

Release Management v2

Managing Releases in ServiceNow

Release v2

Release Management Plugins



Note: *This article applies to Fuji and earlier releases. For more current information, see [Release Management](http://docs.servicenow.com) ^[1] at <http://docs.servicenow.com>* **The ServiceNow Wiki is no longer being updated. Visit <http://docs.servicenow.com> for the latest product documentation.**

Overview

The ServiceNow platform provides three plugins for managing a software release process. The smaller 'Release v2' plugin is a complete release management update, while the 'SDLC' and 'SCRUM' plugins are add-ons adapted to particular process flows.

All three plugins consist of some new custom tables, extended from the Planned Task table shared with Project Management. This allows all of the new structures to take advantage of the existing Planned Task functionality, like scheduling, task dependencies, utilizing the Gantt chart, resource management, and time carding. Planned Task in turn is an extension of the core Task Table, giving Release v2, SDLC, and Scrum records access to all of the tools available to any task.

Using Multiple Processes

If one of the add-on plugins (SDLC or SDLC - Scrum) is activated, the core Release v2 application is retained separate from the SDLC or SDLC - Scrum application. This allows either the SDLC or Scrum processes to coexist alongside a more generic waterfall process (in the Release v2 application). However, the SDLC - Scrum application will replace the SDLC application, so those two processes cannot be implemented side-by-side.

Release Management v2 Plugin

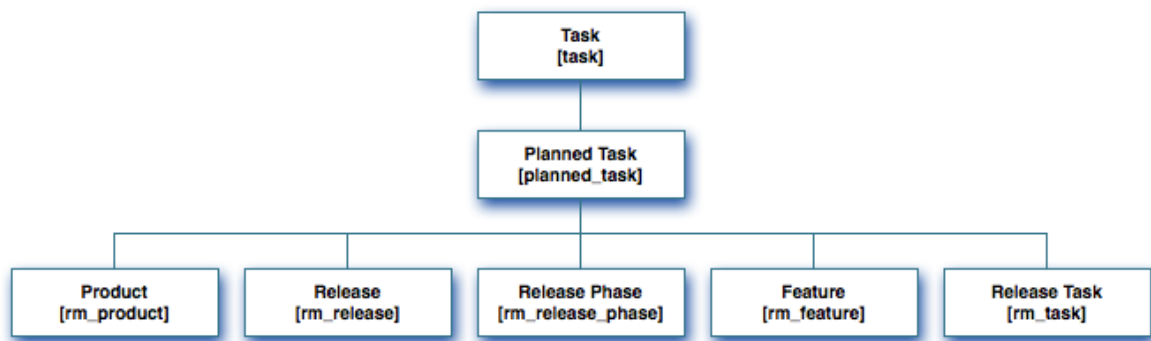
Design

The **Release Management v2 Plugin** is the most basic of the three new plugins, and is designed with a flexible Product, Release, Feature, and Task hierarchical table layout to allow for releases of varying complexity.

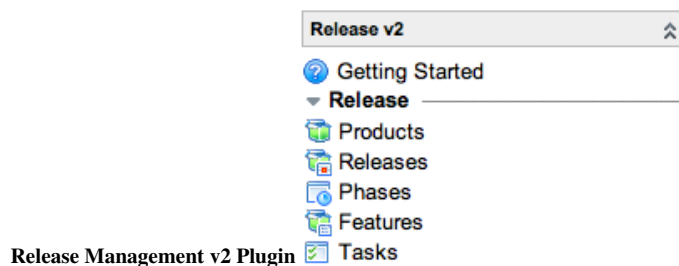
Tables

The following tables represent the concepts that underlie Release Management:

- **Product [rm_product]:** represent whole products whose releases are being managed.
- **Release [rm_release]:** represent individual versions of the product.
- **Release Phase [rm_release_phase]:** represent the different stages of work required to complete a release.
- **Feature [rm_feature]:** represent each feature within the release.
- **Release Tasks [rm_task]:** represent tasks to create individual features.



Applications and Modules



- **Getting Started:** links to this document on the wiki.
- **Release**
 - **Products:** the Product [rm_product] list.
 - **Releases:** the Release [rm_release] list.
 - **Phases:** the Release Phase [rm_release_phase] list.
 - **Features:** the Feature [rm_feature] list.
 - **Tasks:** the Release Task [rm_task] list.

SDLC - Software Development Life Cycle Plugin

Design

The **SDLC - Software Development Life Cycle Plugin** further extends upon the **Release Management v2 Plugin** by adding some new structures to accommodate the Software Development Life Cycle. This plugin is designed to accommodate most non-agile development methodologies, including the common Waterfall method of development.

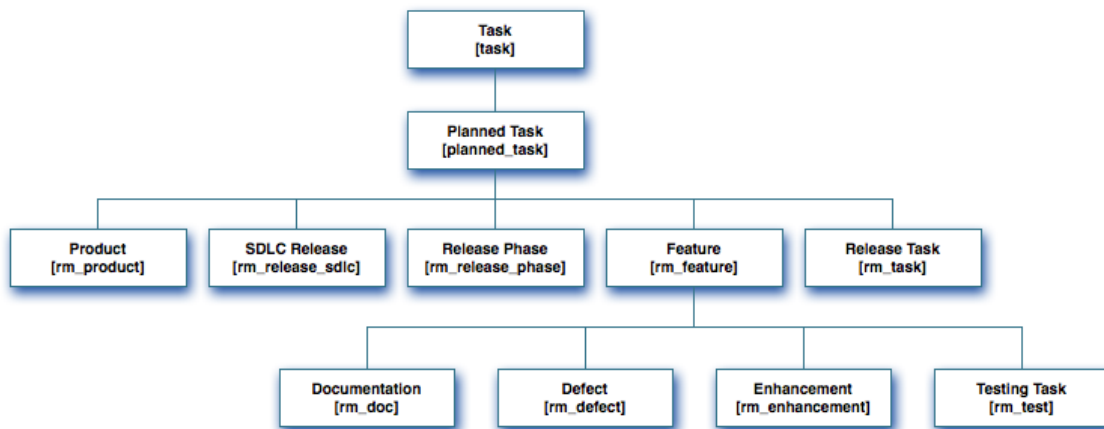
This plugin adds more specific 'Feature' types allowing for the independent management of notions (defects, enhancements, testing tasks, etc.) critical to successful software development.

The new Planning Board is now available as well, to take existing tasks and group them easily in particular parent tasks.

Tables

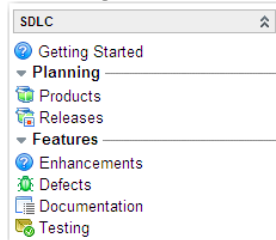
The following concepts power the Software Development Life Cycle:

- **Product [rm_product]:** represent whole products whose releases are being managed.
- **SDLC Release [rm_release_sdlic]:** represent individual versions of the product.
- The following tables represent different types of features included in a release:
 - **Enhancements [rm_enhancement]:** represent an improvement to an existing product.
 - **Defects [rm_defect]:** represent a deviation from a product's expected behavior.
 - **Documentation [rm_doc]:** represent documentation tasks for the product.
 - **Testing [rm_test]:** represent testing tasks for the product.



Applications and Modules

SDLC Plugin



- **Getting Started:** links to this document on the wiki.
- Planning
 - **Products:** the Product [rm_product] list.
 - **Releases:** the Release [rm_release] list.
- Features
 - **Enhancements:** the Enhancements [rm_enhancement] list.
 - **Defects:** the Defects [rm_defect] list.
 - **Documentation:** the Documentation [rm_doc] list.
 - **Testing:** the Testing [rm_test] list.

SDLC - Scrum Plugin

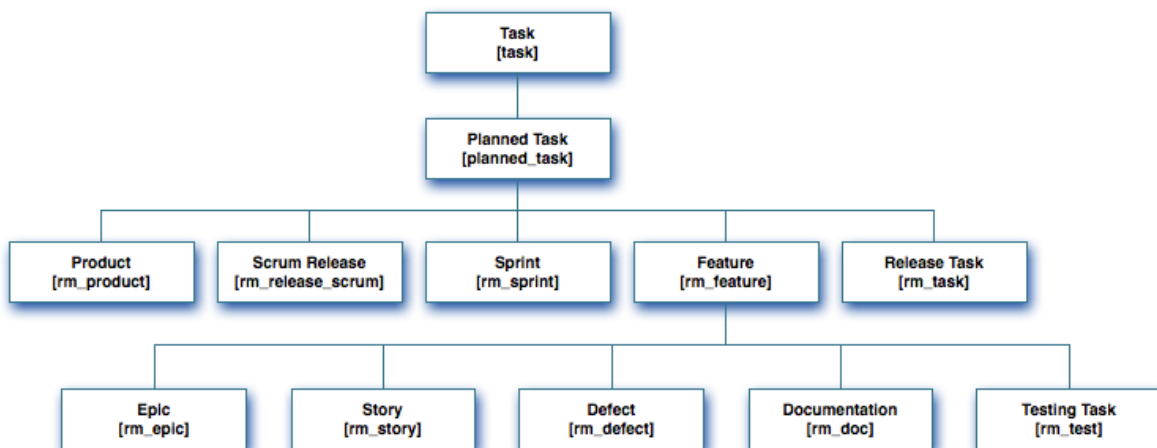
Design

The **SDLC - Scrum Plugin** includes the two plugins above, and adds Sprints and feature types specific to a Scrum development process.

Tables

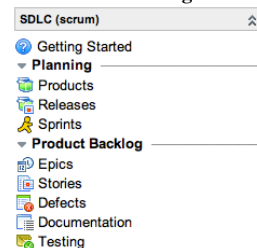
The following concepts power a Scrum process:

- **Product [rm_product]**: represent whole products whose releases are being managed.
- The following tables represent releases:
 - **Scrum Release [rm_release_scrum]**: represent individual versions of the product.
 - **Sprint [rm_sprint]**: - represents the backlog to be addressed together.
- The following tables represent product backlog items to be included in the sprint:
 - **Epic [rm_epic]**: represent related stories or requirements that you have not yet transformed into stories.
 - **Story [rm_story]**: represent self-contained pieces of work that can be completed within a sprint.
 - **Defect [rm_defect]**: represent a deviation from a product's expected behavior.
 - **Documentation [rm_doc]**: represent documentation tasks for the product.
 - **Testing [rm_test]**: represent testing tasks for the product.



Application and Modules

SDLC - Scrum Plugin



- **Getting Started:** links to this document on the wiki.
- **Planning**
 - **Products:** the Product [rm_product] list.
 - **Releases:** the Release [rm_release] list.
- **Features**
 - **Epics:** the Epics [rm_epics] list.
 - **Stories:** the Stories [rm_story] list.
 - **Defects:** the Defects [rm_defect] list.
 - **Documentation:** the Documentation [rm_doc] list.
 - **Testing:** the Testing [rm_test] list.

SDLC - Scrum Process Pack Plugin

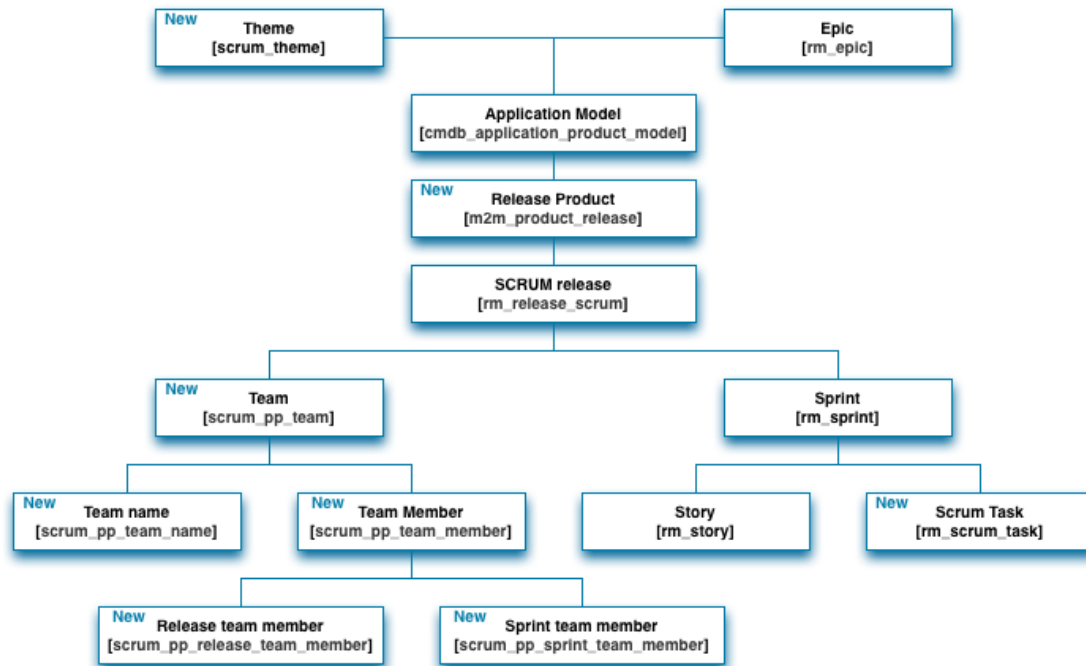
Design

The SDLC Scrum Process retains all the functionality of the existing SDLC Scrum plugin but enhances it by adding a formal scrum process. If you already have a customized version of SDLC-SCRUM plugin ServiceNow recommends evaluating the SDLC - Scrum Process Pack plugin on a development instance where you have deleted your customizations.

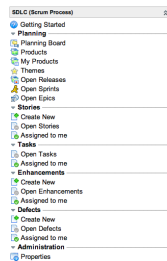
Tables

The SDLC Scrum Process Pack uses these tables to manage the scrum process.

- **Application Model [cmdb_application_product_model]:** represents whole products whose releases are being managed.
- **Release Product [m2m_product_release]:** represents all managed products.
- The following tables represent releases.
 - **Scrum Release [rm_release_scrum]:** represents all available releases. Each release contains a list of sprints with a time range in which the stories in those sprints need to be completed.
 - **Sprint [rm_sprint]:** stores sprints, which are the backlog items to be addressed during a given time period.
- The following tables represent product backlog items to be included in the sprint.
 - **Team [scrump_team]:** represents who will complete Scrum tasks and stories during releases and sprints.
 - **Epic [rm_epic]:** represents stories or requirements that you have not yet transformed into stories.
 - **Theme [scrump_theme]:** represents either a tangible product (such as a trading application) or an abstract goal (such as performance tuning).
 - **Story [rm_story]:** represents self-contained pieces of work that can be completed within a sprint.
 - **Scrum task [rm_scrump_task]:** represents a discrete amount of work for a story carried out during a sprint.
 - **Defect [rm_defect]:** represents a deviation from a product's expected behavior.
 - **Enhancement [rm_enhancement]:** represents an improvement to an existing product.



Application and Modules



- **Getting Started:** links to the SDLC Scrum Process wiki page.
- **Planning**
 - **'Planning Board:** the `scrum_board.do` URL.
 - **Products:** the `[cmdb_application_product_model]` list.
 - **My products:** items on the `[cmdb_application_product_model]` list assigned to the current user.
 - **Themes:** the `[scrum_theme]` list.
 - **Open Releases:** active items on the `[rm_release_scrum]` list.
 - **Open Sprints:** active items on the `[rm_sprint]` list.
 - **Open Epics:** active items on the `[rm_epic]` list.
- **Stories**
 - **Create New:** create a new story in the `[rm_story]` table.
 - **Open Stories:** active items in the `[rm_story]` list.
 - **Assigned to me:** items on the `[rm_story]` list assigned to the current user.
- **Tasks**
 - **Open Tasks:** active items on the `[rm_scrum_task]` list
 - **Assigned to me:** items on the `[rm_scrum_task]` list assigned to the current user.
- **Enhancements**
 - **Create New:** create a new enhancement in the `[rm_enhancement]` table.
 - **Open Enhancements:** active items on the `[rm_enhancement]` list.
 - **Assigned to me:** items on the `[rm_enhancement]` assigned to the current user.
- **Defects**
 - **Create New:** create a new defect in the `[rm_defect]` table.
 - **Open Enhancements:** active items on the `[rm_defect]` list.
 - **Assigned to me:** items on the `[rm_defect]` assigned to the current user.
- **Administration**
 - **Properties:** the `system_properties_ui.do` URL.

Integration with Project Portfolio Suite

The SDLC application can also be activated as part of the Project Portfolio Suite (PPS). If activated as part of PPS, the following modules are added to the Project Management menu:

- ▼ Agile
 - ★ Stories
 - ★ Teams
 - ★ My Stories
 - ★ Sprint Planning

- **Agile**
 - **Stories:** displays the Stories list, which shows a list of current active stories and the associated projects. Add a new story or click a story to open the Story form. Add scrum tasks to a story.
 - **Teams:** displays the Teams list, which shows a list of current teams. Click a team to open the Team form. Create and plan sprints, manage stories, view velocity charts, and view story points by sprint from the Team form.
 - **My Stories:** displays a list of stories assigned to the current user.
 - **Sprint Planning:** displays the Sprint Planning form for the selected team. Use this form to see the team capacity and points allocated for each sprint. Also use this form to manage the project backlog and assign stories to sprints.

The following SDLC tasks can be performed from the project workbench:

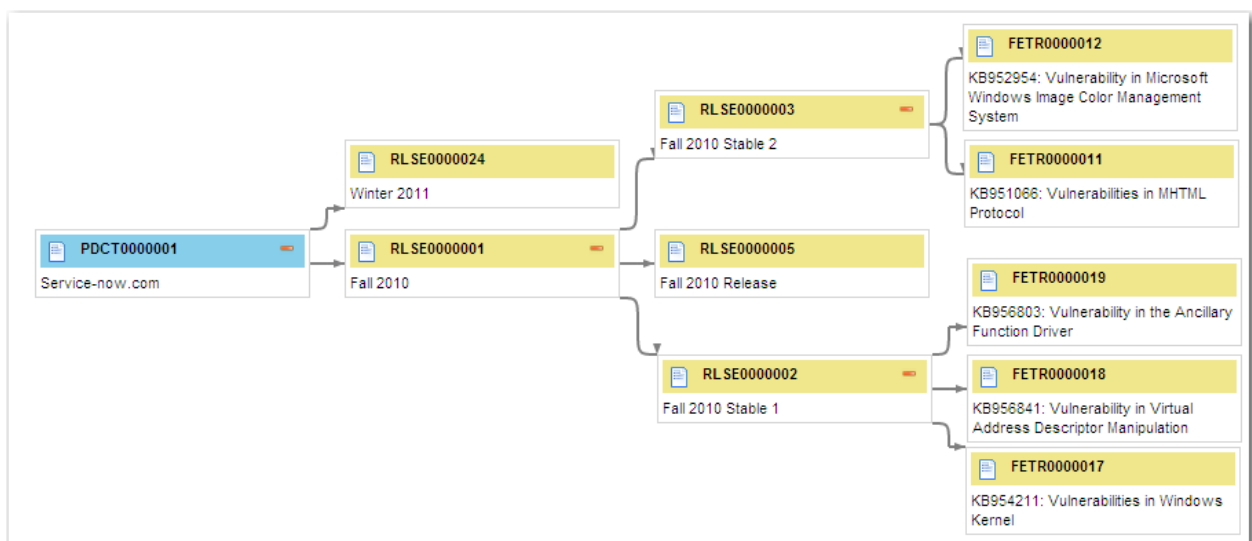
- Use the **Manage Stories** button to open the Manage Stories form
- Create an Agile phase for a project
- Select an Agile phase to display the project-related stories in the list view
- Assign a team to an Agile phase within a project

Interaction of Applications and Modules

The applications and modules installed depend on which plugins have been activated. If the Release Management v2 Plugin is activated, only the Release Management v2 Application will be available. If the SDLC plugin is activated, both the SDLC and Release Management v2 applications are available. If the SDLC - Scrum Plugin is activated, it *replaces* the SDLC application with the Scrum application, and retains the Release Management v2 application.

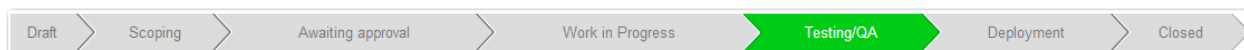
New interfaces

Product/Release Hierarchies



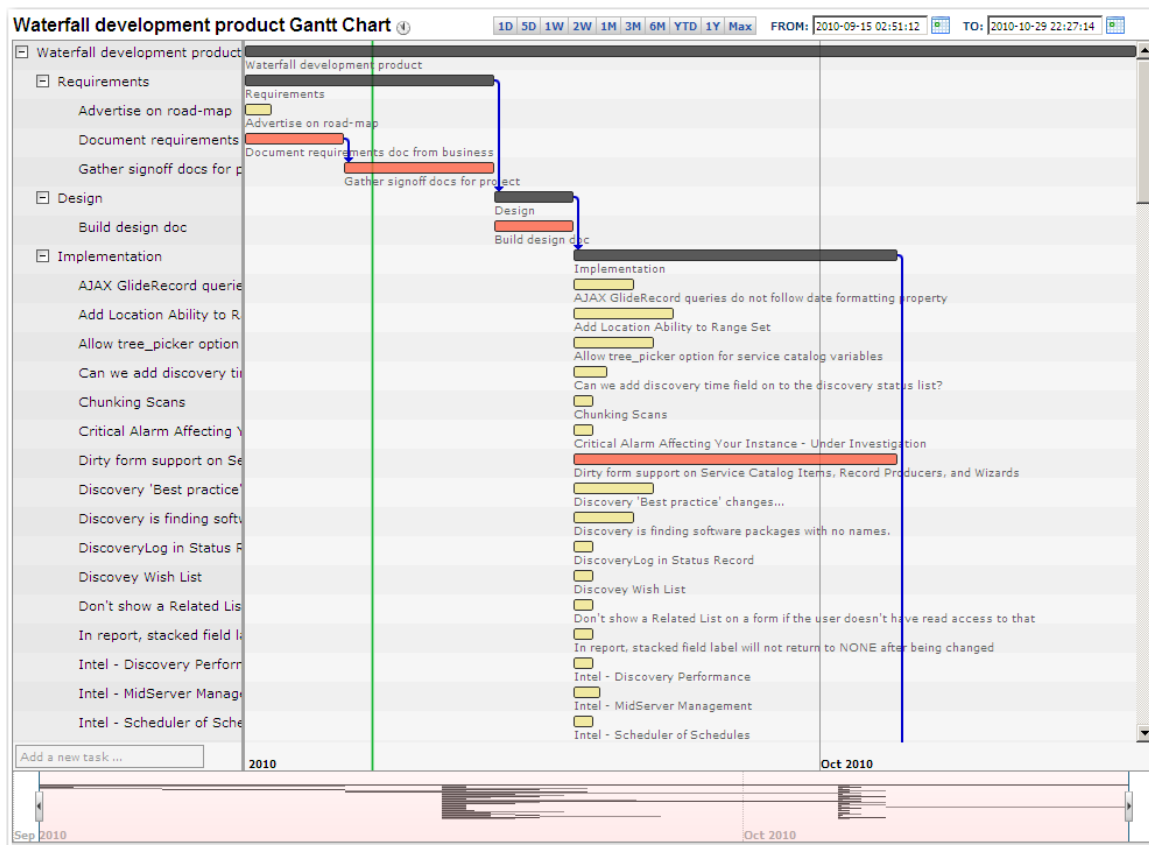
The **Hierarchy** view of Products and Releases can be found from a related list on the form.

Process Flow Formatter



The **Release** and **Feature** forms include a process flow, which displays the current status of the record based on the **State** field. These are generated using the Process Flow Formatter plugin.

Gantt Chart



Releases can also be managed using the Gantt Chart.

Planning Board

The **SDLC** plugin also adds the **Planning Board**, an interface for manipulating the tasks related to releases for a particular product. For more information see [Using the Planning Board](#).

The screenshot displays the Planning Board interface. At the top, there are tabs for 'Enhancements (519)' and 'Defects (480)'. Below the tabs, there is a search bar and a table of enhancements. The table has columns for 'Number', 'Short description', 'Priority', and 'State'. The enhancements listed are all with a priority of '4 - Low' and a state of 'Pending'. On the right side, there is a sidebar titled 'Unscheduled Tasks' which contains four sections: 'Requirements', 'Design', 'Implementation', and 'Verification'. Each section shows start and end dates and durations.

Number	Short description	Priority	State
ENHC0000031	Optimize the database queries discovery uses	4 - Low	Pending
ENHC0000032	Add ability to Schedule AND publish execution of a Pivot table report	4 - Low	Pending
ENHC0000033	Range Sets	4 - Low	Pending
ENHC0000034	Discovery of Juniper Network Devices	4 - Low	Pending
ENHC0000035	Computer Model/Manufacturer	4 - Low	Pending
ENHC0000036	Catalog variable type of integer/number	4 - Low	Pending
ENHC0000037	Approval process exception handling	4 - Low	Pending
ENHC0000038	CMDB Model Map Page (Much like Domain Map Page)	4 - Low	Pending
ENHC0000039	Baseline formatter to act like the new activity formatter (checkboxes to show/hi	4 - Low	Pending
ENHC0000040	Add planned start and planned end date fields to the Schedule Change formatter	4 - Low	Pending
ENHC0000041	Global Catalog client scripts or 'Policy sets'	4 - Low	Pending
ENHC0000042	Report on which CIs have baseline exceptions	4 - Low	Pending
ENHC0000043	BSM classes to line up when BSM is rendered	4 - Low	Pending
ENHC0000044	Being back the 'Save' button on the BSM	4 - Low	Pending
ENHC0000045	Better printing of BSM	4 - Low	Pending
ENHC0000046	list view of kb articles shows html tags instead of formatted text	4 - Low	Pending
ENHC0000047	Add data backed radio choices variable type	4 - Low	Pending
ENHC0000048	Ability to include detail with report output and output other than .png	4 - Low	Pending
ENHC0000049	Attribute to specify query type (starts with vs. contains) for a reference varia	4 - Low	Pending
ENHC0000050	Timezones in schedules	4 - Low	Pending

Unscheduled Tasks

- Requirements**
Start: 2010-09-15 09:51:12
End: 2010-09-27 22:54:46
Duration: 12 days 13 hours 3 minutes
- Design**
Start: 2010-09-27 22:54:46
End: 2010-10-01 22:54:46
Duration: 4 days
- Implementation**
Start: 2010-10-01 22:54:46
End: 2010-10-18 05:27:14
Duration: 16 days 6 hours 32 minutes
- Verification**
Start: 2010-10-18 05:27:14
End: 2010-10-20 05:27:14
Duration: 2 days
- Maintenance**
Start: 2010-10-20 05:27:14
End: 2010-10-30 05:27:14
Duration: 10 days

Getting Started

Activating the Plugin

Click the plus to expand instructions for activating a plugin.

If you have the admin role, use the following steps to activate the plugin.

1. Navigate to **System Definition > Plugins**.
2. Right-click the plugin name on the list and select **Activate/Upgrade**.

If the plugin depends on other plugins, these plugins are listed along with their activation status.

3. [Optional] If available, select the **Load demo data** check box.

Some plugins include demo data—sample records that are designed to illustrate plugin features for common use cases. Loading demo data is a good policy when you first activate the plugin on a development or test instance. You can load demo data after the plugin is activated by repeating this process and selecting the check box.

4. Click **Activate**.

Dependencies

The Release Management plugins depend on the List v2 plugin, the Planned Task plugin, and the Process Flow Formatter.

Plugin Security

The following new roles are available with the plugins:

- **Release:** release_v2_admin and release_v2_user
- **SDLC:** sdlc_admin and sdlc_user
- **Scrum:** scrum_admin and scrum_user

The roles can access the applications as follows:

- **admins** can access the entire application
- **users** can access the all the various feature and task related modules but cannot update their content.

There is an ACL role for each table (same name as the table), controlling write access on a record basis, which can be given to particular roles as desired.

References

- [1] https://docs.servicenow.com/bundle/jakarta-it-business-management/page/product/release-management/concept/c_ITILReleaseManagement.html

Defining a Product with Release v2



Note: This article applies to Fuji. For more current information, see *Define a Product with Release v2* ^[1] at <http://docs.servicenow.com> The ServiceNow Wiki is no longer being updated. Please refer to <http://docs.servicenow.com> for the latest product documentation.

	Functionality described here requires the Release Management v2 plugin.
--	--

Overview

Before a release process can be managed, a **Product** needs to be defined. A Product record stores information about the product for reference purposes, as well as grouping together all of the releases and features for a single product.

Creating a Product

Before a release process is managed, define the whose release will be managed.

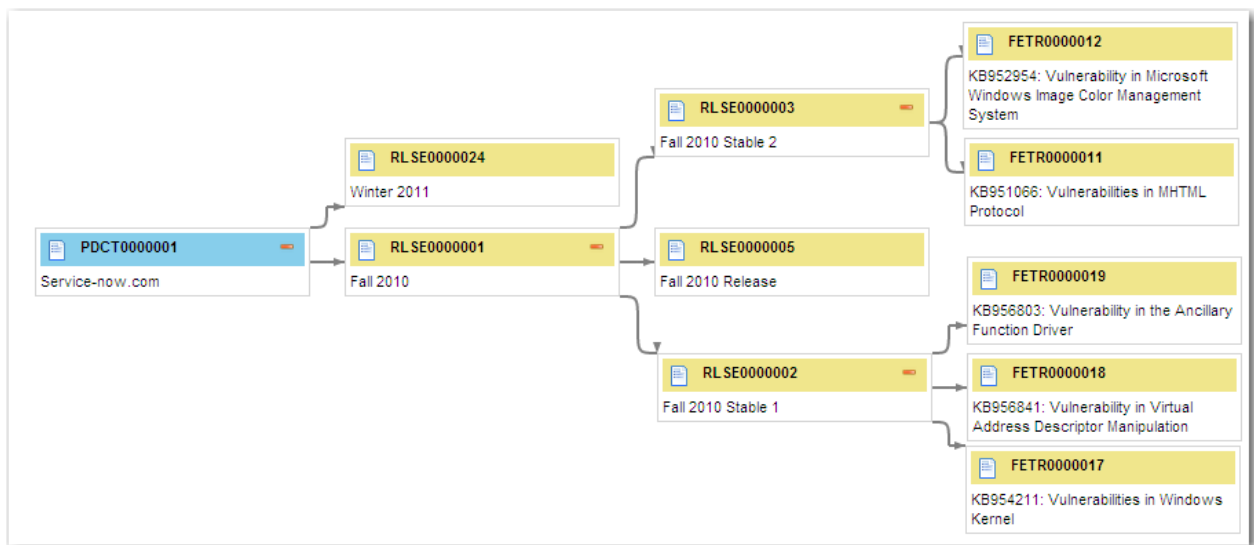
To define a product, navigate to **Release > Product**

Field	Input Value
Number	Unique identifier for the Product. Generated using Number Maintenance.
Configuration Item	The CI that corresponds to the product.
Assignment Group	A group responsible for the product.
Assigned To	A user responsible for the product
Short Description	A short description of the product.
Description	A more verbose description of the product.
Work Notes	A journal field for logging notes about the product.

The reference field **Configuration Items** can be used to link the product with a corresponding CI in the CMDB. CIs keep information about how they relate to other Configuration Items, and can track any incidents, problems, or changes related to it. Specifying a CI for the Product connects information from the release process to other processes in the instance.

Product Hierarchy

Once a product has releases defined, the **Product Hierarchy** related link will display the hierarchy of releases and features associated with the product.



References

- [1] https://docs.servicenow.com/bundle/jakarta-it-business-management/page/product/release-management/reference/r_DefiningAProductWithReleaseV2.html

Planning Releases with Release v2



Note: This article applies to Fuji and earlier releases. For more current information, see *Planned Task Hierarchy* ^[1] at <http://docs.servicenow.com>. **The ServiceNow Wiki is no longer being updated. Visit <http://docs.servicenow.com> for the latest product documentation.**

Overview

Once a product is defined, a release can be planned and executed. The steps in managing a release process are:

1. **Creating the release:** defining the Release record and child tasks.
2. **Scoping the release:** defining features for releases and child tasks.

Creating the Release

Planning the release process involves:

1. Defining the Release
2. Planning Phases

Defining the Release

To define a release, navigate to the form of the appropriate parent Product, scroll down to the **Releases** related list, and click new. The fields are the same as those of the Planned Task table.

Note that releases can have child releases, so that minor releases can be grouped under major releases.

Planning Phases

From the **Release** form, phases can be defined using the **Release Phases** related list. Release Phases use the same fields as other Planned Tasks.

Release Phases are not used with the **SDLC** and **SDLC - Scrum** plugins. With **SDLC - Scrum**, phases are replaced by Sprints, which use the same fields as other Planned Tasks.

Scoping the Release

From the Release form, use the **Features** related list to define features for the release. Features use the same fields as other Planned Tasks.

From the feature form, the **Release Tasks** related list can be used to define release tasks for the feature. Release tasks use the the same fields as other Planned Tasks.

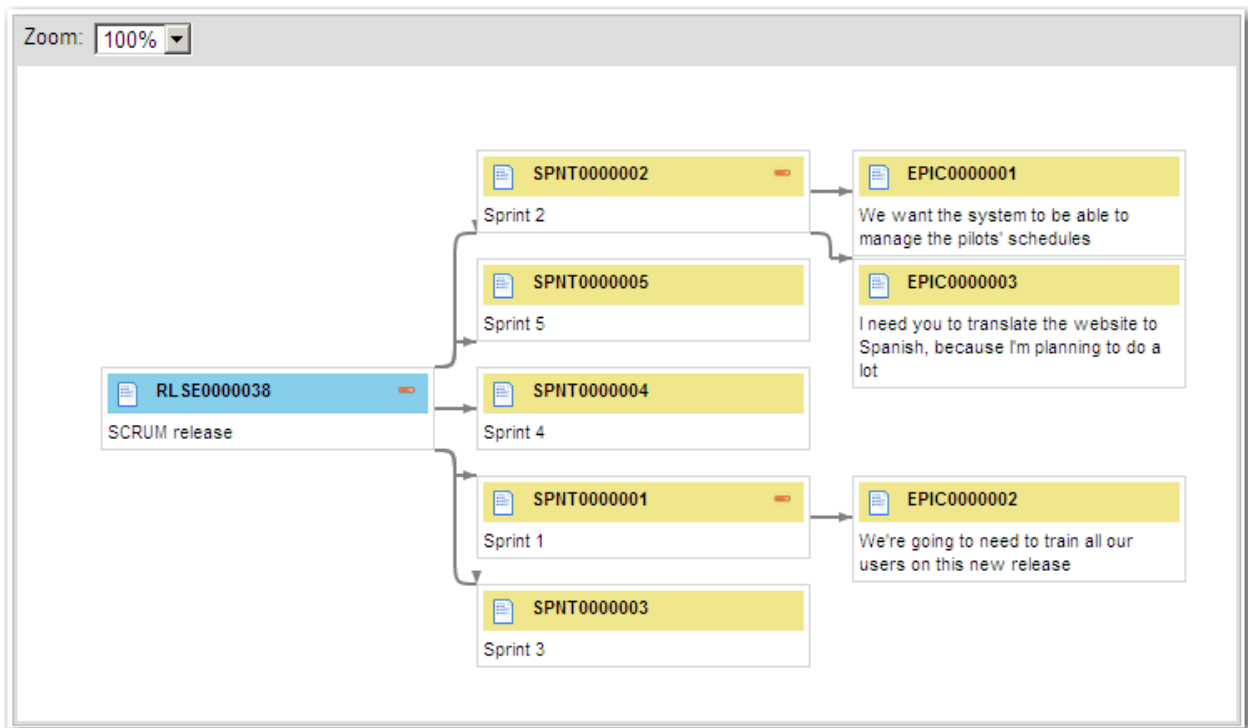
Scoping with SDLC or Scrum

To scope a release with SDLC or Scrum:

1. Define the desired features (for SDLC: Enhancements, Defects; for Scrum: Epics, Stories, and Defects) using the appropriate modules. These each use the same fields as other Planned Tasks.
2. Use the Planning Board to sort the features into the appropriate releases.
3. Add Documentation and Testing tasks to the features from their forms. These each use the same fields as other Planned Tasks.

Release Hierarchy

During the process of creating and scoping the release, the release can be viewed in hierarchy form using the **Release Hierarchy** related list on the Release Form:



References

- [1] https://docs.servicenow.com/bundle/jakarta-servicenow-platform/page/administer/task-table/task/t_PlannedTaskHierarchy.html

Using the Planning Board

Overview

The **Planning Board** is an interface for manipulating the tasks related to releases for a particular product. The Planning Board requires the SDLC plugin.

The screenshot displays the Planning Board interface. At the top, there are tabs for 'Enhancements (519)' and 'Defects (480)'. Below the tabs, there is a search bar and a table of enhancements. The table has columns for 'Number', 'Short description', 'Priority', and 'State'. The enhancements listed are all with a priority of '4 - Low' and a state of 'Pending'. On the right side, there is a sidebar titled 'Unscheduled Tasks' which contains four categories: 'Requirements', 'Design', 'Implementation', and 'Verification'. Each category shows a start and end date and a duration.

Number	Short description	Priority	State
ENHC0000031	Optimize the database queries discovery uses	4 - Low	Pending
ENHC0000032	Add ability to Schedule AND publish execution of a Pivot table report	4 - Low	Pending
ENHC0000033	Range Sets	4 - Low	Pending
ENHC0000034	Discovery of Juniper Network Devices	4 - Low	Pending
ENHC0000035	Computer Model/Manufacturer	4 - Low	Pending
ENHC0000036	Catalog variable type of integer/number	4 - Low	Pending
ENHC0000037	Approval process exception handling	4 - Low	Pending
ENHC0000038	CMDB Model Map Page (Much like Domain Map Page)	4 - Low	Pending
ENHC0000039	Baseline formatter to act like the new activity formatter (checkboxes to show/hide)	4 - Low	Pending
ENHC0000040	Add planned start and planned end date fields to the Schedule Change formatter	4 - Low	Pending
ENHC0000041	Global Catalog client scripts or 'Policy sets'	4 - Low	Pending
ENHC0000042	Report on which CIs have baseline exceptions	4 - Low	Pending
ENHC0000043	BSM classes to line up when BSM is rendered	4 - Low	Pending
ENHC0000044	Bring back the 'Save' button on the BSM	4 - Low	Pending
ENHC0000045	Better printing of BSM	4 - Low	Pending
ENHC0000046	list view of kb articles shows html tags instead of formatted text	4 - Low	Pending
ENHC0000047	Add data backed radio choices variable type	4 - Low	Pending
ENHC0000048	Ability to include detail with report output and output other than .png	4 - Low	Pending
ENHC0000049	Attribute to specify query type (starts with vs. contains) for a reference varia	4 - Low	Pending
ENHC0000050	Timezones in schedules	4 - Low	Pending

Unscheduled Tasks

- Requirements**
Start:2010-09-15 09:51:12
End:2010-09-27 22:54:46
Duration:12 days 13 hours 3 minutes
- Design**
Start:2010-09-27 22:54:46
End:2010-10-01 22:54:46
Duration:4 days
- Implementation**
Start:2010-10-01 22:54:46
End:2010-10-18 05:27:14
Duration:16 days 6 hours 32 minutes
- Verification**
Start:2010-10-18 05:27:14
End:2010-10-20 05:27:14
Duration:2 days
- Maintenance**
Start:2010-10-20 05:27:14
End:2010-10-30 05:27:14
Duration:10 days

Using the Planning Board

To open the Planning Board for a product:

1. Open the product record and select the **Planning Board** related link.

On the right-hand side is a column of the releases associated with the product:

2. Click the name of the release to highlight it in green

Unscheduled Tasks

Requirements
Start:2010-09-15 09:51:12
End:2010-09-27 22:54:46
Duration:12 days 13 hours 3 minutes

Design
Start:2010-09-27 22:54:46
End:2010-10-01 22:54:46
Duration:4 days

Implementation
Start:2010-10-01 22:54:46
End:2010-10-18 05:27:14
Duration:16 days 6 hours 32 minutes

Verification
Start:2010-10-18 05:27:14
End:2010-10-20 05:27:14
Duration:2 days

Maintenance
Start:2010-10-20 05:27:14
End:2010-10-30 05:27:14
Duration:10 days

The related tasks for the selected release appear in the center pane.

Enhancements (519)		Defects (480)	
Enhancements		New	Go to <input type="text"/> <input type="text"/>
All > Parent =		1 to 20 of 519	
Number	Short description	Priority	State
ENHC0000031	Optimize the database queries discovery uses	4 - Low	Pending
ENHC0000032	Add ability to Schedule AND publish execution of a Pivot table report	4 - Low	Pending
ENHC0000033	Range Sets	4 - Low	Pending
ENHC0000034	Discovery of Juniper Network Devices	4 - Low	Pending
ENHC0000035	Computer Model/Manufacturer	4 - Low	Pending
ENHC0000036	Catalog variable type of integer/number	4 - Low	Pending
ENHC0000037	Approval process exception handling	4 - Low	Pending
ENHC0000038	CMDB Model Map Page (Much like Domain Map Page)	4 - Low	Pending
ENHC0000039	Baseline formatter to act like the new activity formatter (checkboxes to show/hide)	4 - Low	Pending
ENHC0000040	Add planned start and planned end date fields to the Schedule Change formatter	4 - Low	Pending
ENHC0000041	Global Catalog client scripts or 'Policy sets'	4 - Low	Pending
ENHC0000042	Report on which CIs have baseline exceptions	4 - Low	Pending
ENHC0000043	BSM classes to line up when BSM is rendered	4 - Low	Pending
ENHC0000044	Being back the 'Save' button on the BSM	4 - Low	Pending
ENHC0000045	Better printing of BSM	4 - Low	Pending
ENHC0000046	list view of kb articles shows html tags instead of formatted text	4 - Low	Pending
ENHC0000047	Add data backed radio choices variable type	4 - Low	Pending
ENHC0000048	Ability to include detail with report output and output other than .png	4 - Low	Pending
ENHC0000049	Attribute to specify query type (starts with vs. contains) for a reference varia	4 - Low	Pending
ENHC0000050	Timezones in schedules	4 - Low	Pending

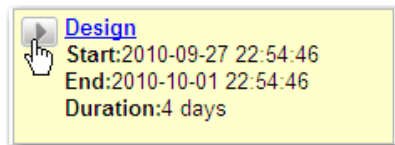
Moving Tasks from Release to Release

Tasks can be moved from one release to another, or can be assigned to a Release if they are associated with **Unscheduled Tasks**:

1. Check the boxes of the tasks to be moved:

<input checked="" type="checkbox"/>	▶	ENHC0000036	Catalog variable type of integer/number	4 - Low	Pending
<input checked="" type="checkbox"/>	▶	ENHC0000037	Approval process exception handling	4 - Low	Pending
<input checked="" type="checkbox"/>	▶	ENHC0000038	CMDB Model Map Page (Much like Domain Map Page)	4 - Low	Pending

2. Click the arrow icon of the desired release:



The tasks will now be associated with the release, and the center pane will refresh.

Release Management Tools



Note: This article applies to Fuji and earlier releases. For more current information, see *Release Management*^[1] at <http://docs.servicenow.com>. **The ServiceNow Wiki is no longer being updated. Visit <http://docs.servicenow.com> for the latest product documentation.**

Overview

The ServiceNow platform provides three plugins for managing a software release process. The smaller 'Release v2' plugin is a complete release management update, while the 'SDLC' and 'SCRUM' plugins are add-ons adapted to particular process flows.

All three plugins consist of some new custom tables, extended from the Planned Task table shared with Project Management. This allows all of the new structures to take advantage of the existing Planned Task functionality, like scheduling, task dependencies, utilizing the Gantt chart, resource management, and time carding. Planned Task in turn is an extension of the core Task Table, giving Release v2, SDLC, and Scrum records access to all of the tools available to any task.

Using Multiple Processes

If one of the add-on plugins (SDLC or SDLC - Scrum) is activated, the core Release v2 application is retained separate from the SDLC or SDLC - Scrum application. This allows either the SDLC or Scrum processes to coexist alongside a more generic waterfall process (in the Release v2 application). However, the SDLC - Scrum application will replace the SDLC application, so those two processes cannot be implemented side-by-side.

Release Management v2 Plugin

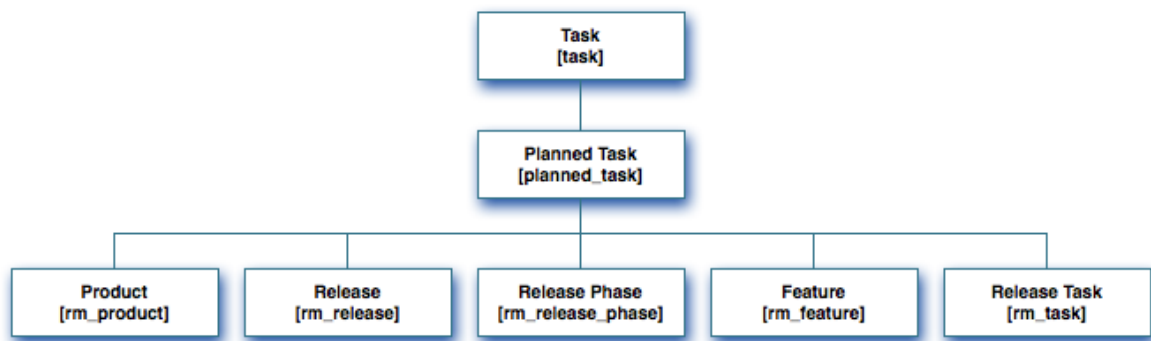
Design

The **Release Management v2 Plugin** is the most basic of the three new plugins, and is designed with a flexible Product, Release, Feature, and Task hierarchical table layout to allow for releases of varying complexity.

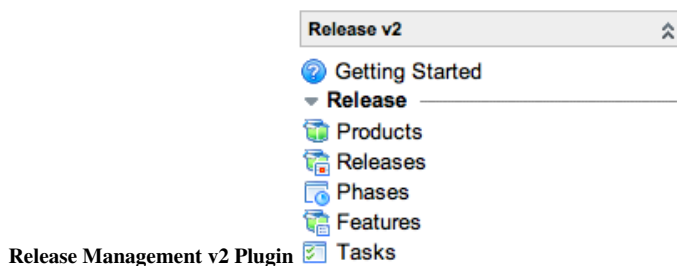
Tables

The following tables represent the concepts that underlie Release Management:

- **Product [rm_product]:** represent whole products whose releases are being managed.
- **Release [rm_release]:** represent individual versions of the product.
- **Release Phase [rm_release_phase]:** represent the different stages of work required to complete a release.
- **Feature [rm_feature]:** represent each feature within the release.
- **Release Tasks [rm_task]:** represent tasks to create individual features.



Applications and Modules



- **Getting Started:** links to this document on the wiki.
- **Release**
 - **Products:** the Product [rm_product] list.
 - **Releases:** the Release [rm_release] list.
 - **Phases:** the Release Phase [rm_release_phase] list.
 - **Features:** the Feature [rm_feature] list.
 - **Tasks:** the Release Task [rm_task] list.

SDLC - Software Development Life Cycle Plugin

Design

The **SDLC - Software Development Life Cycle Plugin** further extends upon the **Release Management v2 Plugin** by adding some new structures to accommodate the Software Development Life Cycle. This plugin is designed to accommodate most non-agile development methodologies, including the common Waterfall method of development.

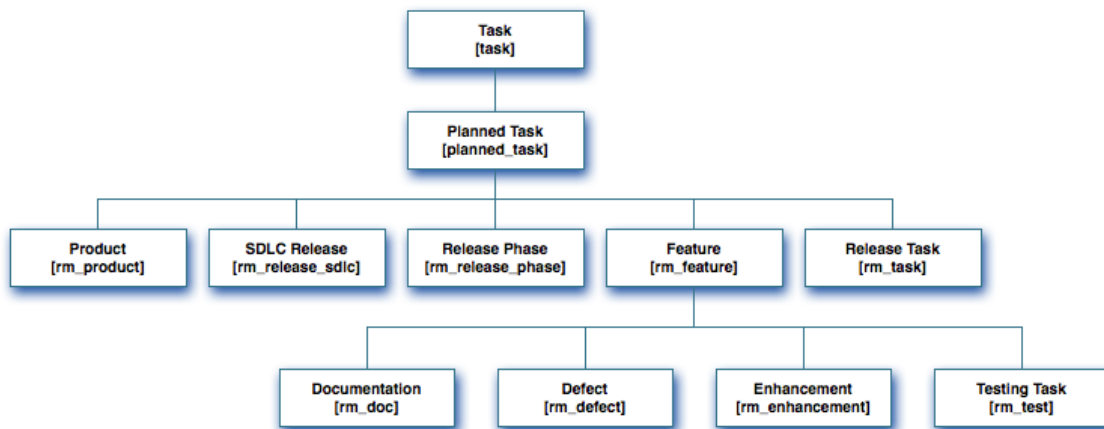
This plugin adds more specific 'Feature' types allowing for the independent management of notions (defects, enhancements, testing tasks, etc.) critical to successful software development.

The new Planning Board is now available as well, to take existing tasks and group them easily in particular parent tasks.

Tables

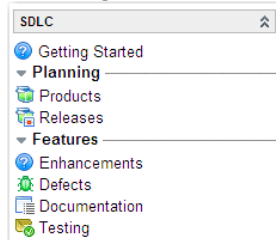
The following concepts power the Software Development Life Cycle:

- **Product [rm_product]:** represent whole products whose releases are being managed.
- **SDLC Release [rm_release_sdlic]:** represent individual versions of the product.
- The following tables represent different types of features included in a release:
 - **Enhancements [rm_enhancement]:** represent an improvement to an existing product.
 - **Defects [rm_defect]:** represent a deviation from a product's expected behavior.
 - **Documentation [rm_doc]:** represent documentation tasks for the product.
 - **Testing [rm_test]:** represent testing tasks for the product.



Applications and Modules

SDLC Plugin



- **Getting Started:** links to this document on the wiki.
- Planning
 - **Products:** the Product [rm_product] list.
 - **Releases:** the Release [rm_release] list.
- Features
 - **Enhancements:** the Enhancements [rm_enhancement] list.
 - **Defects:** the Defects [rm_defect] list.
 - **Documentation:** the Documentation [rm_doc] list.
 - **Testing:** the Testing [rm_test] list.

SDLC - Scrum Plugin

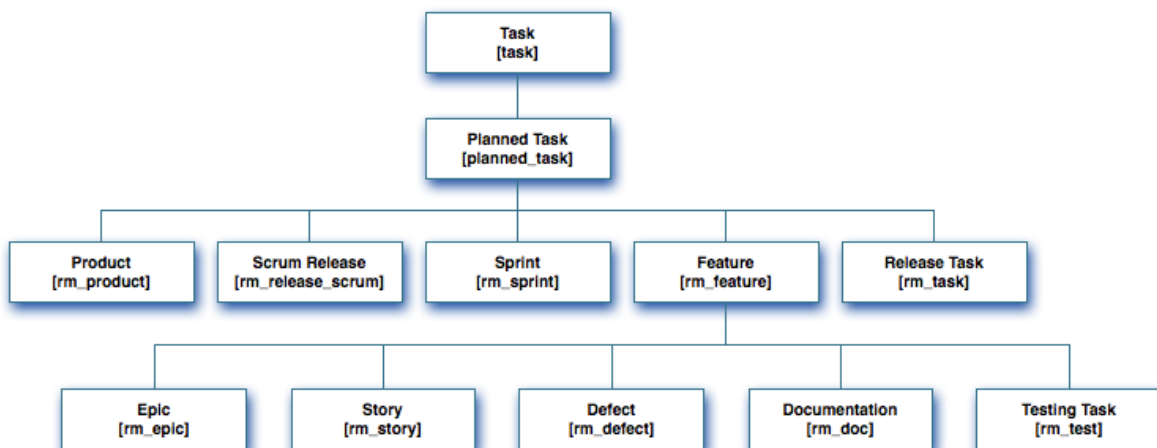
Design

The **SDLC - Scrum Plugin** includes the two plugins above, and adds Sprints and feature types specific to a Scrum development process.

Tables

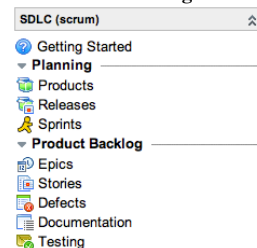
The following concepts power a Scrum process:

- **Product [rm_product]**: represent whole products whose releases are being managed.
- The following tables represent releases:
 - **Scrum Release [rm_release_scrum]**: represent individual versions of the product.
 - **Sprint [rm_sprint]**: - represents the backlog to be addressed together.
- The following tables represent product backlog items to be included in the sprint:
 - **Epic [rm_epic]**: represent related stories or requirements that you have not yet transformed into stories.
 - **Story [rm_story]**: represent self-contained pieces of work that can be completed within a sprint.
 - **Defect [rm_defect]**: represent a deviation from a product's expected behavior.
 - **Documentation [rm_doc]**: represent documentation tasks for the product.
 - **Testing [rm_test]**: represent testing tasks for the product.



Application and Modules

SDLC - Scrum Plugin



- **Getting Started:** links to this document on the wiki.
- **Planning**
 - **Products:** the Product [rm_product] list.
 - **Releases:** the Release [rm_release] list.
- **Features**
 - **Epics:** the Epics [rm_epics] list.
 - **Stories:** the Stories [rm_story] list.
 - **Defects:** the Defects [rm_defect] list.
 - **Documentation:** the Documentation [rm_doc] list.
 - **Testing:** the Testing [rm_test] list.

SDLC - Scrum Process Pack Plugin

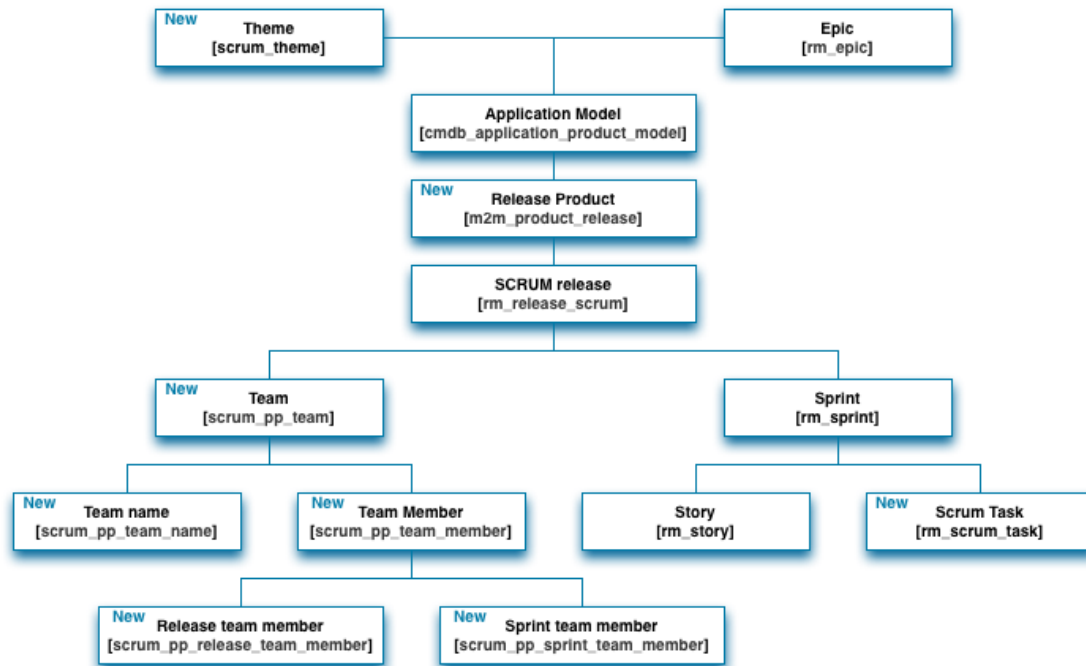
Design

The SDLC Scrum Process retains all the functionality of the existing SDLC Scrum plugin but enhances it by adding a formal scrum process. If you already have a customized version of SDLC-SCRUM plugin ServiceNow recommends evaluating the SDLC - Scrum Process Pack plugin on a development instance where you have deleted your customizations.

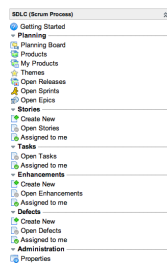
Tables

The SDLC Scrum Process Pack uses these tables to manage the scrum process.

- **Application Model [cmdb_application_product_model]:** represents whole products whose releases are being managed.
- **Release Product [m2m_product_release]:** represents all managed products.
- The following tables represent releases.
 - **Scrum Release [rm_release_scrum]:** represents all available releases. Each release contains a list of sprints with a time range in which the stories in those sprints need to be completed.
 - **Sprint [rm_sprint]:** stores sprints, which are the backlog items to be addressed during a given time period.
- The following tables represent product backlog items to be included in the sprint.
 - **Team [scrump_team]:** represents who will complete Scrum tasks and stories during releases and sprints.
 - **Epic [rm_epic]:** represents stories or requirements that you have not yet transformed into stories.
 - **Theme [scrump_theme]:** represents either a tangible product (such as a trading application) or an abstract goal (such as performance tuning).
 - **Story [rm_story]:** represents self-contained pieces of work that can be completed within a sprint.
 - **Scrum task [rm_scrump_task]:** represents a discrete amount of work for a story carried out during a sprint.
 - **Defect [rm_defect]:** represents a deviation from a product's expected behavior.
 - **Enhancement [rm_enhancement]:** represents an improvement to an existing product.



Application and Modules



- **Getting Started:** links to the SDLC Scrum Process wiki page.
- **Planning**
 - **'Planning Board:** the `scrum_board.do` URL.
 - **Products:** the `[cmdb_application_product_model]` list.
 - **My products:** items on the `[cmdb_application_product_model]` list assigned to the current user.
 - **Themes:** the `[scrum_theme]` list.
 - **Open Releases:** active items on the `[rm_release_scrum]` list.
 - **Open Sprints:** active items on the `[rm_sprint]` list.
 - **Open Epics:** active items on the `[rm_epic]` list.
- **Stories**
 - **Create New:** create a new story in the `[rm_story]` table.
 - **Open Stories:** active items in the `[rm_story]` list.
 - **Assigned to me:** items on the `[rm_story]` list assigned to the current user.
- **Tasks**
 - **Open Tasks:** active items on the `[rm_scrum_task]` list
 - **Assigned to me:** items on the `[rm_scrum_task]` list assigned to the current user.
- **Enhancements**
 - **Create New:** create a new enhancement in the `[rm_enhancement]` table.
 - **Open Enhancements:** active items on the `[rm_enhancement]` list.
 - **Assigned to me:** items on the `[rm_enhancement]` assigned to the current user.
- **Defects**
 - **Create New:** create a new defect in the `[rm_defect]` table.
 - **Open Enhancements:** active items on the `[rm_defect]` list.
 - **Assigned to me:** items on the `[rm_defect]` assigned to the current user.
- **Administration**
 - **Properties:** the `system_properties_ui.do` URL.

Integration with Project Portfolio Suite

The SDLC application can also be activated as part of the Project Portfolio Suite (PPS). If activated as part of PPS, the following modules are added to the Project Management menu:

- ▼ Agile
- ★ Stories
- ★ Teams
- ★ My Stories
- ★ Sprint Planning

- **Agile**
 - **Stories:** displays the Stories list, which shows a list of current active stories and the associated projects. Add a new story or click a story to open the Story form. Add scrum tasks to a story.
 - **Teams:** displays the Teams list, which shows a list of current teams. Click a team to open the Team form. Create and plan sprints, manage stories, view velocity charts, and view story points by sprint from the Team form.
 - **My Stories:** displays a list of stories assigned to the current user.
 - **Sprint Planning:** displays the Sprint Planning form for the selected team. Use this form to see the team capacity and points allocated for each sprint. Also use this form to manage the project backlog and assign stories to sprints.

The following SDLC tasks can be performed from the project workbench:

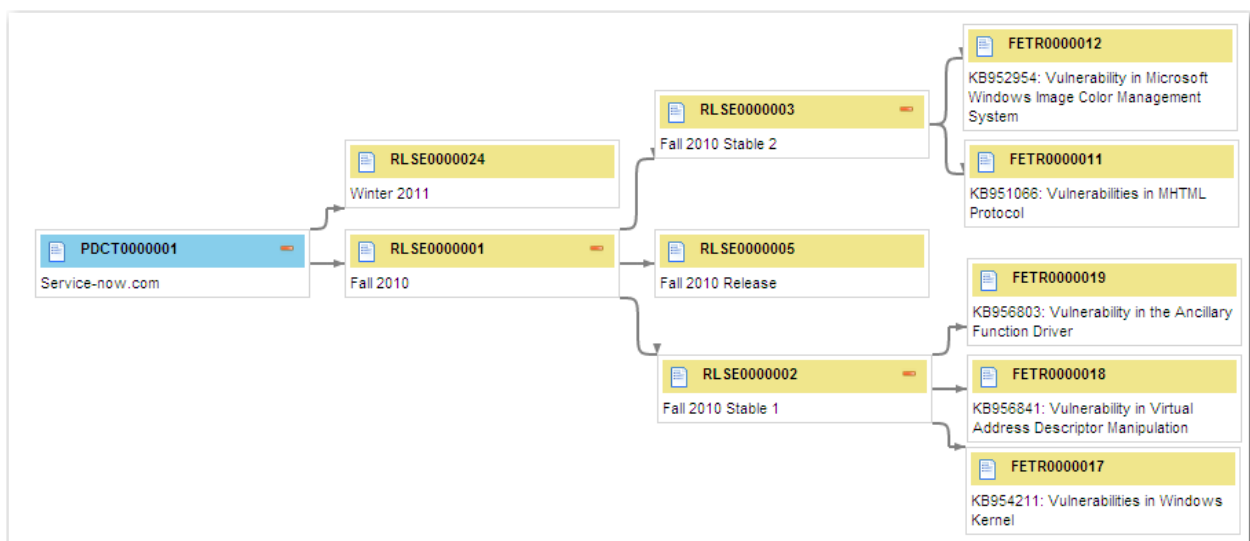
- Use the **Manage Stories** button to open the Manage Stories form
- Create an Agile phase for a project
- Select an Agile phase to display the project-related stories in the list view
- Assign a team to an Agile phase within a project

Interaction of Applications and Modules

The applications and modules installed depend on which plugins have been activated. If the Release Management v2 Plugin is activated, only the Release Management v2 Application will be available. If the SDLC plugin is activated, both the SDLC and Release Management v2 applications are available. If the SDLC - Scrum Plugin is activated, it *replaces* the SDLC application with the Scrum application, and retains the Release Management v2 application.

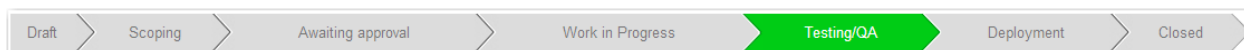
New interfaces

Product/Release Hierarchies



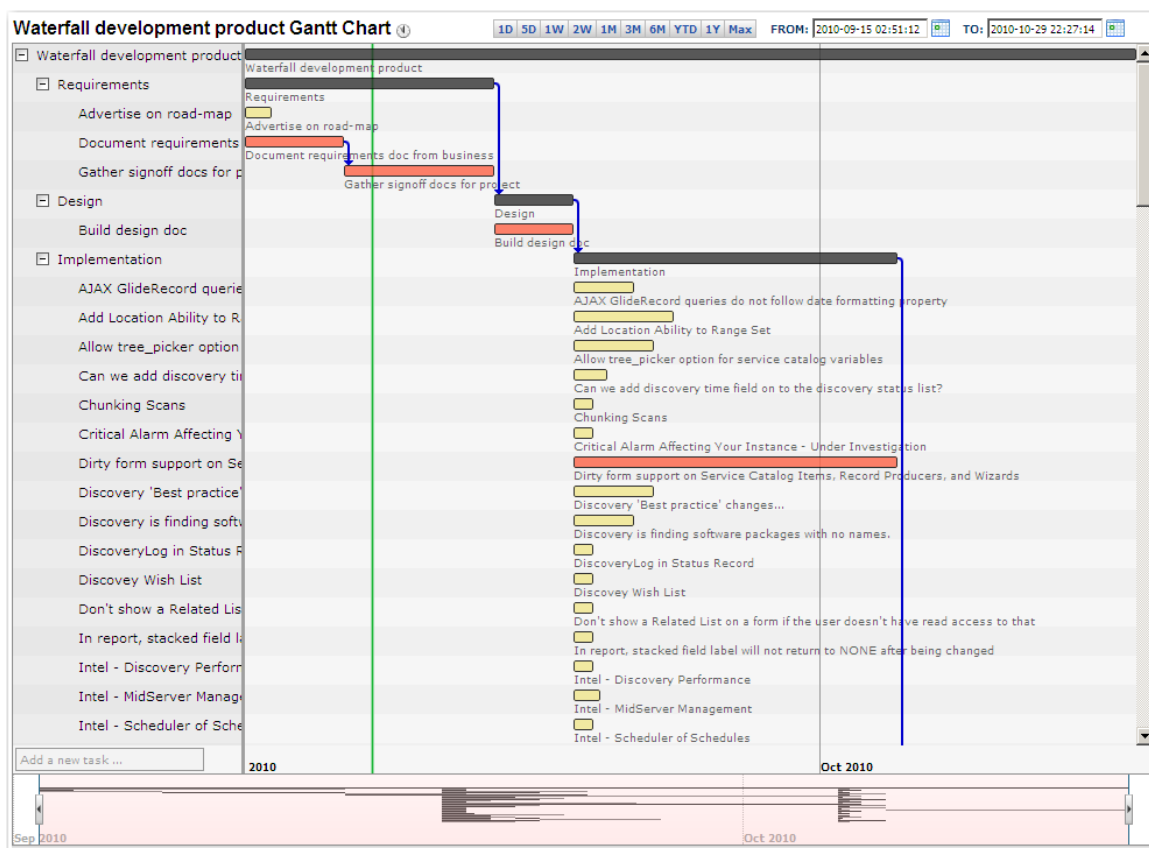
The **Hierarchy** view of Products and Releases can be found from a related list on the form.

Process Flow Formatter



The **Release** and **Feature** forms include a process flow, which displays the current status of the record based on the **State** field. These are generated using the Process Flow Formatter plugin.

Gantt Chart



Releases can also be managed using the Gantt Chart.

Planning Board

The **SDLC** plugin also adds the **Planning Board**, an interface for manipulating the tasks related to releases for a particular product. For more information see [Using the Planning Board](#).

The screenshot displays the Planning Board interface. At the top, there are tabs for 'Enhancements (519)' and 'Defects (480)'. Below the tabs, there is a search bar and a table of enhancements. The table has columns for 'Number', 'Short description', 'Priority', and 'State'. The enhancements listed are all with a priority of '4 - Low' and a state of 'Pending'. On the right side, there is a sidebar titled 'Unscheduled Tasks' which contains four sections: 'Requirements', 'Design', 'Implementation', and 'Verification'. Each section shows a start and end date and a duration.

Number	Short description	Priority	State
ENHC0000031	Optimize the database queries discovery uses	4 - Low	Pending
ENHC0000032	Add ability to Schedule AND publish execution of a Pivot table report	4 - Low	Pending
ENHC0000033	Range Sets	4 - Low	Pending
ENHC0000034	Discovery of Juniper Network Devices	4 - Low	Pending
ENHC0000035	Computer Model/Manufacturer	4 - Low	Pending
ENHC0000036	Catalog variable type of integer/number	4 - Low	Pending
ENHC0000037	Approval process exception handling	4 - Low	Pending
ENHC0000038	CMDB Model Map Page (Much like Domain Map Page)	4 - Low	Pending
ENHC0000039	Baseline formatter to act like the new activity formatter (checkboxes to show/hide)	4 - Low	Pending
ENHC0000040	Add planned start and planned end date fields to the Schedule Change formatter	4 - Low	Pending
ENHC0000041	Global Catalog client scripts or 'Policy sets'	4 - Low	Pending
ENHC0000042	Report on which CIs have baseline exceptions	4 - Low	Pending
ENHC0000043	BSM classes to line up when BSM is rendered	4 - Low	Pending
ENHC0000044	Being back the 'Save' button on the BSM	4 - Low	Pending
ENHC0000045	Better printing of BSM	4 - Low	Pending
ENHC0000046	list view of kb articles shows html tags instead of formatted text	4 - Low	Pending
ENHC0000047	Add data backed radio choices variable type	4 - Low	Pending
ENHC0000048	Ability to include detail with report output and output other than .png	4 - Low	Pending
ENHC0000049	Attribute to specify query type (starts with vs. contains) for a reference varia	4 - Low	Pending
ENHC0000050	Timezones in schedules	4 - Low	Pending

Unscheduled Tasks

- Requirements**
Start:2010-09-15 09:51:12
End:2010-09-27 22:54:46
Duration:12 days 13 hours 3 minutes
- Design**
Start:2010-09-27 22:54:46
End:2010-10-01 22:54:46
Duration:4 days
- Implementation**
Start:2010-10-01 22:54:46
End:2010-10-18 05:27:14
Duration:16 days 6 hours 32 minutes
- Verification**
Start:2010-10-18 05:27:14
End:2010-10-20 05:27:14
Duration:2 days
- Maintenance**
Start:2010-10-20 05:27:14
End:2010-10-30 05:27:14
Duration:10 days

Getting Started

Activating the Plugin

Click the plus to expand instructions for activating a plugin.

If you have the admin role, use the following steps to activate the plugin.

1. Navigate to **System Definition > Plugins**.
2. Right-click the plugin name on the list and select **Activate/Upgrade**.

If the plugin depends on other plugins, these plugins are listed along with their activation status.

3. [Optional] If available, select the **Load demo data** check box.

Some plugins include demo data—sample records that are designed to illustrate plugin features for common use cases. Loading demo data is a good policy when you first activate the plugin on a development or test instance. You can load demo data after the plugin is activated by repeating this process and selecting the check box.

4. Click **Activate**.

Dependencies

The Release Management plugins depend on the List v2 plugin, the Planned Task plugin, and the Process Flow Formatter.

Plugin Security

The following new roles are available with the plugins:

- **Release:** release_v2_admin and release_v2_user
- **SDLC:** sdlc_admin and sdlc_user
- **Scrum:** scrum_admin and scrum_user

The roles can access the applications as follows:

- **admins** can access the entire application
- **users** can access the all the various feature and task related modules but cannot update their content.

There is an ACL role for each table (same name as the table), controlling write access on a record basis, which can be given to particular roles as desired.

Process Flow Formatter Plugin

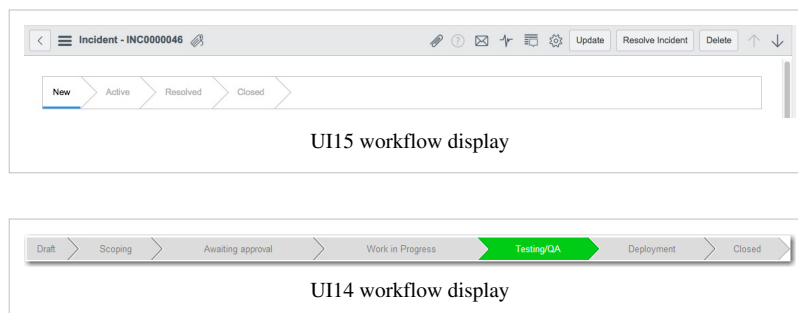


Note: This article applies to Fuji and earlier releases. For more current information, see *Process Flow Formatter* ^[1] at <http://docs.servicenow.com>. **The ServiceNow Wiki is no longer being updated. Visit <http://docs.servicenow.com> for the latest product documentation.**

Overview

The process flow formatter ^[2] quickly summarizes multiple pieces of information about a process and displays the stages graphically at the top of a form. Each record on the Flow Formatter [sys_process_flow] table represents a process stage and can have a different condition applied to it. When specified conditions are fulfilled, the formatter highlights the current stage and, starting with the Fuji release, all previous stages.

These examples show a workflow in the UI15 and UI14 interfaces. See Navigation and the User Interface for more information on these interfaces.



As soon as any formatter stages are defined for a table, they appear on the form associated with that table in the order specified, assuming the formatter has been added to the form.

You can see examples of preconfigured process flow formatter stages in Work Management, Release Management, and Sales Force Automation.

Adding a Process Flow Formatter

To add a process flow formatter, complete these tasks.

Task 1: Create a Process Flow Formatter


Users with the admin role can create a process flow formatter stage:


1. Navigate to **System UI > Process Flow**.
2. Click **New**.
3. Complete the form, as appropriate (see table).
4. Repeat as necessary.


<


≡


Flow Formatter - Draft













Update

Delete





* Table

Release [rm_release]

* Name

Draft

* Label

Draft

Order

0

Active

☐

Condition

Add Filter Condition

Add "OR" Clause

State

is

Draft

AND

OR

X

Description


-


+

B

I


U








Fonts


Size












































Update

Delete

Field	Description
Table	Select a table for this process flow formatter.
Name	Enter a name to identify the formatter stage.
Label	Enter the name to be displayed in the Personalize Form Layout slushbucket.
Order	Enter a number to indicate where in the process flow the formatter stage will be displayed. Formatter stages are arranged with the lowest number on the left and the highest number on the right.
Active	Select the check box to ensure the formatter stage is active. When the check box is cleared, the formatter stage does not appear in the flow display. This field is available starting with the Fuji release.
Condition	Use the condition builder to set the conditions under which the formatter stage is highlighted as current. Any field available in the condition builder, such as SLA or Impact, can be used to trigger a process flow stage.
Description	Describe the process flow formatter stage. This description does not appear on the actual formatter.

Task 2: Attach the Process Flow Formatter to the Form

After creating the formatter, personalize the appropriate form to attach the new formatter.

Available

Watch list
Work notes list
|- begin_split -|
|- split -|
|- end_split -|
* Annotation
Attached Knowledge
Parent Breadcrumbs
Process Flow
Task Relations
Ratings
Activity->Parent
Affected CIs
Affected Cost Centers
Affected Groups
Affected Locations
Appointment->Task
Approvers

Add

Remove

Selected

|- begin_split -|
Number
Company
Caller
Affected CI
Location
Template
|- split -|
Opened
Priority
State
Qualification group
Initiated from
Billable
|- end_split -|
Short description
Description
Work notes

Up
Down

Save

Cancel

Activating the Process Flow Formatter

Users with the admin role can activate the Process Flow Formatter plugin.

Click the plus to expand instructions for activating a plugin.

If you have the admin role, use the following steps to activate the plugin.

1. Navigate to **System Definition > Plugins**.
2. Right-click the plugin name on the list and select **Activate/Upgrade**.

If the plugin depends on other plugins, these plugins are listed along with their activation status.

3. [Optional] If available, select the **Load demo data** check box.

Some plugins include demo data—sample records that are designed to illustrate plugin features for common use cases. Loading demo data is a good policy when you first activate the plugin on a development or test instance. You can load demo data after the plugin is activated by repeating this process and selecting the check box.

4. Click **Activate**.

Enhancements

Fuji

- The **Active** field on the Flow Formatter [sys_process_flow] table determines whether formatter stages appear in the flow display.

References

[1] https://docs.servicenow.com/bundle/jakarta-servicenow-platform/page/administer/form-administration/reference/r_ProcessFlowFormatter.html

[2] https://docs.servicenow.com/bundle/helsinki-servicenow-platform/page/administer/form-administration/reference/r_ProcessFlowFormatter.html

Article Sources and Contributors

Release Management Plugins *Source:* <http://wiki.servicenow.com/index.php?oldid=82903> *Contributors:* Cheryl.dolan, Davida.hughes, Fuji.publishing.user, G.yedwab, Guy.yedwab, Jerrod.bennett, John.ramos, John.roberts, Joseph.messerschmidt, Liz.malone, Rachel.sienko, Steven.wood, Vaughn.romero

Defining a Product with Release v2 *Source:* <http://wiki.servicenow.com/index.php?oldid=250490> *Contributors:* Davida.hughes, G.yedwab, Guy.yedwab, John.ramos, Joseph.messerschmidt

Planning Releases with Release v2 *Source:* <http://wiki.servicenow.com/index.php?oldid=89942> *Contributors:* Cheryl.dolan, Davida.hughes, G.yedwab, Guy.yedwab, John.ramos, Joseph.messerschmidt, Steven.wood

Using the Planning Board *Source:* <http://wiki.servicenow.com/index.php?oldid=101093> *Contributors:* Davida.hughes, G.yedwab, Guy.yedwab, Joseph.messerschmidt, Steven.wood

Release Management Tools *Source:* <http://wiki.servicenow.com/index.php?oldid=250805> *Contributors:* Cheryl.dolan, Davida.hughes, Fuji.publishing.user, G.yedwab, Guy.yedwab, Jerrod.bennett, John.ramos, John.roberts, Joseph.messerschmidt, Liz.malone, Rachel.sienko, Steven.wood, Vaughn.romero

Process Flow Formatter Plugin *Source:* <http://wiki.servicenow.com/index.php?oldid=82825> *Contributors:* Cheryl.dolan, Davida.hughes, Emily.partridge, Fuji.publishing.user, G.yedwab, Guy.yedwab, Joe.zucker, John.ramos, Joseph.messerschmidt, Phillip.salzman, Rachel.sienko, Steven.wood, Suzanne.smith

Image Sources, Licenses and Contributors

Image:Warning.gif *Source:* <http://wiki.servicenow.com/index.php?title=File:Warning.gif> *License:* unknown *Contributors:* CapaJC

Image:Rm2-concepts.png *Source:* <http://wiki.servicenow.com/index.php?title=File:Rm2-concepts.png> *License:* unknown *Contributors:* G.yedwab, Guy.yedwab

Image:Rm2-application.png *Source:* <http://wiki.servicenow.com/index.php?title=File:Rm2-application.png> *License:* unknown *Contributors:* G.yedwab, Guy.yedwab

Image:Sdlc-concepts.png *Source:* <http://wiki.servicenow.com/index.php?title=File:Sdlc-concepts.png> *License:* unknown *Contributors:* G.yedwab, Guy.yedwab

Image:SDLC-application.png *Source:* <http://wiki.servicenow.com/index.php?title=File:SDLC-application.png> *License:* unknown *Contributors:* G.yedwab, Gerardo.gutierrez, Guy.yedwab

Image:Scrum-concepts.png *Source:* <http://wiki.servicenow.com/index.php?title=File:Scrum-concepts.png> *License:* unknown *Contributors:* G.yedwab, Guy.yedwab

Image:Scrum-application.png *Source:* <http://wiki.servicenow.com/index.php?title=File:Scrum-application.png> *License:* unknown *Contributors:* G.yedwab, Guy.yedwab

Image:Scrum_process_pack.png *Source:* http://wiki.servicenow.com/index.php?title=File:Scrum_process_pack.png *License:* unknown *Contributors:* Vaughn.romero

Image:scrum_process_pack_app.png *Source:* http://wiki.servicenow.com/index.php?title=File:Scrum_process_pack_app.png *License:* unknown *Contributors:* Vaughn.romero

Image:SDLC Team Agile Module.png *Source:* http://wiki.servicenow.com/index.php?title=File:SDLC_Team_Agile_Module.png *License:* unknown *Contributors:* Fuji.publishing.user

Image:Rm2-heirarchy.png *Source:* <http://wiki.servicenow.com/index.php?title=File:Rm2-heirarchy.png> *License:* unknown *Contributors:* G.yedwab

Image:Workflow Display.png *Source:* http://wiki.servicenow.com/index.php?title=File:Workflow_Display.png *License:* unknown *Contributors:* G.yedwab

Image:Rm2-gantt.png *Source:* <http://wiki.servicenow.com/index.php?title=File:Rm2-gantt.png> *License:* unknown *Contributors:* G.yedwab

Image:SDLC-planning1.png *Source:* <http://wiki.servicenow.com/index.php?title=File:SDLC-planning1.png> *License:* unknown *Contributors:* G.yedwab

Image:Plugin.gif *Source:* <http://wiki.servicenow.com/index.php?title=File:Plugin.gif> *License:* unknown *Contributors:* CapaJC, Joseph.messerschmidt

Image:Rm2-relhierarchy.png *Source:* <http://wiki.servicenow.com/index.php?title=File:Rm2-relhierarchy.png> *License:* unknown *Contributors:* G.yedwab

Image:SDLC-planning2.png *Source:* <http://wiki.servicenow.com/index.php?title=File:SDLC-planning2.png> *License:* unknown *Contributors:* G.yedwab

Image:SDLC-planning3.png *Source:* <http://wiki.servicenow.com/index.php?title=File:SDLC-planning3.png> *License:* unknown *Contributors:* G.yedwab

Image:SDLC-planning4.png *Source:* <http://wiki.servicenow.com/index.php?title=File:SDLC-planning4.png> *License:* unknown *Contributors:* G.yedwab

Image:SDLC-planning5.png *Source:* <http://wiki.servicenow.com/index.php?title=File:SDLC-planning5.png> *License:* unknown *Contributors:* G.yedwab

Image:Workflow Display UI15.jpg *Source:* http://wiki.servicenow.com/index.php?title=File:Workflow_Display_UI15.jpg *License:* unknown *Contributors:* Suzanne.smith

Image:Flow_Formatter.png *Source:* http://wiki.servicenow.com/index.php?title=File:Flow_Formatter.png *License:* unknown *Contributors:* Fuji.publishing.user, Steven.wood

Image:Adding_Process.png *Source:* http://wiki.servicenow.com/index.php?title=File:Adding_Process.png *License:* unknown *Contributors:* Emily.partridge, Guy.yedwab