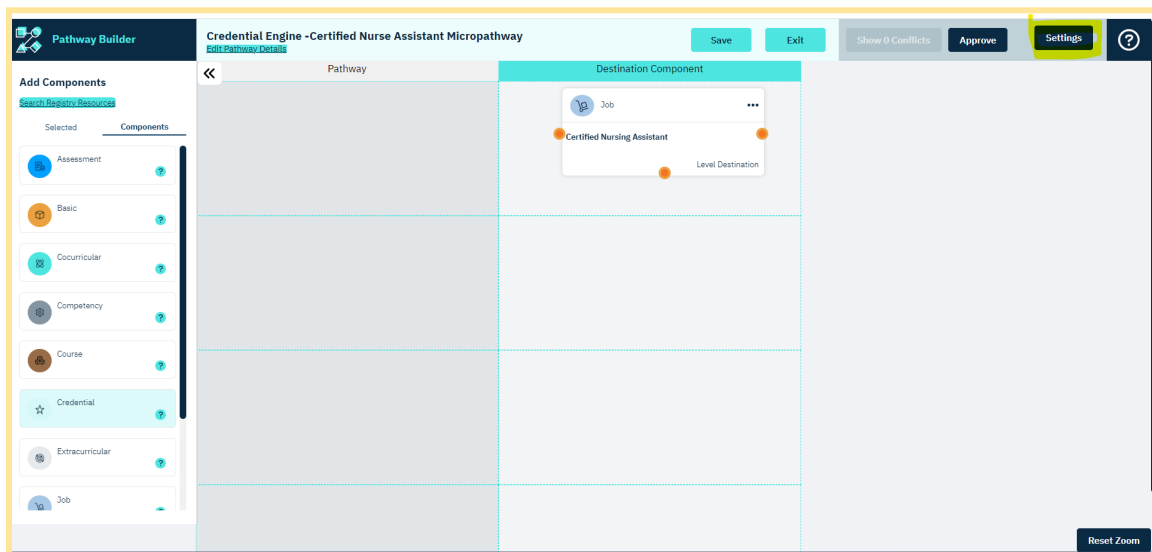

5. **Drag and Drop Progression:** Build your pathway by dragging and dropping cards to indicate the pathway progression towards the destination. If you're using a progression model, place the cards under the appropriate levels. Before connecting the components, make sure all of them are positioned on the board to represent the progression from left to right, leading to the destination component.
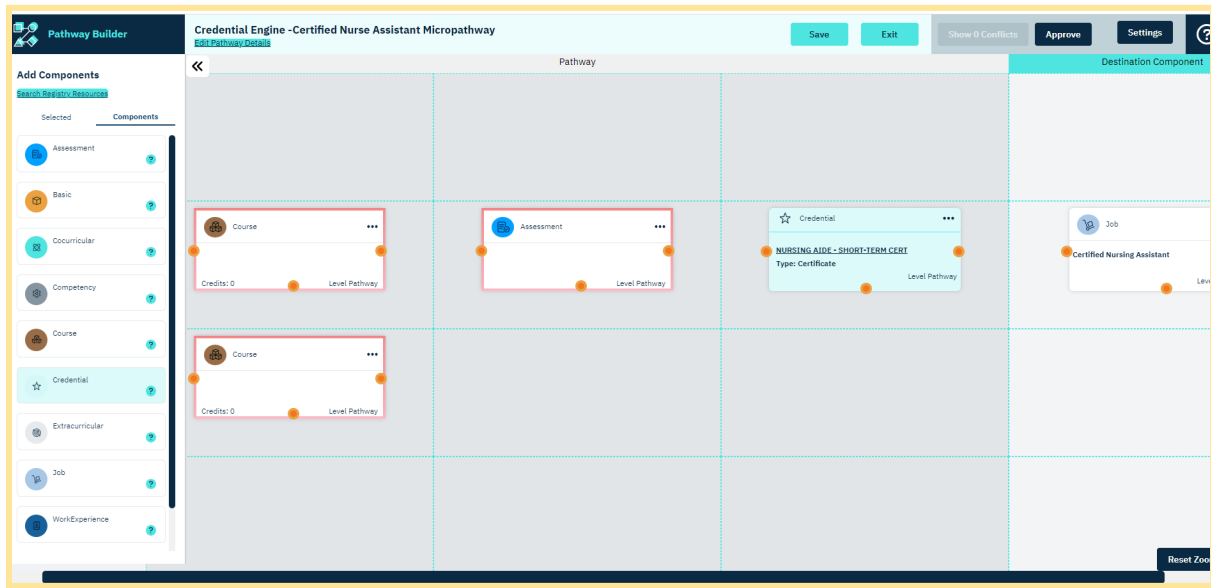
6. **Save:** The Pathway Builder will automatically save every 5 minutes. However, you should use the "Save" button in the header to save your pathway all along the way.
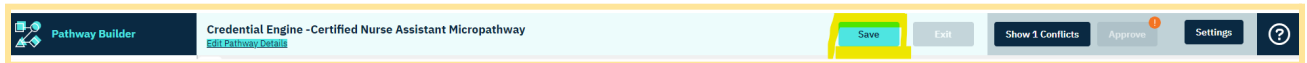
7. **Fill in Empty Components:** Selected resources from the Registry already include all the data you need about those components. If you use the Component Library, you'll need to fill in the required information and if you're including assessments, courses, or credentials that are not yet published to the Registry, you can use those empty components to publish those resources to the Registry on-the-fly and create your pathway components.

    a. **Fill in a Component:** Drag the appropriate component onto the board and select the (...) to edit. The card will be highlighted in red to indicate it needs to be filled in. Fill in all required information. Where possible, it's always recommended to add more helpful information. The example below shows a Job that was dragged on the board and edited to fill in the required information. After entering information, select "Save Component"
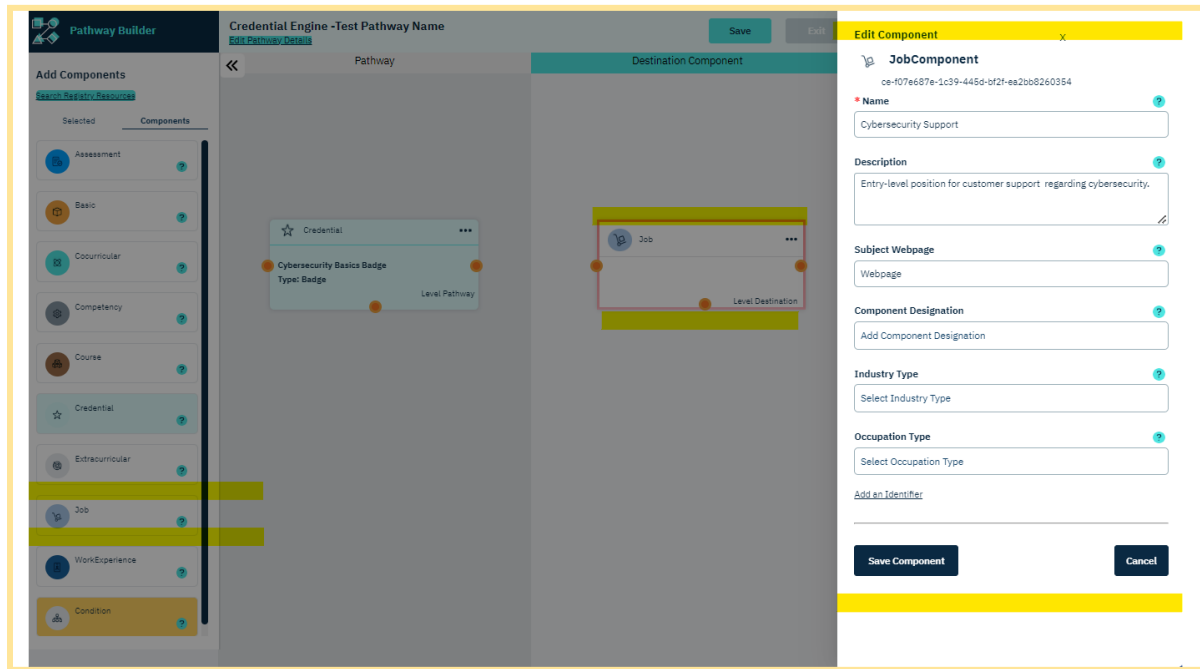
b. **Publish a Registry Resource On-the-Fly**: If an assessment, course or credential component is not yet published to the Registry that you own and offer, you can publish that resource to the Credential Registry on-the-fly. Drag the assessment, course or credential component onto the board and select the (...) to edit. The card will be highlighted in red to indicate it needs to be filled in.

Make sure to use the toggle at the top of the edit modal by moving it to the right to Create a Registry Resources.

Complete of the required information. It's always recommended to add more helpful information so fill in as much information as possible.

The example below shows a credential that was dragged on the board and edited to fill in the required information.

After entering information, select "Save Resource." This will publish the resource directly to the Credential Registry and make it available as a resource on the board for your pathway. You can access the published resource via the Publishing System Organization Summary page or via the search function if you need to make any additional edits.
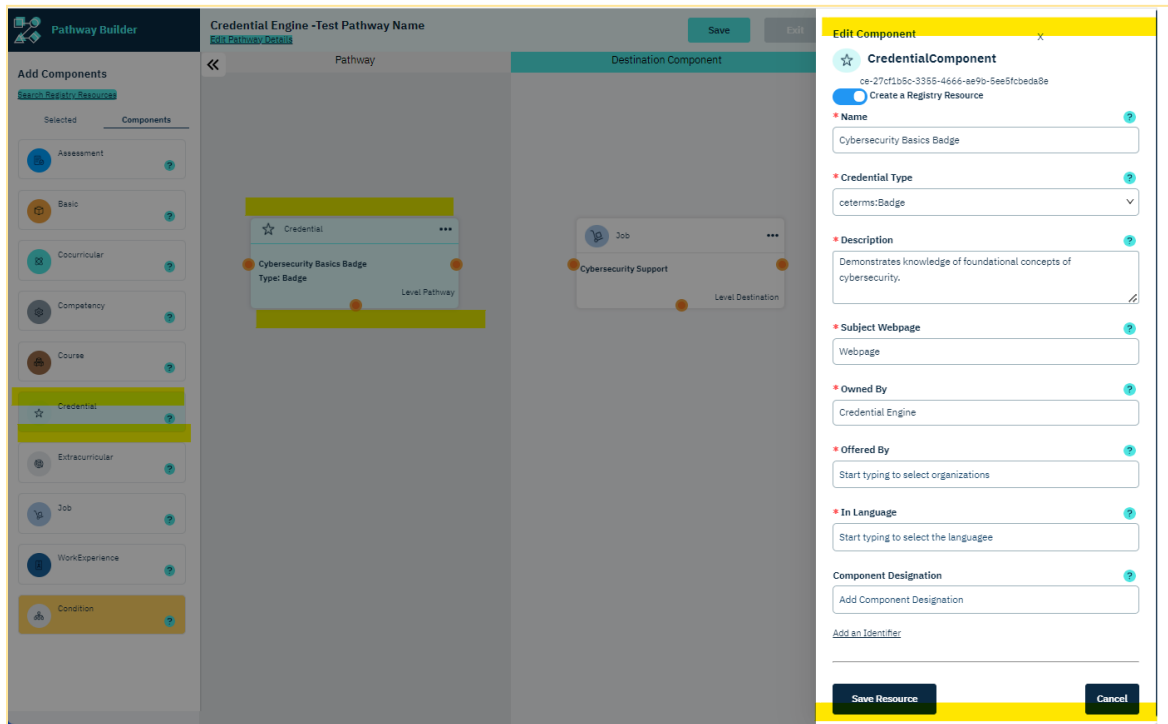
8. **Connectors and Conditions:** Depending on the level of expression you prefer, you can proceed with the following steps:

   a. Connectors: If you only want to add connectors, click on the orange dot on the card that needs to connect to another card's orange dot, and point it towards the destination card. The connections should always go towards the destination. The Conflicts queue will identify any missing arrows that are required.
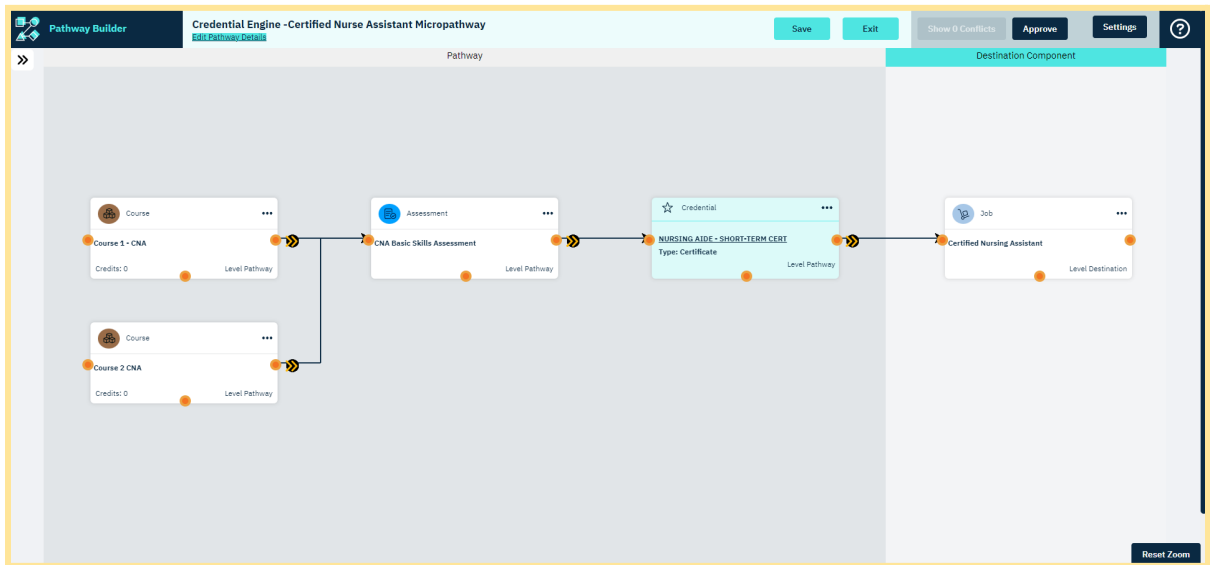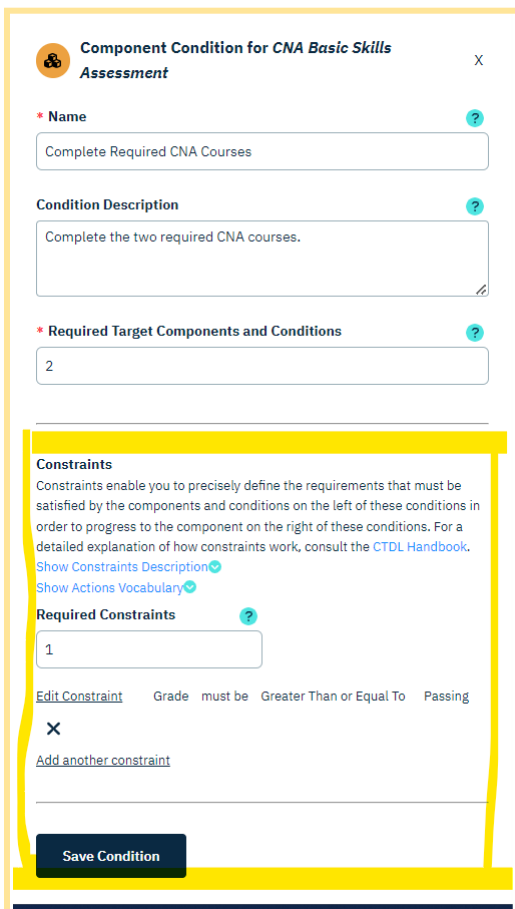
Removing Connectors: To remove a connector, select its icon and use the X to remove the arrow.
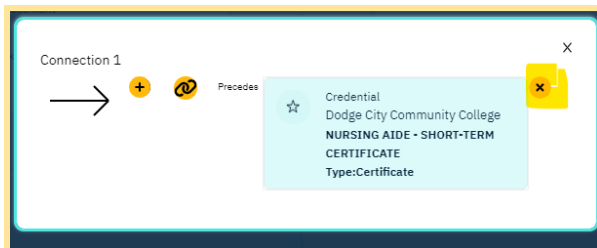
b. **Add Conditions:** To add conditions, use the components library and drag and drop condition cards. When dropping them, you'll need to fill in the required information. Conditions include the name and a quantity, which represents the number of component cards that must be completed to progress through the pathway. For example, a pathway may require completing a course, an assessment, or a work experience, with a quantity of 1.
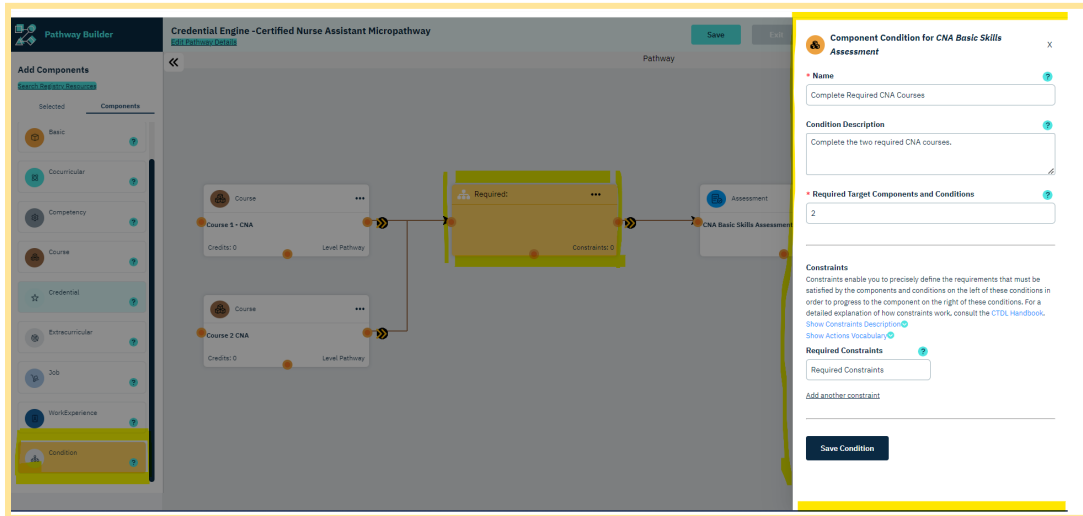
c. **Add Constraints:** If you want to add constraints to conditions, select that option from the condition cards.

9. **Highlight Connectors:** Double click on any card with connectors to highlight (in blue) the pathway to and from that card as well as directly connected cards. Double-click again to remove the highlight.
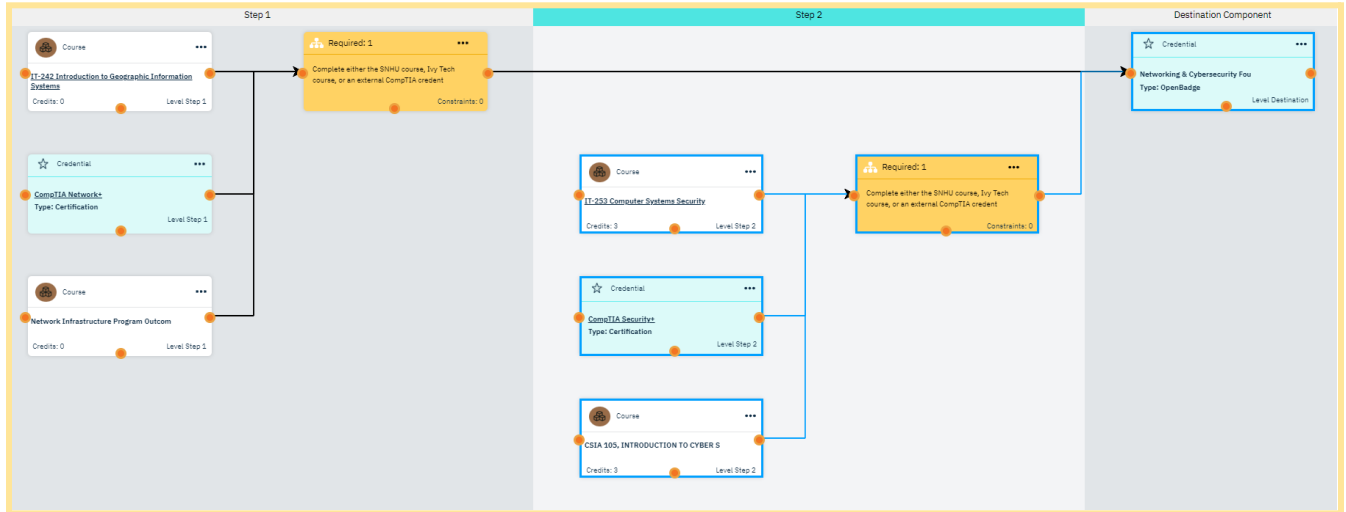

10. **Conflicts:** As you save your pathway, any conflicts will be visible in the conflicts queue in the header. If you choose to approve a pathway that has conflicts, a listing will be displayed. This is normal though once you complete your pathway, all conflicts need to be resolved. Selecting the "Show Conflicts" will display a list. If you display the list of conflicts, you'll need to clear them off the board by selecting the X. This will not resolve the conflict, it will stay in the queue until it's resolved. The Handling Error Messages and Conflicts section provides a listing and explanation for each type of conflict.
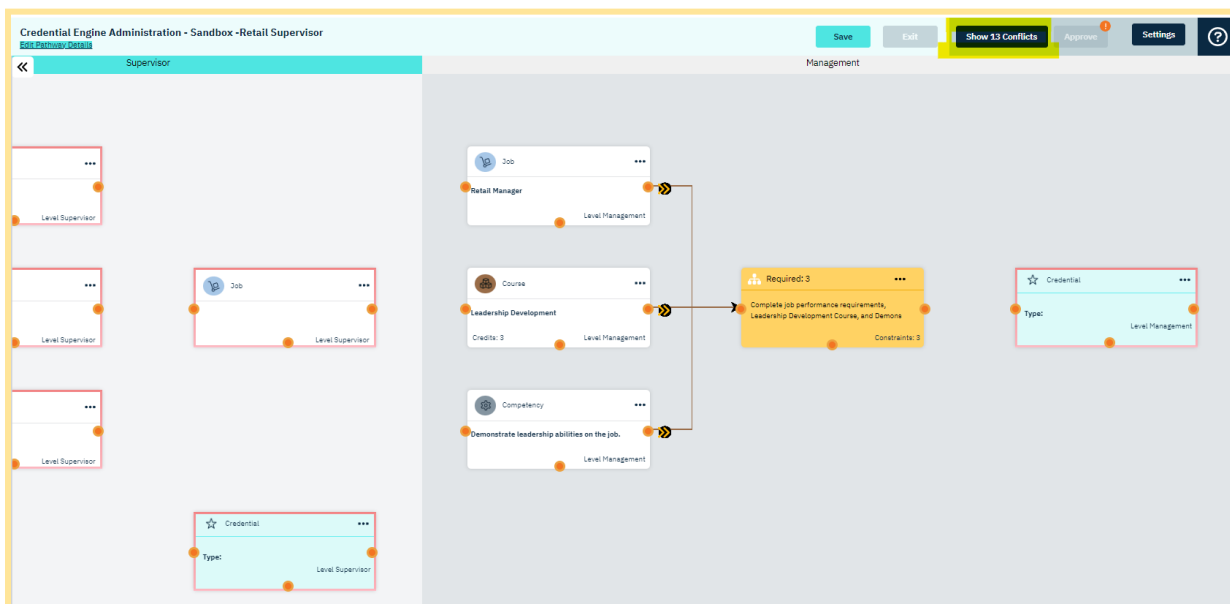
11. **Approve:** Once you complete your pathway and any conflicts are resolved, select Approve from the header. Once approved, your pathway will be published to the Credential Registry and will be visible via the Credential Finder https://credentialfinder.org
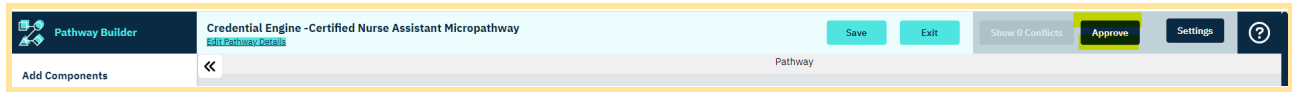
12. **Errors:** If you see error messages after approving your pathway, correct the errors and re-approve the pathway. Error messages that prompt corrections include:

   a. **Missing Connections:** Every card on the board should have at least one connection to another card, always pointing towards the destination.
   b. **Resources in the Left Rail:** If any resource cards remain in the left rail at the time of approval, you need to either delete them or move them to the board and connect them.
   c. **Resources Need to be Published:** The resource for a card must be published or re-published prior to approving the pathway. You can publish resources via the Organization Summary page.
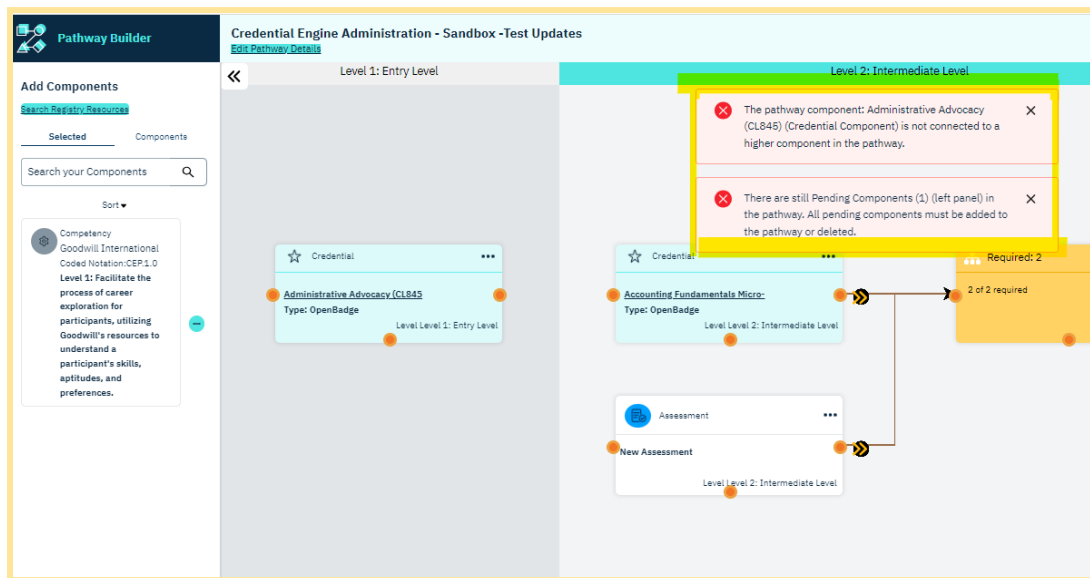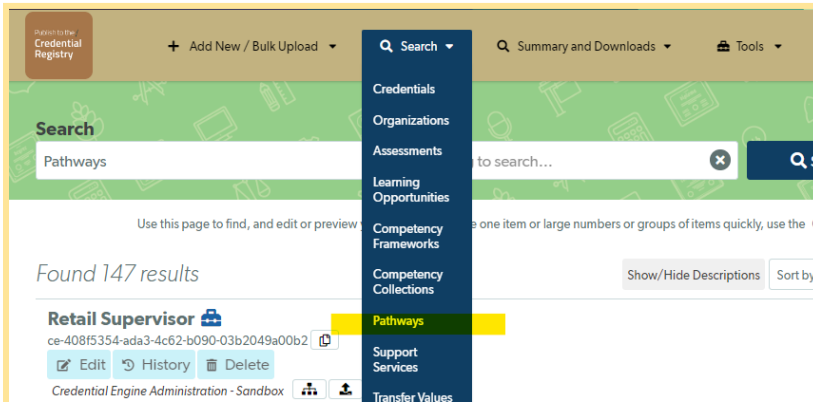
Returning to Your Pathway

***This section is further expanded with Google Slides and an overview video** [linked here.](#)*

🔲 ***6 Returning to Your Pathway***

To continue working on your pathway, follow these steps:

1. **Log in:** Log into the Credential Registry Publishing System https://apps.credentialengine.org/publisher. By accessing the Pathway Builder through your account and selecting the edit option for the desired pathway, you can easily return to your pathway and continue working on it.

2. **Search and Edit:** Use the search function on the main menu. Locate the pathway and select "Edit". This will take you back to the Pathway Builder interface, where you can make further modifications to your pathway.

3. **Organization Summary and Edit:** Alternatively, select your "Organization Summary" page from the main navigation, select the "Pathways" tab. Locate the pathway and select "Edit. This will take you back to the Pathway Builder interface, where you can make further modifications to your pathway.
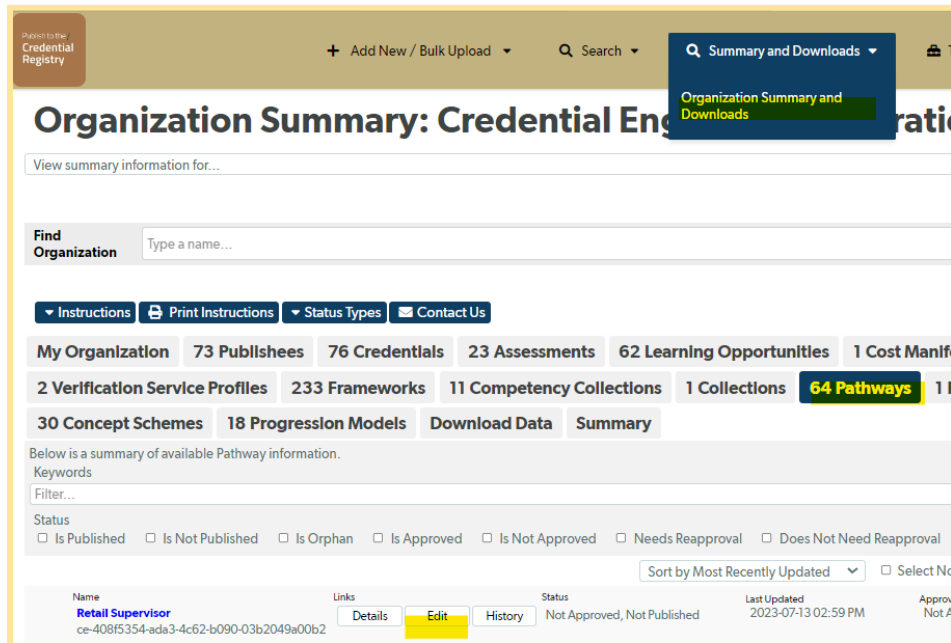
Resolving Conflict and Error Messages

This section is further expanded with Google Slides and an overview video linked here.

▢ ***7 Handling Error Messages and Conflicts July 26, 202***

Saving occurs automatically every 5 minutes. As manual and automatic saving occurs, if any of the Conflicts listed below are present, they will show in the Conflicts area of the header.

During the pathway creation process, it's important to address any error messages and conflicts to ensure a smooth approval and publication. It's important to review and understand any specific error messages or conflict prompts provided by the Pathway Builder interface for accurate resolution. Here's how to handle them effectively:

1. **Save Your Pathway:** Save your pathway as you work on it to retain your progress. You can save an incomplete pathway and return to it later.

2. **Error Messages and Conflicts:** Once you approve a pathway, error messages and conflicts may appear if there are any unresolved issues. These can include unused cards, missing connectors, and other conflicts. The pathway cannot be approved until all errors and conflicts are resolved.

3. **Conflict Error Messages:** Conflict error messages are displayed in the header's conflicts queue. Here are some common scenarios and how to resolve them:

   a. **Condition Quantity:** If the required number of target components doesn't match the count specified in the condition, an error will occur. To fix this, adjust the quantity in the Condition Component to match the number of required cards. For example, if 2 out of 3 cards are required, set the quantity to 2 and ensure there are 3 cards pointing to that Condition Component.

   b. **Disconnected Condition:** If a component condition is not connected to a parent component, an error will be displayed. Correct this by connecting the parent resource or component to the target resource or component.

   c. **Invalid URL:** Invalid URLs for subject webpages require a valid URL to a public webpage. Make sure to enter a correct and accessible URL.

   d. **Missing Destination Component:** Every pathway should have one destination component in the destination column of the board. Drag and drop a destination from the resource or component libraries to fulfill this requirement.

   e. **Required Fields:** When adding a component, ensure that all fields flagged with red as required are completed to avoid any errors.

4. **Other Error Messages:** Additional error messages that prompt corrections include:
   a. **Missing Connections:** Every card on the board should have at least one connection to another card, always pointing towards the destination.

   b. **Resources in the Left Rail:** If any resource cards remain in the left rail at the time of approval, you need to either delete them or move them to the board and connect them.

   c. **Resources Need to be Published:** The resource for a card must be published or re-published prior to approving the pathway. You can publish resources via the Organization Summary page.

Conditions and Constraints

This section is further expanded with Google Slides and an overview video [linked here](#).
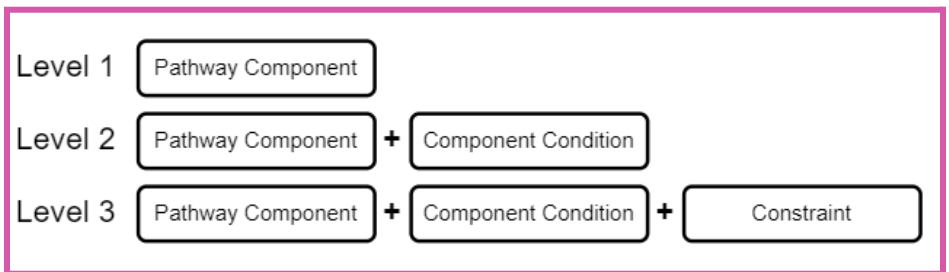🟨 ***8 Conditions and Constraints July 26, 2023***

Conditions and Constraints are optional levels of expression of a pathway. However, they add important information to understand the requirements to progress through a pathway. Conditions can be included without any constraints or constraints can be included with conditions as they're applicable.

Pathway Levels of Expression: When constructing a CTDL pathway using the Pathway Builder, you have three levels of expression to consider:

1. **Pathway Components and Connectors:** Pathways are created by linking Pathway Components to the destination using arrow connectors. You can include components that you own or offer, as well as components offered by other organizations. This allows for the integration of various credentials, courses, competencies, jobs, or other components within a single pathway.

2. **Component Conditions (optional):** At the next level of expression, you can specify Component Conditions, which define the required quantities of predetermined Pathway Components. For example, you can set requirements such as completing two courses to progress to the next set of courses or earning a specific credential within the pathway.

3. **Constraints (for complex pathways):** For more complex pathways, an additional level of information called Constraints can be included. Constraints allow you to express additional restrictions using CTDL properties. For instance, you can specify that the number of credits earned must be equal to or greater than a specific quantity, courses must be at a certain level, or the number of hours worked must meet a predetermined threshold.

By leveraging these three levels of expression, you can create dynamic CTDL pathways that precisely reflect the desired progression and requirements for learners or professionals seeking to navigate a specific educational or career pathway.

Conditions and Constraints: The Component Condition does three things and has two requirements:

1. Provides a way to describe conditions for progressing along a pathway. The Condition Description is optional but useful information.

2. Identifies the number of required target components and conditions.

   The Required Number field indicates how many of the Components and Conditions that branch out to the left of these Conditions are required to be satisfied in order for these Conditions to be true (in addition to any other constraints

indicated below). Use 0 if the items that branch out to the left are entirely optional.

3. Supports including Constraints.

Add Conditions: To add conditions, use the components library and drag and drop condition cards. When dropping them, you'll need to fill in the required information. Conditions include the name and a quantity, which represents the number of component cards that must be completed to progress through the pathway. For example, a pathway may require completing a course, an assessment, and job experience, with a quantity of 3.

Constraints: When applicable, Constraints are always appended to Condition Components.

- Constraints always require the following and a condition can have one or more constraints:

  - Left Source - Left hand parameter of the constraint.
  - Comparator - Type of symbol that denotes an operator in a constraint expression such as greater than or equal to, equal to, less than; select from the existing dropdown values.
  - Right Source - Right hand parameter of the constraint.

Comparators are a defined list that includes the following:
- Equal to
- Greater than
- Greater than or equal to
- Less than
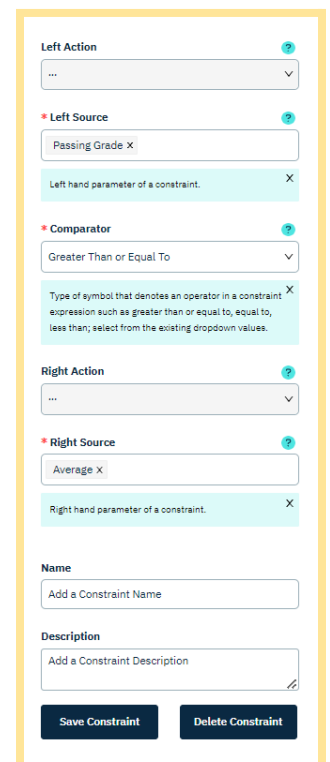- Less than or equal to
- Not equal to

Constraints can be expressed grammatically. For example, the person must have a grade of C or better:
  - Left Source = Grade
  - Comparator = Greater than or equal to
  - Right Source = C

Add Constraints: If you want to add constraints to conditions, select that option from the condition cards.
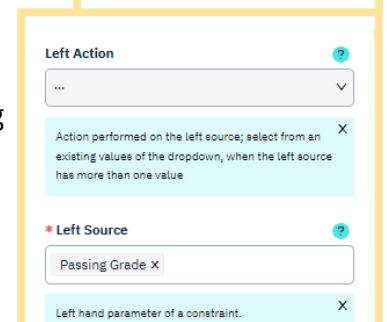
Left and Right Action: Constraints can have a Left and Right Action:

- **Left Action** - Action performed on the left source; select from an existing values of the dropdown, when the left source has more than one value

- **Right Action** - Action performed on the right source; select from an existing values of the dropdown when the right source has more than one value

The Left and Right Action is only applicable when more than one Right Action is entered. The example on the right has two Right Source values and can be grammatically read as the person must have a grade of Average or better or determined by the instructor. Thereby, it must have a Right Action. In this case, the Right Action = Any. The Right Source values are 1. Average and 2. Determined as Passing by Instructor.

Both used a defined vocabulary as follows:
- **All Of** - All of the values.
- **Any Of** - Any (one or more) of the values.
- **Count Distinct** - The number of unique values; yields a number.
- **Maximum** - The highest of all the values.
- **Mean** - The arithmetic mean of all the values.
- **Minimum** - The lowest of all the values.
- **One Of** - Any one (but no more) of the values.
- **Sum** - The numeric total obtained by adding all the values.

Publishing a Progression Model

This section is further expanded with Google Slides and an overview video linked here.
📁 *9 Publishing a Progression Model July 26, 2023*

If a progression level will be included with a pathway, it is required that the Progression Model be published to the Registry prior to starting to build your pathway.

About Progression Models: Using a Progression Model within a pathway adds valuable information and context. It enables the alignment of pathway components with specific levels of progression, such as increasing levels of competence, complexity, achievement, or progression over time. However, only use a Progression Model only when every component in the pathway should be aligned to a level, except for the destination component, which aligns with the destination column on the board.

The Progression Model is particularly helpful for understanding the relationships between pathway components and the levels of progression. When a Progression Model is included, the related levels are displayed below the header alongside the "Destination" column. If no Progression Model is used, the pathway itself is displayed along with the "Destination."

When to use a Progression Model: When determining if a Progression Model is needed, consider whether the components of the pathway should align with specific points in the model. For instance, if the Progression Model represents intervals of 6 months, 9 months, and 12 months over time, each component in the pathway should align with one of these three points. Other examples could include semesters, quarters, or levels of performance such as beginner, intermediate, and advanced. This alignment provides insights into the progression through components and how it relates to grades, levels, stages, or time. Understanding that the progression towards a destination can occur within 12 months, for example, offers valuable information.

By utilizing a pre-designed pathway or framework, publishing pathway components to the Credential Registry, analyzing the progression requirements, and planning accordingly, you can effectively build or design pathways using the Pathway Builder tool. This approach ensures that the pathway aligns with the desired progression and offers a clear understanding of the journey and milestones along the way.

Progression Models offer versatility and reusability, as they can be employed with other components like competencies in a competency framework or collection.


Publishing a Progression Model: If you're going to use a Progression Model with your Pathway, it must be published to the Credential Registry prior to building your pathway. Follow these steps to publish a Progression Model:
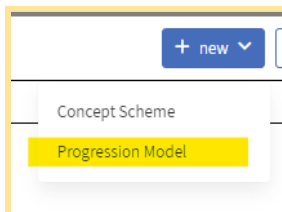
1. Log into the Credential Registry Publishing System https://apps.credentialengine.org/publisher.
2. Navigate to "+ Add New / Bulk Upload / Progression Models."
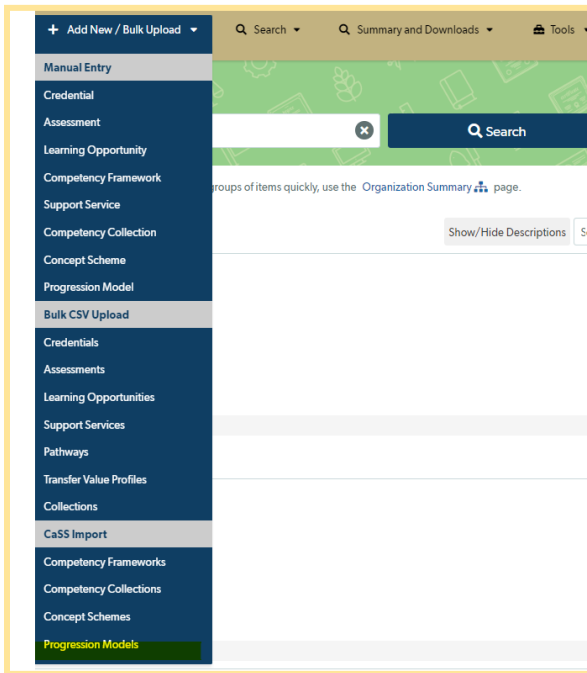
3. Select the organization you're affiliated with.
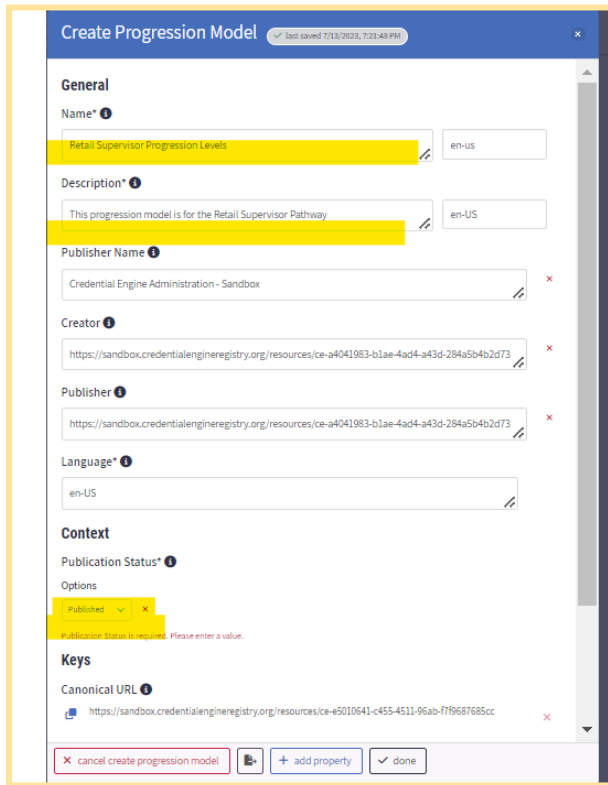4. From the left menu, select "Progression Models."
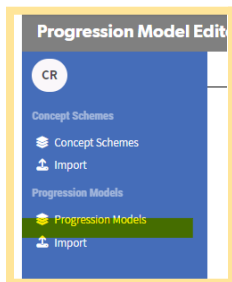
5. From the top menu, select "+ New / Progression Model."

6. Fill in the required fields:
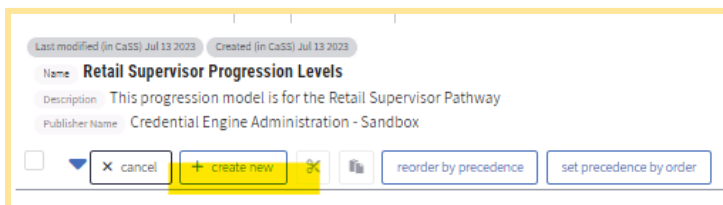   a. Name
   b. Description

c. Publication Status - Select either "Draft" or "Published" and select "Done."
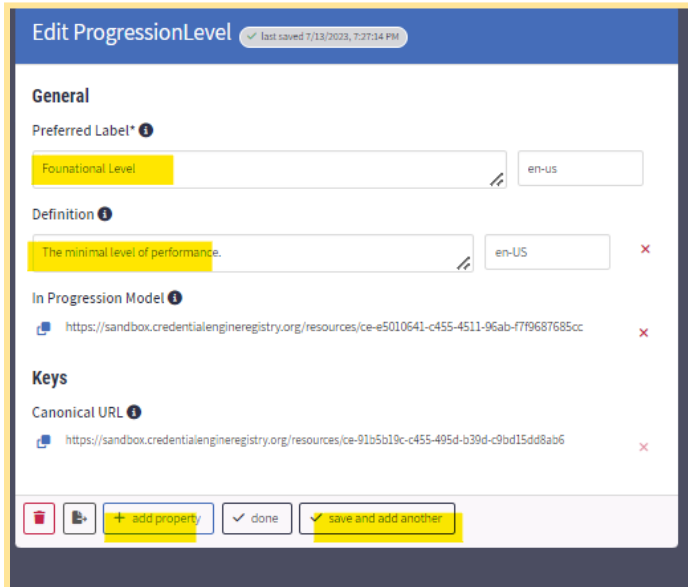

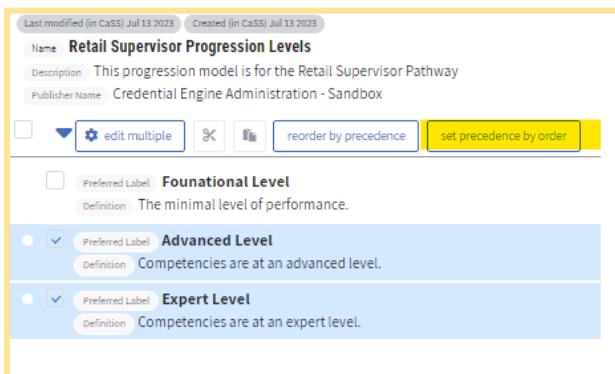
7. Select "add level."

8. Select "create new."

9. Enter the "Preferred Label". This is the first level, or lowest level, in the Progression Model. Optionally, but recommended, select "+ add property", select "Definition" and enter the definition for the level. Repeat this for each level in the Progression Model. After adding the highest level, select "Done."

10. Select "Set Precedence Order." This necessary step ensures the level order is maintained.

11. At the bottom right, select "Approve Selected Progression Progression Model." Credential Engine will be notified and publish the Progression Model typically that business day.
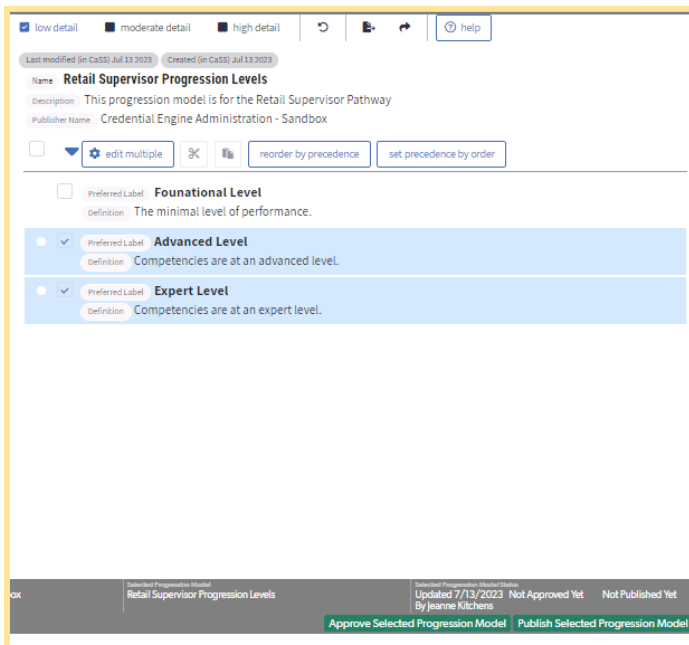
View Your Published Pathway

***This section is further expanded with Google Slides and an overview video** linked here.*

🟨 ***10 View Your Published Pathway***

Once you have approved a pathway, it will be published to the Credential Registry. There are two options available for viewing your published pathways:

1. **Pathway Builder:** From the header of your pathway, click on the share button after publishing to obtain the URL. Simply copy and paste this URL into a web browser to share the pathway with others.

2. **Credential Finder:** Utilize the Credential Finder (https://credentialfinder.org) to search for and access your pathway. You can search for your pathway in two ways:

   a. Pathway Drop-Down: Use the Pathway drop-down menu to search and locate your specific pathway.

   b. Organization's Detail Page: Go to your organization's detail page and navigate to the Connections section. Perform a search exclusively for your pathways here.

To provide more information about the pathway, you can share the URL to your pathway's detail page in the Credential Finder. This will offer additional details and resources related to the pathway.

Pathways Resource List

- Pathway Builder Tool Webpage https://credentialengine.org/pathwaybuilder/
- Create your Credential Engine Account https://apps.credentialengine.org/accounts/
- Log into the Credential Registry Publishing System https://apps.credentialengine.org/publisher
- **Pathways section of the CTDL Handbook https://credreg.net/ctdl/handbook#pathwayclasses**
  - Complete list of CTDL Pathway Components
  - Essential Reading: Pathways Overview *2022-06-30*
    - 📄 CTDL Pathways, Conditions and Constraints: Essential Readiing – CTDL Pathways Overview
- Progression Model section of the CTDL Handbook
  https://credreg.net/ctdl/handbook#useofprogressionmodels
- **Google Slides corresponding to the Pathway Builder Guidance and Instruction sections**
  - 🟨 1 Pathway Classes and Pathway Builder Terminology July 26 2023
  - 🟨 2 Pathway Planning and Analysis July 26, 2023
  - 🟨 3 Publish Your Pathway Components July 26, 2023
  - 🟨 4 Start Building Your Pathway July 26 2023
  - 🟨 5 Deeper Dive Into Building Your Pathway July 26, 2023
  - 🟨 6 Returning to Your Pathway July 26, 2023
  - 🟨 7 Handling Error Messages and Conflicts July 26, 202
  - 🟨 8 Conditions and Constraints July 26, 2023
  - 🟨 9 Publishing a Progression Model July 26, 2023
  - 🟨 10 View Your Published Pathway July 26, 2023
- **YouTube Playlist**
  - Building Clear Pathways
  - Pathway Builder: Building a Pathway Demonstration
  - CTDL and Pathway Builder Terminology
  - Planning and Analysis for Building Pathways
  - Publish Your Pathway Components
  - Start Building Your Pathway
  - Deeper Dive Into Building Your Pathway
  - Returning to Your Pathway
  - Resolving Conflict and Error Messages

- Conditions and Constraints
- Publishing a Progression Model
- View Your Published Pathway