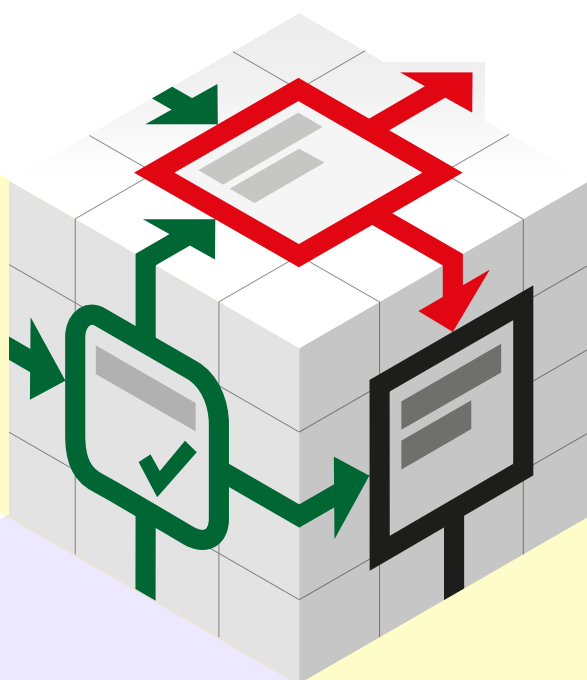


inShort

User Guide



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1. Basic concepts

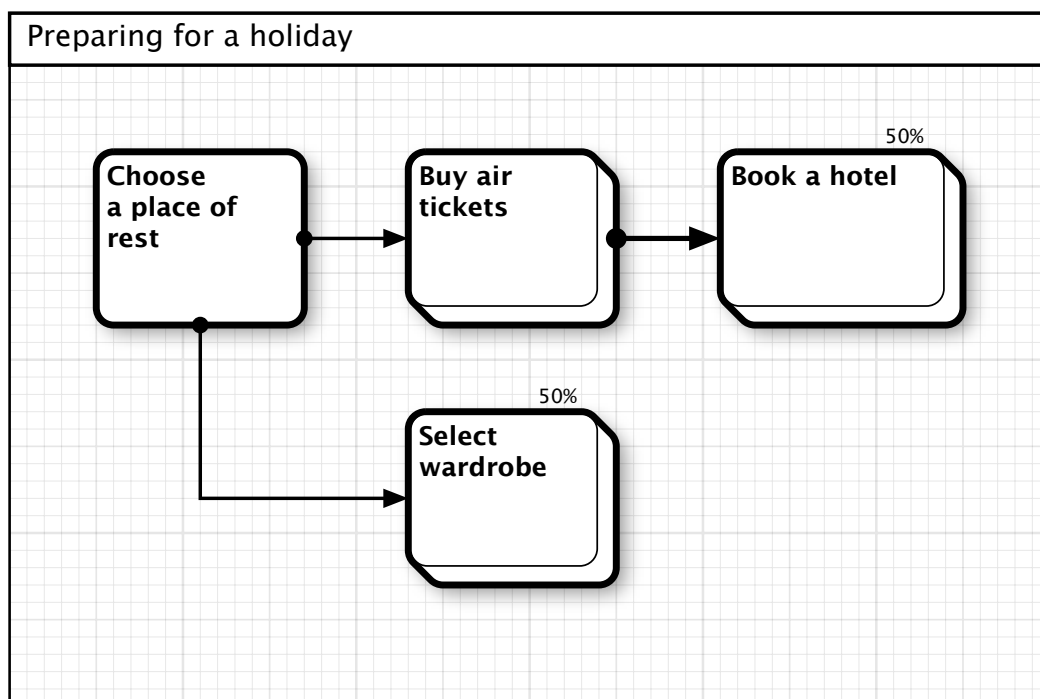
Before you start

Goals and Tasks

The easiest way to organize your activities is to keep a linear list of tasks. For example, on the eve of a holiday, you can make something like the following list:

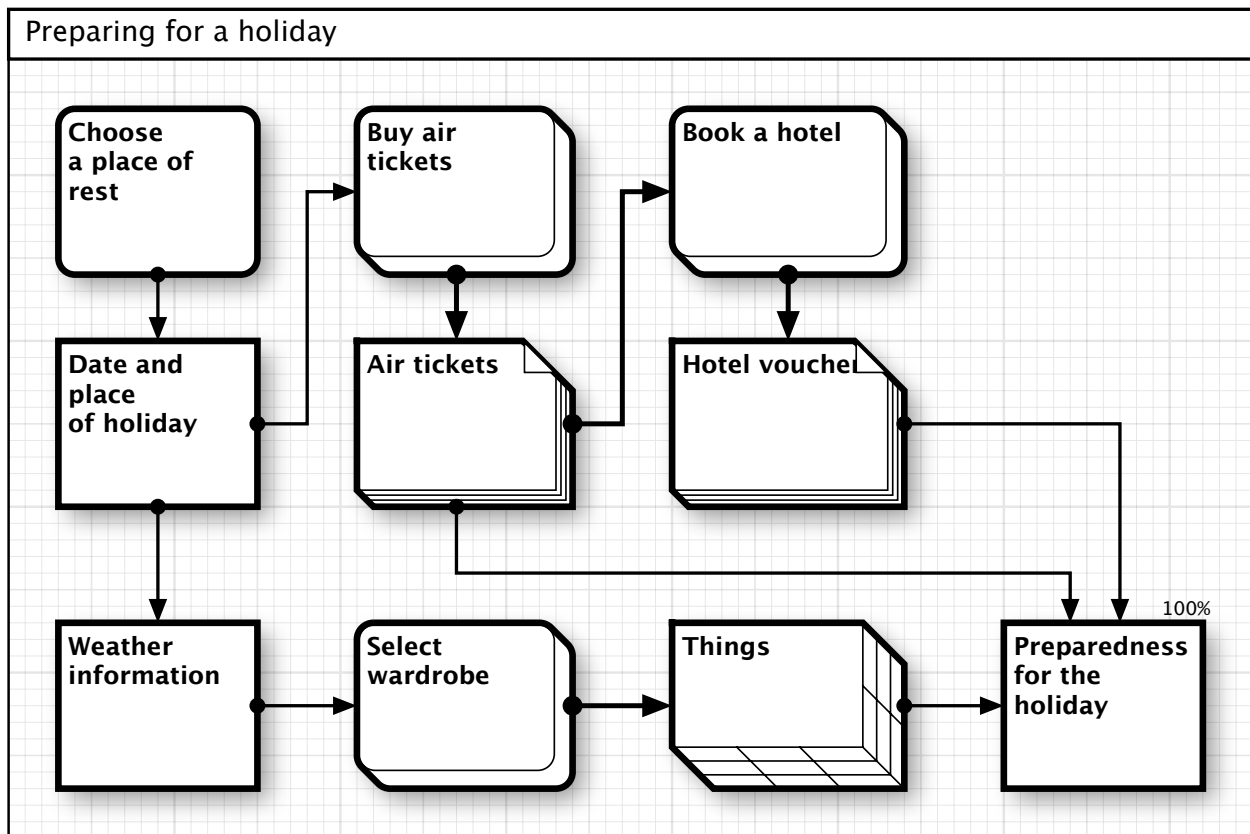
- choose a place of rest;
- buy air tickets;
- book a hotel;
- select things for the trip.

Often tasks depend on each other, but such a record allows you to display only the sequential order of execution, hiding the real links between tasks. All the matter is that we have limited ourselves to a single dimension while placing our tasks in a plane opens far more opportunities.



Here we managed to visualize the dependencies between our tasks and get rid of the misconception that our process is organized linearly. Now let us debunk another, greater misconception, to which the new diagram leads us: the process approach or thinking only in terms of processes. Tasks are only the way to achieve the goals, and fulfilling a task, we must

not lose sight of the goal, otherwise there is a risk of «going astray». So, let us include the goals for each task in the diagram.



Goals are marked with right-angled figures.

Tasks ceased to be self-sufficient, they received clear performance criteria, and the nature of dependencies between tasks became more definite. The goal achieved by a process becomes a resource consumed by another one, so any goal can be regarded as a resource for the current or the future tasks. Since a resource is an object or a condition that is kept stable and unchanged between processes, the resources can be regarded as static milestones, and the processes – as dynamic paths between them. It is convenient to mark resources with right-angled figures, and processes – with rounded figures.

Psychologists say that a person perceives figures with right angles as static and stable while rounded figures are more dynamic for perception. Thus, the chosen shape of diagram objects corresponds in the subconscious perception to their nature.

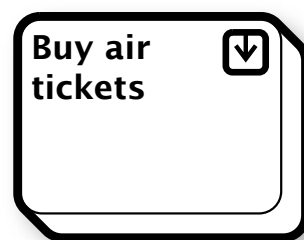
Detailing

In 1956, American scientist and psychologist George Miller discovered a rule, according to which human short-term memory usually cannot remember and repeat more than 7 ± 2 elements. This observation: «The Magical Number Seven, Plus or Minus Two» has been called

«Miller's law»¹. So, to perceive complicated schemes, a person mentally divides them into groups of 5-9 elements. From a practical standpoint, this means that a diagram designed for quick perception must contain no more than 9 elements, a diagram of 15-18 elements requires time to learn, and a scheme containing more than 20 objects seems to be congested and difficult to understand.

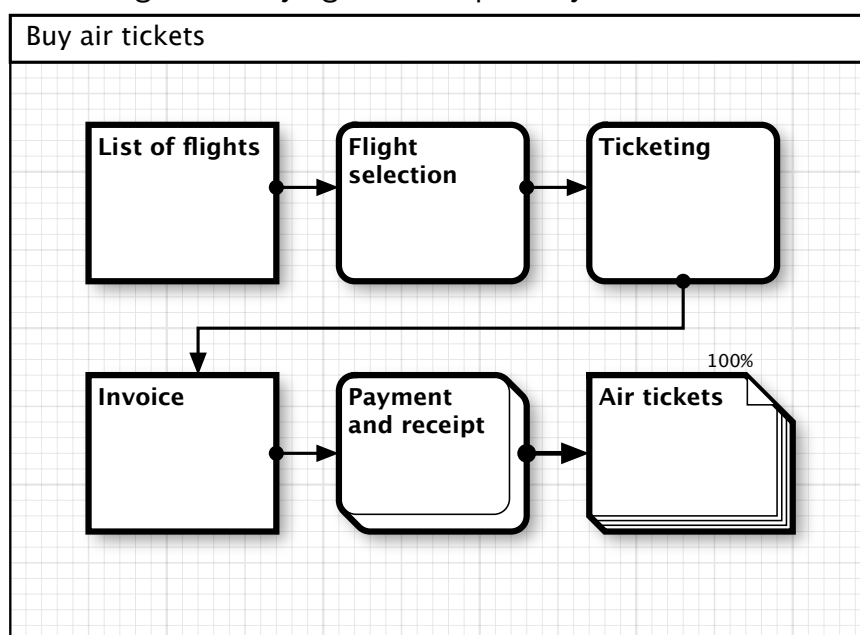
Achieving most of the important goals requires execution of many processes and the use of a significant number of resources that cannot be placed on a diagram with 20 elements. It is the use of nested diagrams that can help avoiding the conflict with Miller's law.

For example, the process of buying air tickets from the diagram above involves several steps, starting with the preparation of the list of suitable flights, choice of the optimal flight, completing with the payment and receipt of tickets. Placing all of these elements on the original diagram will make it cumbersome to read and less understandable. Let us mark the process of buying tickets as a process containing an embedded diagram.



You can open the nested diagram by touching the «Drill Down» icon at the top right of the object

Let us build the diagram of buying tickets separately.



¹ The Magical Number Seven, Plus or Minus Two: Some Limits on our Capacity for Processing Information. Psychological Review 1956.

Thus, we have detailed the process without complicating the original diagram, now we can always delve into the process, studying it in more detail. This method also works the other way: in a complex diagram, you can select a group consisting of several objects, and turn it into one process or resource, thus increasing the readability of the general scheme.

As a result, the use of nested diagrams allows you to represent a process of any complexity as a set of simple and readable diagrams.

Aspects

There are many approaches to the management of the processes, the choice of the optimal techniques being largely determined by the nature of the managed processes. Of all the varieties, three groups of processes and their corresponding methods can be singled out.

1st group. Workflows.

This group includes frequently performed tasks for which the fullness of the description is of particular importance. For example, in technological process it is important that all stages of the process have been described and monitored. Peculiarity of these processes is dictated by the fact that most often the task performers are relatively weakly associated with the process designers, and achieving success is largely determined by the completeness of description.

2nd group. Projects.

Design processes are executed in separate projects, for such tasks, of great importance is the control of risks associated with the timing and resources. As a rule, the task performers are closely related to the project managers, and the risk of the completeness of description is relatively reduced.

3rd group. Continuous processes.

Processes of this type require the continuity of the workflow execution. A typical example of such a process is an industrial conveyor.

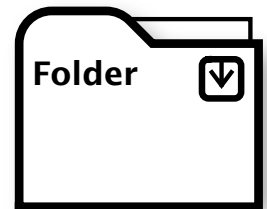
Currently **inShort** allows you to plan and execute the processes of the first two groups. Furthermore, complex workflows can be represented as projects, and vice versa, frequently executed projects can be represented as workflows. Combining the advantages of different techniques, you can approach your tasks from different aspects and achieve the best results.

2. Ensuring task execution

Information organization

Folders

Human activities are multifaceted, so each person strives to achieve a variety of goals, which requires parallel execution of multiple tasks. It is useful to organize the work so that the achievement of goals not connected with one another did not influence each other, therefore, execution risks for any certain task would affect the achievement of only one of the goals.



To protect diagrams from mutual influence, inShort has special objects – folders. A folder can be placed in any place of any diagram, you can even make links to it from other objects, but in any case the parent process will not affect neither the folder itself, nor the diagram embedded in it.

Placing folders in conveniently accessed locations, you can organize your diagrams in accordance with your preferences.

Desktop

While you can open the nested diagram by touching the «Drill Down» icon on the object, you can go back with the help of the «Roll Up» button on the top toolbar or by using the respective menu command.

Repeatedly pressing this button, you can climb to the top-level diagram, which is the Desktop of the application. Upon reaching the Desktop, the roll-up button will change its appearance.



iOS: Upon reaching the Desktop, the roll-up button will change its appearance.



Navigator

Navigator is available only for Mac OS

The left part of the application workspace can be allocated to the navigator pane. Navigator has three tabs which allow you to get quick access to different data.

Visibility of the navigator pane can be controlled using «View» menu.

The first tab. **Hierarchy of diagrams.**

At the top of this tab there is a list of the parent diagrams from the current diagram to the Desktop. Activating the diagram title, you can quickly navigate to it. The bottom part of the tab contains the list of diagrams that were accessed recently.

The second tab. **Collection of objects.**

This tab contains the set of possible objects from which a scheme can be built. Create new diagram objects by dragging them from this set in a blank area of the diagram.

The third tab. **Object tree.**

The tab shows the structure of diagrams with their member objects. Activating objects, you can quickly navigate to them by highlighting them in the workspace.

Please note.

The next two chapters contain a description of editing functions with serious differences for the Mac OS version of the application and the iOS version. Therefore, this section is set out twice for each of the versions, you can skip one of the chapters without affecting the subsequent reading of the document.

Modes of work with a diagram on Mac OS

You can work with a diagram in two modes. Switching between modes is made in the «Modes» menu or with a switch on the top toolbar.

Execution mode



For execution of a diagram, setting the object parameters, control of schedules and planning, the execution mode is used. In this mode, you can only change the timing of the diagram execution, while the basic structure of the diagram is protected from possible revisions. The diagram execution will be discussed in detail in the next section, the text below describes the edit mode.

Edit mode



Changing the structure of a diagram, the geometry of objects and the relationships between them is possible only while in the edit mode.

If a diagram is protected from edits, it cannot be changed in the edit mode.

The diagram area is marked with a grid, all graphic elements of a diagram are always attached to its nodes.

Creating a new object

New objects can be created by dragging objects of the desired type from the «Collection of objects», the second tab of the Navigator.

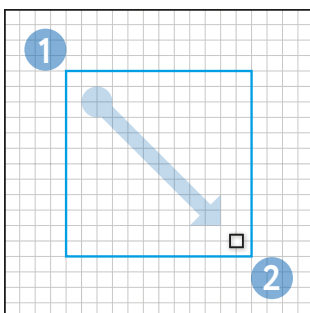
There is an alternative way to create objects.

0. Activate the mode of creating a new object from the «Diagram» menu or with the help of the toolbar.

1. Move the mouse pointer to the intended upper left corner of the new object.

2. Holding the mouse button down, slide the pointer diagonally to the intended lower right corner.

Upon completion, the program will prompt you to select the type of the new object.

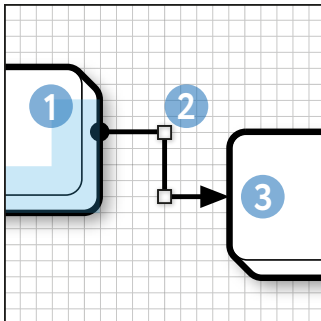


Object editing

Select an object while in the edit mode. By controlling the elements of the edit frame, resize the object or, touching the object, move it on the diagram. In an inShort diagram, object boundaries must be at a distance of not less than four steps of the grid between each other, this is the minimum distance that allows to fully display the relationship between objects. If the position of an object or its dimensions violate this rule, the edit frame will be highlighted in red, and the object will take the valid position closest to the given one or will take the maximum allowable size (when resizing).

For an object, the context menu of editing is available, with which you can perform a range of actions on the object, including cutting or copying the object to the clipboard, or removing the object.

To facilitate the mutual placement of objects during editing, there will appear alignment lines, which will help precisely align the edges and align the size of different objects..



Creating a new link

0. Activate the mode of creating a new link from the «Diagram» menu or with the help of the toolbar.



1. After placing the mouse pointer to the right or the bottom edge of the source object, press and release the left mouse button.

2. Sequentially moving the control element along the diagram area, set the link configuration.

3. Complete linking by bringing the control element to the target object

Note that a link can only consist of horizontal and vertical segments.

An important quality of any diagram is its **readability**, it is this quality that determines how easy it will be for another person or for the author himself, over an extended period of time, to understand the diagram. In the convenient tradition it is comfortable for a person to learn information, shifting the view from left to right and from top to bottom. This principle should be followed by the diagram, so in an inShort diagram, links from an object may go either to the right, or down. On the one hand, this restriction organizes the author to build the appropriate direction of the process on the diagram area. On the other hand, knowing that links can only come from two sides, a person who studies the diagram will find his bearings quicker.

Link editing

Select a link while in the edit mode. By controlling the elements of editing, change the shape of the link. Sufficiently long segments of the link can be divided into two equal segments by using the dissection element in the form of a diagonal cross. Note that the segments adjacent to an object cannot be shorter than two steps of the grid.

For a link, the context menu of editing is available, with which you can perform a range of actions on it, including cutting or copying the link and the surrounding objects to the clipboard, or removing the link.

Selecting a group of objects

To create a selection box, in the edit mode, pull the mouse pointer on an empty place of the diagram. Any objects being wholly or partially within the selection area are included in the group of the selected objects, the links between the selected objects also fall into the selection group. Release the mouse button to complete the selection.

The selected group can be widened or narrowed by using the elements of editing. If you select objects while holding down ⌘, then the objects will be, depending on their state, either included or excluded from the total group.

The selected group can be shifted around the screen. For a group of objects, you can open the context menu that allows you to perform a range of actions on the selection, including cutting or copying the group of selected objects and the links between them to the clipboard, or deleting the group.

Touching a blank area of the diagram outside the selection area will remove the selection from the objects.

Deletion

To delete the selected object, link or group of objects, you can use the delete operation, activated by a button on the control panel, or with the standard delete key.



Inserting objects

If you open the context menu on a blank area of the diagram while in the edit mode, then, provided there are previously copied objects or text in the clipboard, you can paste them into the current diagram.

If the clipboard contains previously copied objects and links, their copy will be placed on a blank area of the diagram of a suitable size as close to the point of insertion as possible.

Inserting text

If the clipboard contains text when pasting, the program will suggest converting text to one or several objects. The generated objects will be of type General process, and their size will depend on the size of the pasted text. With the text insertion feature, you can quickly convert a plain text list into a diagram.

Dragging and dropping objects

If you start moving an object, a link or a group of objects on the screen while holding down ⌘, this will move, instead of the object itself (the group of objects, the link), a copy, which can be placed on another diagram or in another application.

Advanced features of folding objects

If you drag and drop an object or a group of objects on another object of the diagram, then the selected objects will form the nested diagram of the destination object; if the recipient already had a nested diagram, it will be supplemented.

A selected group of objects can be collapsed via the context menu of editing, by activating the menu item «Roll Up». A new object with a nested diagram, which includes all objects of the collapsed group, will be created. The created object will have connections with the rest of diagram objects, similar to the links of the collapsed objects.

Property inspector

The right side of the application workspace can be allocated to the Inspector. The Inspector may have different sets of tabs depending on the current active selection, which allow you to edit parameters of various components selected in the application workspace.

Visibility of the Inspector panel can be controlled via «View» menu.

Most frequently used is the tab of the main properties of the object, which allows you to edit type, serial number, name and description of the object.

Creation and deletion of nested diagrams

The tab of the main properties of the object contains the **«Drill-down diagram» section**. If the object has a type allowing the detailing with a nested diagram, but has no nested diagram, you can use the corresponding button of this section to create such a diagram.

When you create a new diagram, its name will be the name of the object. When you change the name of the object, the name of the nested diagram will change accordingly, but only on condition that before the edit the name of the object and of the diagram coincided.

If the object already contains a nested diagram, then using the «Drill Down» button you can go to the nested diagram. Also the section contains the delete button for the diagram. To perform removal, you must first activate the delete button by «unfastening» the lock to its right. Note that when deleting a diagram, the program does not prompt the user, as the very removal is carried out in two stages.

Properties of the diagram

If you press the left mouse button when the pointer is on a blank area of the diagram or on the diagram title, the Inspector will display the properties of the diagram. In the tab of the main properties of the diagram there is a **switch to lock changes** of the diagram, by activating which you can prohibit editing the structure of the diagram and the properties of its objects, but all timing parameters associated with execution of the diagram will be available for

change. Thus it is possible to execute the diagram in full confidence that no random changes will be made to it.

When you activate the properties of the diagram, the second tab of the Inspector will be the **tab for changing the diagram canvas**. The tab contains a schematic view of configuration of the diagram and control elements allowing you to specify a new size of the diagram canvas. In order for the new size to take effect, you need to use the «Apply» button. Additional buttons allow you to set the minimum size of the diagram that is sufficient for full display of all objects and links, and also, if necessary, to set the old size of the canvas.

Modes of work with a diagram on iOS

You can work with a diagram in different modes. Switching between modes is made with switches on the right side of the top panel of the application.

Please note. If there are no mode switches on the top panel, it means that this diagram is protected from modifications and works only in execution mode.

Execution mode

For execution of a diagram, setting the object parameters, control of schedules and planning, the execution mode is used.



The diagram execution will be discussed in detail in the next section, the text below describes the edit modes.

Edit modes

Changing the structure of a diagram, the geometry of objects and the relationships between them is possible only while in edit modes.

The diagram area is marked with a grid, all graphic elements of a diagram are always attached to its nodes.

Creating a new object

To create a new object, you should activate the corresponding mode.



A panel for quick selection of objects from which you can select an object of the desired type and drag it to the diagram area, will appear on the screen.

There is an alternative way to create objects: tap the screen in the area of the intended upper left corner of the new object and drag diagonally to the intended lower right corner. Release your finger, the program will prompt you to select the type of the new object.

After creating the object, the program will switch to the edit mode.

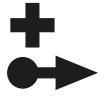
Creating a new link

Activate the mode of creating a new link.

Tap the right or the bottom edge of the source object. After the appearance of the blue editing element, pull it perpendicularly to the edge of the object, then, sequentially moving the control element along the diagram area, bring it to the target object. Release your finger, the program will create a new link between the selected objects. Note that a link can only consist of horizontal and vertical segments.

Creating a link can be interrupted by the activation of any other mode of work with a diagram.

After creating the link, the program will switch to the edit mode.



An important quality of any diagram is its **readability**, it is this quality that determines how easy it will be for another person or for the author himself, over an extended period of time, to understand the diagram. In the convenient tradition it is comfortable for a person to learn information, shifting the view from left to right and from top to bottom. This principle should be followed by the diagram, so in an inShort diagram, links from an object may go either to the right, or down. On the one hand, this restriction organizes the author to build the appropriate direction of the process on the diagram area. On the other hand, knowing that links can only come from two sides, a person who studies the diagram will find his bearings quicker.

Deletion

In deletion mode, you can remove unwanted objects or links.

Before removing, the program will ask the user to confirm the action. After removal, the program will switch to the editing mode.



Editing mode

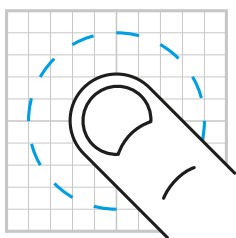
Editing mode is the major mode of modifying a diagram.



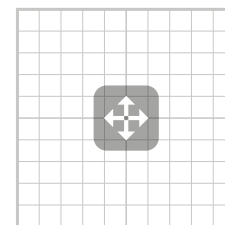
Editing indicators

If a diagram has a size larger than the area of the screen, it is possible to shift its visible area along the screen, or in other words scroll.

Since the touches of the screen are used by the program for working with the diagram and for scrolling at the same time, the gestures starting with a shift are treated as scrolling, and the gestures with a slight delay before the shift mean the beginning of editing. For user



convenience, the beginning of editing is accompanied by flashing of the circular indicator around the tap area



To lock scrolling, you can use the **scroll control element**, which appears in the lower left corner of the editing area. Enabling this element blocks possible

shifts of the diagram, what makes editing faster and more convenient. Re-tapping of the element releases the lock.

Object editing

Tap an object while in the editing mode to select an object for editing. By controlling the blue elements of the edit frame, resize the object or, touching the object, move it on the diagram. In an inShort diagram, object boundaries must be at a distance of not less than four steps of the grid between each other, this is the minimum distance that allows to fully display the relationship between objects. If the position of an object or its dimensions violate this rule, the edit frame will be highlighted in red, and the object will take the valid position closest to the given one or will take the maximum allowable size (when resizing).

Re-tapping of the activated object opens the context menu of editing, with which you can perform a range of actions on the object, including cutting or copying the object to the clipboard, or removing the object.

To facilitate the mutual placement of objects during editing, there will appear alignment lines, which will help precisely align the edges and align the size of different objects.

Link editing

Tap a link while in the editing mode to select a link for editing. By controlling the blue elements of editing, change the shape of the link. Sufficiently long segments of the link can be divided into two equal segments by using the dissection element in the form of a diagonal cross. Note that the segments adjacent to an object cannot be shorter than two steps of the grid.

Selecting a group of objects

In the editing mode, tap a blank area of the diagram. After the appearance of the editing indicator slide your finger to create a marquee. Moving a finger, you can change the size of the selected area. Any objects being wholly or partially within the selection area are included in the group of the selected objects, the links between the selected objects also fall into the selection group. Release your finger to complete the selection.

The selected group can be widened or narrowed by using the elements of editing. If you tap objects that are not included in the selected group, when the selection is active, then these objects will also be included in the group selection. In this case, the selection area will be expanded, but only with the selected object.

The selected group can be shifted around the screen. Re-tapping of the selection opens the context menu of editing that allows you to perform a range of actions on the selection,

including cutting or copying the group of selected objects and the links between them to the clipboard, or deleting the group.

Tapping a blank area of the diagram outside the selection area will remove the selection from the objects.

Inserting objects

If you tap a blank area of the diagram when in the editing mode with no current selection, then, provided there are previously copied objects or text in the clipboard, a context menu with the paste option will appear.

If the clipboard contains previously copied objects and links, their copy will be placed on a blank area of the diagram of a suitable size as close to the point of insertion as possible.

Inserting text

If the clipboard contains text when pasting, the program will suggest converting text to one or several objects. The generated objects will be of type General process, and their size will depend on the size of the pasted text. With the text insertion feature, you can quickly convert a plain text list into a diagram.

Advanced features of folding objects

If you drag and drop an object or a group of objects on another object of the diagram, then the selected objects will form the nested diagram of the destination object; if the recipient already had a nested diagram, it will be supplemented.

A selected group of objects can be collapsed via the context menu of editing, by activating the menu item «Roll Up». A new object with a nested diagram, which includes all objects of the collapsed group, will be created. The created object will have connections with the rest of diagram objects, similar to the links of the collapsed objects.

Object card

Most of the properties and parameters of an object can be changed in the object card. While in the execution mode, tap an object to open its card. In the editing mode, the card is available via the popup menu of editing, the «Info» menu item.

By switching the card to the editing mode, you can change the name and description of the object.

Creating a nested diagram

In the section «Nested diagram» of the card, you can add a diagram to the object. The program will offer either creating a new blank diagram, or copying one of the diagrams stored on the device.

If an object already contains a nested diagram, you can remove it when editing the card. Tapping the title of a nested diagram will move to it.

If a diagram was copied, the name of the new diagram will be taken from the copied diagram. When you create a new diagram, its name will be the name of the object. When you change the name of the object, the name of the nested diagram will change accordingly, but only on condition that before the edit the name of the object and of the diagram coincided.

Diagram card

Tapping the name of the diagram in its title area opens the diagram card. In this card, you can configure the properties that are common for the entire scheme, including locking this diagram from changes.

Diagram execution

Object execution

For workflow diagrams, of great importance is task execution control, ensuring that all processes are performed in the necessary order. inShort program provides such control by means of **diagram execution feature**.

Diagram execution is done by executing its objects that are in the active state. Each object of a diagram can be in one of four states.

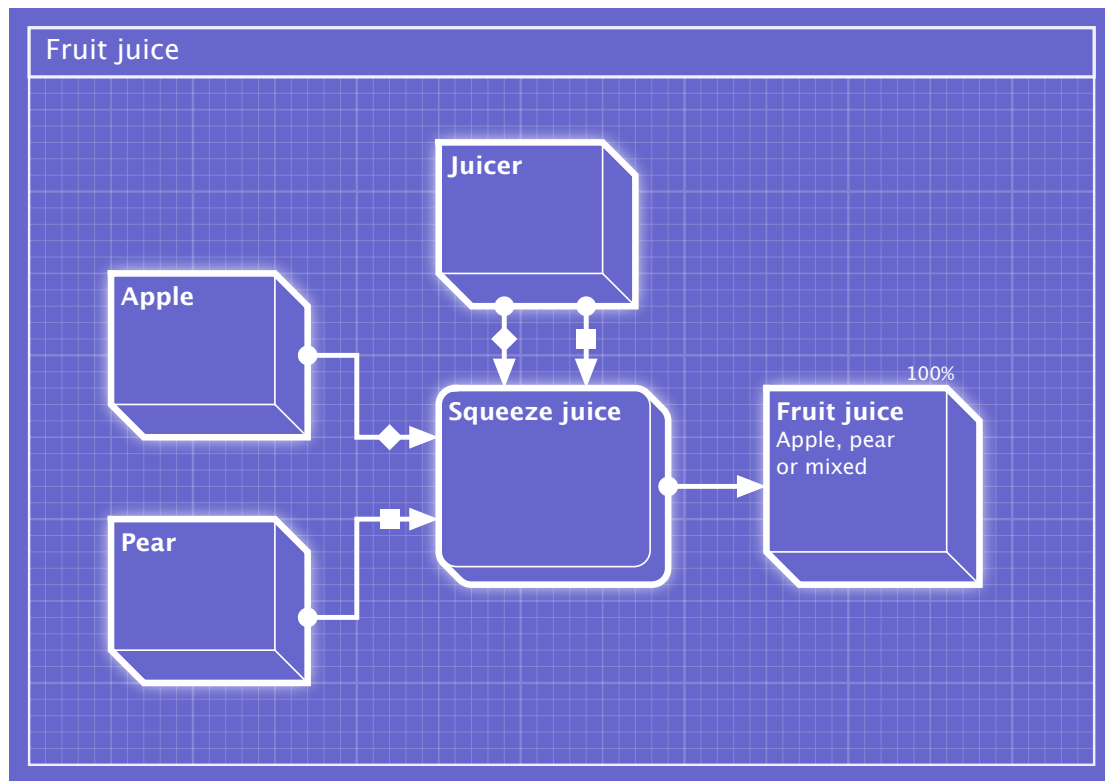


Passive state

When an object is in the passive state, it means that it cannot be executed, because there are no conditions for its activation. Such an object is displayed in the diagram for the needs of planning, indicating the place of the task or the goal in the overall task structure.

Active state

Active objects are colored in red in the diagram, and their borders have a red hue. In order for an object to move to the active state, it is necessary that the conditions for its



activation are developed: all preceding objects are in the fulfilled state, or if there are no preceding objects, the diagram itself is in the active state.

When an object is in the active state, it means that the related task of the real world is now being executed, and upon its completion the diagram object can be moved to the fulfilled state.

At the bottom of the active object there is schedule area. If you activate it, the program will prompt you to specify the degree of completion of the object. For different types of objects, specifying the degree of completion is done in various ways, for example, for processes you need to specify the percentage of readiness of the work being executed.

If an object has a nested diagram, then instead of specifying the degree of readiness you should execute the nested diagram, for which purpose the nested diagram becomes active, and all objects of the nested diagram without predecessors also go into the active state.

Fulfilled state

- ➡ When an object is completely ready – the tasks are performed, the goals are achieved, it goes into the fulfilled state. Borders of completed objects acquire a green hue, with the aid of which you can visually assess the degree of completion of the diagram.
- ➡ **A** At any time, you can activate the schedule area of a fulfilled object and return it back to the active state, with all its dependent objects going back to the passive state.
- ➡ **B** At any time, you can activate the schedule area of a fulfilled object and return it back to the active state, with all its dependent objects going back to the passive state.
- ➡ **C** At any time, you can activate the schedule area of a fulfilled object and return it back to the active state, with all its dependent objects going back to the passive state.
- ➡ **D** If an object has a nested diagram, it goes into the fulfilled state only upon completion of the nested diagram.

Deferred state

If a diagram has been executed without executing any activated object, this object is marked as deferred. Borders of deferred objects acquire a purple hue. Active objects of the nested diagram are also marked as deferred.

Thus, noting the change in the state of objects in the diagram, you can control the passage of the workflow, when various business processes are executed, and be sure that the process goes in strict accordance with the established order.

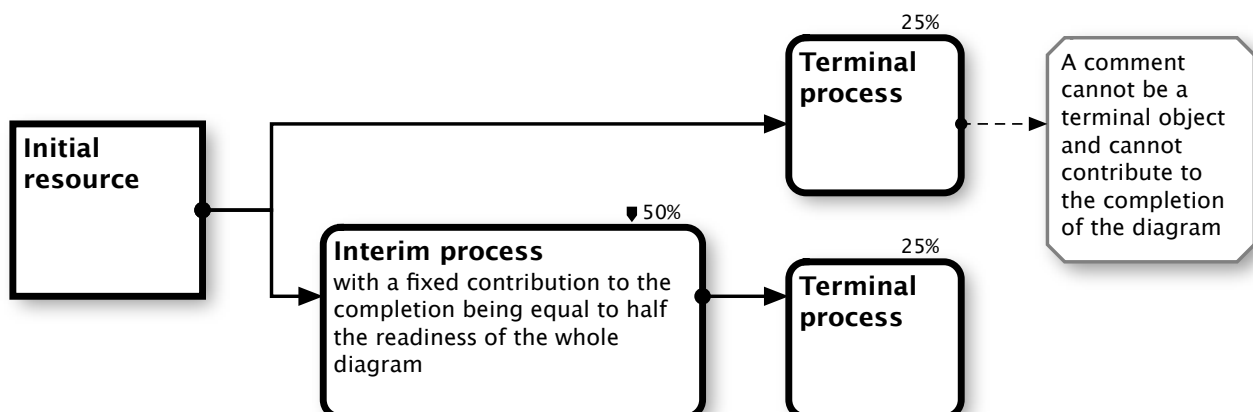
Alternative ports of activation

Often a specific goal can be achieved in various ways. To reflect this situation, it is necessary to use alternative ports of object activation. An object can totally have five ports of activation: the standard one and ports A, B, C, D. Using the tab «Link properties» of the Inspector, you can assign each link to any of these ports, which will be marked on the link itself. To activate the object, it will be sufficient that all the links marked with one of the ports lead to the fulfilled objects. Thus, you can configure the logic of the object activation by the AND method, by the OR method, as well as by any combination of these methods.

In this diagram, for the task «Squeeze juice», two ports of activation A and B are defined (marked on the links by a diamond and a square). Port A is activated in the presence of a juicer and an apple, port B in the presence of a juicer and a pear, so juice will be squeezed in the presence of a juicer and one of the fruits, regardless of the presence of the other fruit.

Contribution to the completion of the diagram

Each diagram object that has no outgoing links, is considered a **terminal object**, for which its contribution to the completion of the diagram is determined. In general, all terminal objects are considered equivalent, and overall contribution to the completion of the diagram is split evenly between all terminal objects. Contribution of the object to the completion of the diagram is indicated above the upper right edge of the object as a percentage. A diagram is considered executed when the total contribution of the fulfilled objects to the completion of the diagram is equal or more than 100%.



Thus, in the default case, fulfilling all terminal objects leads to completion of the diagram.

For more complex cases, you can specify the value of a **fixed contribution** of the object to the completion of the diagram in the card of the object. To specify a fixed contribution to the completion of the diagram, an object may not be terminal, it can be any object of the diagram. Fixation of contribution is marked by a tag to the left of the contribution value. If fixed contributions to the completion are defined in the diagram, then the terminal objects (having no fixed contribution) share the remainder of the total contribution after subtracting fixed contributions from 100%.

Fixing contributions to the completion of the diagram for various objects, you can define various scenarios of completion of the diagram.

Objects of specific types are not subject to execution, they are not considered terminal when they have no outgoing links, and for them you cannot set a fixed contribution to the completion of the diagram.

Object types

For the pictorial representation of the reflected business process the diagram can include objects of different types, each type representing different aspects of a certain kind of goals and tasks, with their own characteristic parameters and peculiarities of execution.

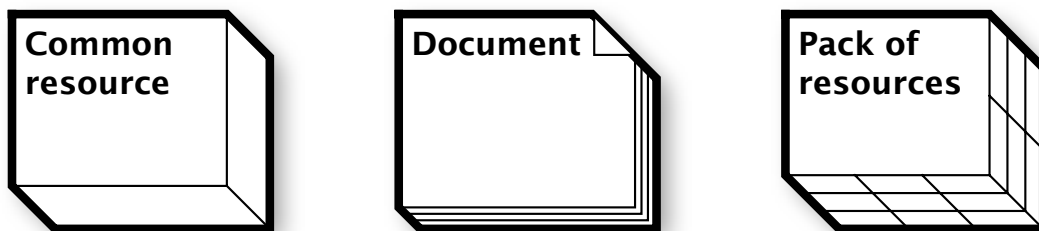
Information and physical objects

One of the main division of objects is their division on informational and physical. Since working with information differs significantly from working with physical objects, it is important to separate information and physical flows. There is a principle in an inShort diagram, according to which physical objects are depicted with volume figures, information — with flat ones, and links between physical objects have a greater thickness than information links.

Resources

Conditions necessary to start executing tasks, as well as goals achieved by performing tasks are marked with objects of type 'resource' on the diagram. As noted earlier, these objects are designated with shapes with straight (not rounded) corners. Since the most important parameter for a resource is its presence, then to fulfill an object of this type, you should check the switch indicating availability of this resource for subsequent processes. With that said, it is reasonable that the nested diagram for these objects contains processes of obtaining a resource, checking its quality or the process of bringing a resource for subsequent use.

Avoid direct links between resources, since such a connection always involves a process of transformation of resources, which is useful to be displayed explicitly. However, sometimes, to simplify a diagram in the case of apparent conversion that does not require a separate description, a direct link between resources is admissible. An example of such an admission is extraction of a separate part of the resource needed for a subsequent task, for example, from the resource «Concert ticket» you can extract the information resource «Time and place of the concert», which will be used for the process «Taxi booking».



Common resource

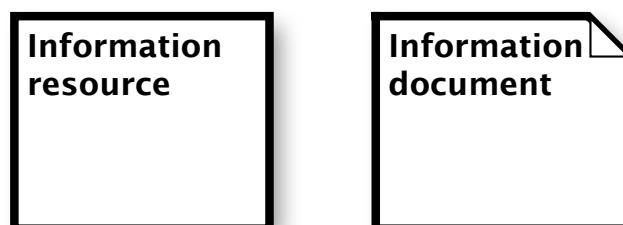
Common resource is a basic object of this type. Using it you can denote physical resources or resources, identification of the nature of which presents difficulties.

Document

Document is a unique physical resource of the established form, the authenticity of which can be confirmed. Passport, contract, stamp, seal are appropriate candidates to be represented with an object of type 'document'.

Resource kit

Resource kit denotes an arbitrary group of resources. This object is appropriate to use when it is useful to emphasize that a group of disconnected resources rather than a one-piece object is denoted. For example, the resource «Engine parts» can be denoted as a resource group entering the input of the process «Engine assembly», the result of executing which is the common resource «Engine».



Information resource

Information resource is used to indicate information of any kind.

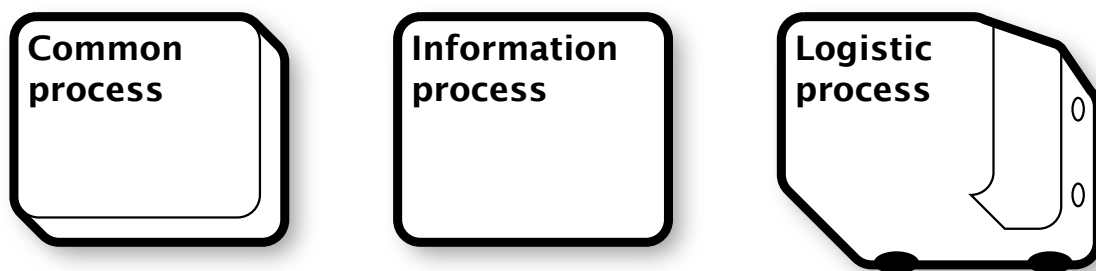
Information document

Information document is a unique information of the established form, the authenticity of which can be confirmed. Electronic signature, file in an authorized location, personal mark in a database are appropriate candidates to be represented with an object of type 'information document'.

Processes

Processes refer to any activity. These objects are represented by shapes with rounded corners. For the execution of a process you should mark the progress in task execution in percentage terms, upon reaching 100% of progress the process is considered fulfilled.

For each process, it is desirable to identify a resource that is the goal of task execution. However, if the end result of task execution is some temporary resource entirely consumed by the following process, then for simplifying the diagram you may omit indication of this resource.



Common process

Common process is a basic object. Using it you can denote any activity or objects, identification of the nature of which presents difficulties.

Information process

Information process is used to indicate a procedure of information processing.

Logistics process

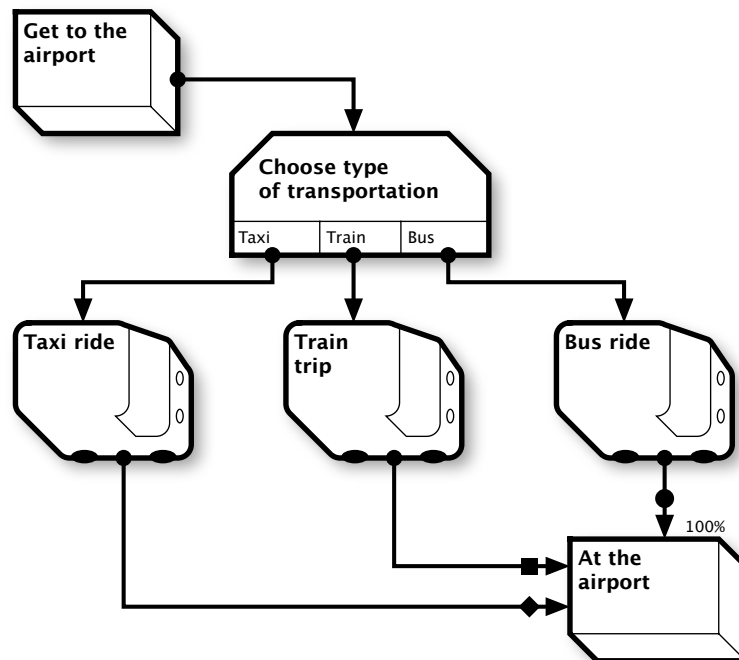
Logistics process is used to indicate a procedure of moving resources from place to place.

Decision-making step

Sometimes you can anticipate different ways for the situation to develop, but it is quite difficult to determine in advance what way will be passed. To describe this situation, you can use a decision-making object in the diagram. This object has the shape of a trapezium in its upper part, and its lower part is divided into several segments according to the number of possible alternatives. When executing the object, you have to choose one of the possible solutions, then the links originating from the corresponding segment will become fulfilled and

will activate the following objects, and other links will remain passive. Thus the execution of the diagram will be directed to a certain path.

Objects of this type cannot have a nested diagram.



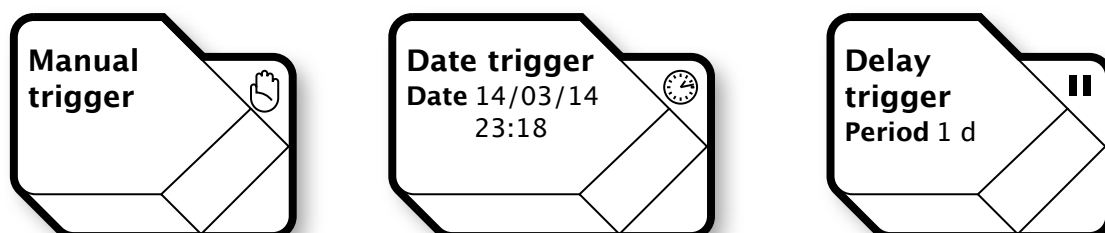
Alternative ways of solving problems

Combining the decision-making object and alternative ports of object activation, you can create alternative ways of achieving a same goal within the diagram.

Triggers

Execution of processes may depend on external events poorly controlled by the executors of the diagram. A typical example of such events are time events: reaching a certain date or the expiry of a period of time. To reflect the impact of external events on the course of execution of the diagram, the objects of type 'trigger' are used.

The program provides three types of triggers.



Manual trigger

When the event associated with the trigger occurs, the user must manually mark the trigger as executed, thus activating the further process. The manual trigger is marked with the palm sign on a diagram.

Date trigger

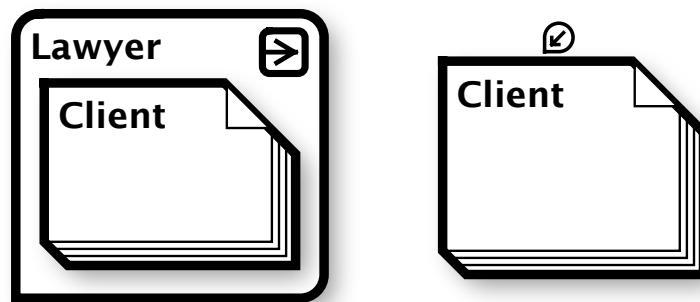
This trigger is executed automatically, without user intervention, when it is pre-specified date. However, if the trigger was activated later than the scheduled date, it will never be fulfilled.

Delay trigger

This trigger is executed automatically, when predetermined time since its activation expires.

Proxies

Sometimes execution of a project depends on the state of affairs in another one. Most often this is manifested if both projects competitively use a same resource.



To reflect such a dependence, use proxy objects. Such an object can be associated with a destination object of any diagram and represent the state of the associated element. After the establishment of proxy relationship the states of the proxy object and of its addressee are interrelated: the destination object can move to the active state only if its proxy is also in the active state, in turn, the proxy can only be fulfilled by the execution of the destination object.

A small copy of the destination object is displayed inside the proxy. Activating the area with the link sign in the upper right part of the image of the proxy object you can quickly jump to its addressee. If an object has a proxy, this is marked by a special tag at the top.

Please note. Despite the high flexibility of proxies, use them with caution as they introduce hidden dependencies in the diagram and are resource demanding from the device. The feature of analyzing diagrams as a project may not work correctly with diagrams containing proxies. Also, the program does not allow the creation of situations in which the state of a proxy and of its addressee are additionally interconnected by the structure of the diagrams.

Failed tasks

Quite often, when the task is to achieve an innovative goal, there is a possibility that this goal cannot be achieved in the current conditions. In this situation, the object associated with the task can be marked as **failed**. Such an object is usually displayed struck through crosswise with a dark red border.

The object can be failed by internal, external or for subsequent causes.

Internal causes

When the cause is internal, this turns out during the execution of the task, and a mark about failure is made by the executor. This action means a **manual mark on the failure**, which can be set for any active or executed object.

If an object has a nested diagram that has been failed, the object will **fail through a nested diagram**, which is also an internal cause.

Failures by internal causes are not instantaneous, and for them you need to specify the **time of failure registration**.

External causes

If before the start of the task execution it turns out that it is impossible to create conditions in which it can be executed, then the causes of the failure will be external to the task. Since a diagram should reflect the process of creating conditions for the execution of the task, it is most likely in this situation that one of the preceding objects has failed. Such a failure is called **the predetermined failure by dependencies**. Since there is no sense in starting a task with a predetermined failure, such failures do not take time are marked immediately on the anticipated start of the task, that is, they occur instantaneously.

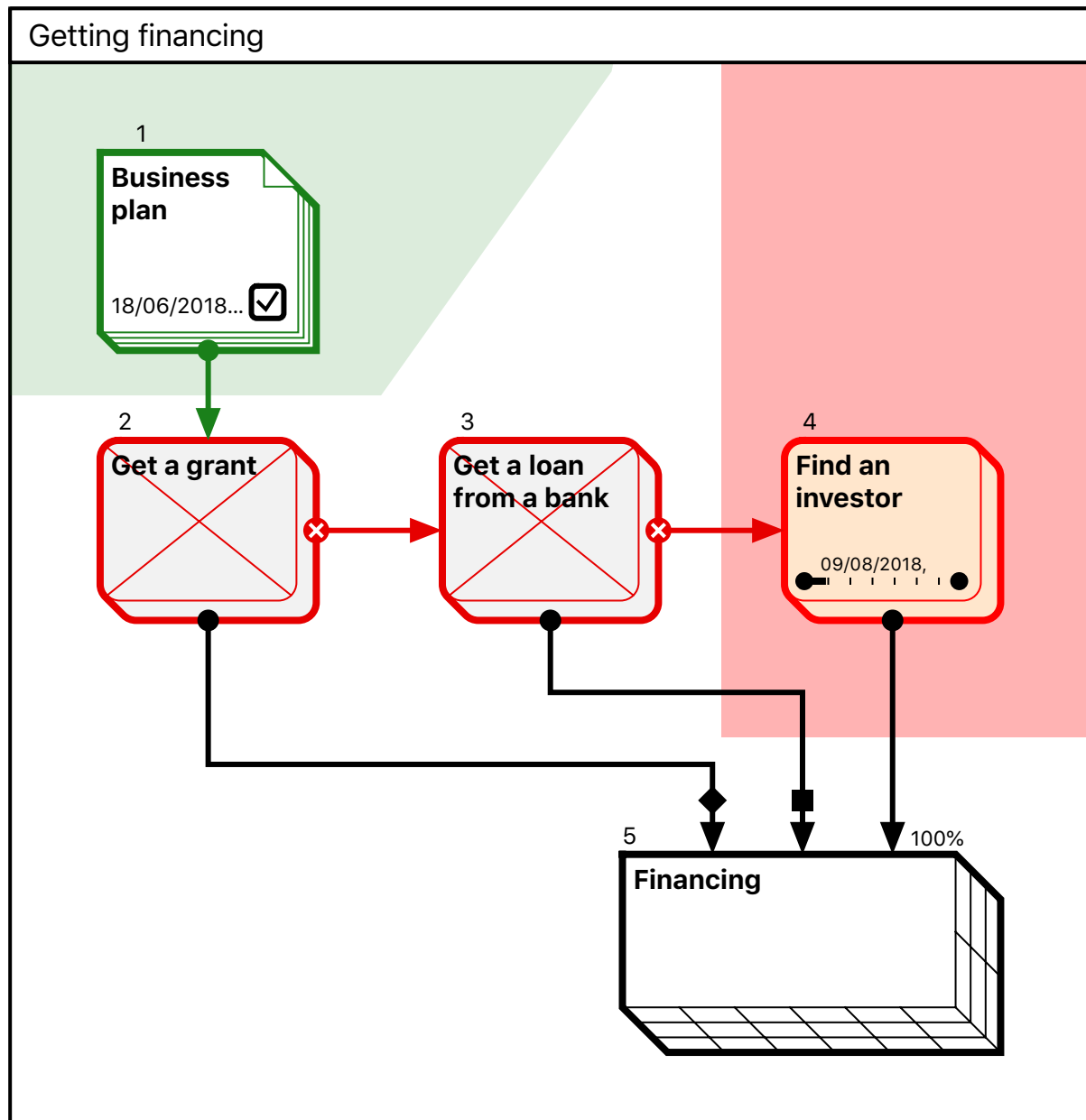
Subsequent causes

Sometimes the fact of failure is fixed after the mark on the execution of the task, this is a **failure for subsequent causes**, and it is marked as manual.

Thus, if a task was failed, then all subsequent tasks depending on it will also be marked as predetermined failures, and the nested diagram will be stopped. After the failure of the task, the diagram containing it will be analyzed, and if there are no potential ways in which the diagram can be executed after the failure, then the diagram also fails.

Emergency links

If it is obvious in the planning that certain tasks have a high probability of failure, it will be useful to provide for a response procedure. For this, emergency links are provided. In the link properties, any suitable link can be marked as an emergency link, which means that unlike the usual connection, it will be activated if the source object fails.



The emergency link is marked with a cross on the port of the source object.



By placing objects activated in the failure in the diagram, you can avoid that the entire diagram will be marked as failed, but for this, emergency response paths should alternatively lead to objects that have sufficient contribution to the completion of the diagram.

Groups

There are situations where it is useful to visually separate a few contextually related diagram objects from other ones. For these purposes, you can use the object of type 'group'. When editing a group, you must specify its area; any diagram object that touches this area will be included in the group. The area of the group can be tinted with an arbitrary color, visually separating it from the other part of the diagram. To edit a group, you have to select it by activating the header area of the group.

There are three types of groups in the program, they differ by the method of specifying the area of inclusion of objects.

Arbitrary area

The area of the group is defined by an arbitrary rectangle in the diagram.

Horizontal track

The area of the group is defined as a horizontal rectangle touching the left and right borders of the diagram. When the diagram is resized, the area of the group is adjusted accordingly.

Vertical column

The area of the group is a vertical rectangle touching the upper and lower borders of the diagram. When the diagram is resized, the area of the group is adjusted accordingly.

A group cannot have links and is not subject to execution.

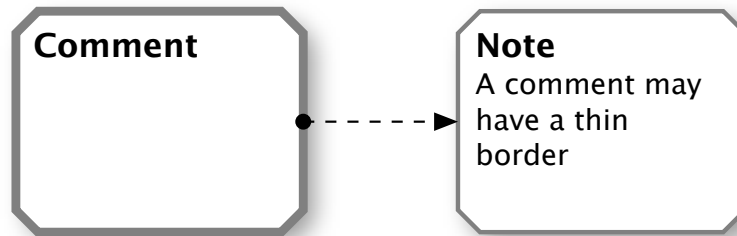
Some of the properties of groups (work resources and calendars) can be extended to the objects they include, such cases will be considered further. One object can be included in several groups, but a group cannot be included in another group.

Folders

As mentioned earlier, folders are a special kind of object insulating diagrams from each other. In the card of the folder, you can deactivate the schedule for the nested diagram, then all objects of the diagram will go into the passive state, and the execution of the diagram will be impossible. Use this option to create diagram templates, which do not imply their execution. A folder may have links with other objects, but these links are descriptive and do not affect the order of execution of the diagram.

Comments

To place background and explanatory information on the diagram, the objects of type 'comment' are used. Comments are displayed with rectangles with beveled four corners, the borders of which have a gray hue. Objects of this type are not subject to execution and may be connected with other objects with only descriptive links.



Descriptive parameters of objects

In the card of an object, you can detail the object description using particular descriptive parameters.

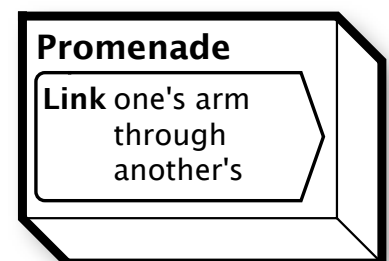
External link

You can specify one active external link for an object. The link must satisfy RFC 1808¹. Besides the link itself, you can specify its name, which will be displayed on the object instead of the link code. Upon activation of the link area, the application will form a request to the operating system to open the document associated with the link.

In this way you can, for example, refer to an Internet resource or form a post message to a specific address. Applications installed on the device may register their own link schemas, with which you can refer to the content within such application or activate the execution of pre-registered operations. Check the documentation for the installed applications to learn about the ability of these applications to work with original link schemas.

A link defined in the object is non-modal background information, it means that the execution of the object does not depend on the activation of the link, that is, a user can fulfill an object without learning the content of the link.

In turn, inShort defines its own link schema, which will be described separately.



When you export a diagram in pdf format, links within the pdf file will also function.

¹ Network Working Group. Request for Comments: 1808. Relative Uniform Resource Locators. June 1995.

Illustration

An object can be supplemented with a graphic image from the image library on the device. If the object is large enough to accommodate the image with a reasonable reduction, it will be shown in a blank area of the object.

Hidden object

Sometimes the idea of the further course of the process can prevent executors from effectively focusing on the execution of current tasks, for such cases hiding of objects is provided. If an object is marked as hidden, it will not be displayed in the passive state, so executors will see only active and fulfilled objects on the diagram without receiving information about a possible future direction of the process.

In edit mode, hidden objects are displayed on a par with normal.

Customizing the appearance

Taking advantage of the option to customize the appearance, you can change the font and font size of inscriptions on the object. To achieve professional easily readable appearance of the diagram, it is recommended to use this opportunity restrictedly, in case of obvious need, and not to use more than 2-3 fonts on the same diagram.

Object tinting

To highlight key points on a diagram, you can tint individual objects with a suitable color. When you turn on object tinting for the first time, the object is provided with a random color, which can be changed to a more appropriate one. The additional object's fill cannot be made completely opaque, so the base color of the object will always be noticeable. This allows correctly assessing the state of the object by the hue of the filling and the color of the borders regardless of tinting.

It is recommended to use this feature sparingly, as the abundance of various color accents on a diagram may complicate its reading, and even give it a clumsy, unprofessional appearance. It is more preferable to introduce color coding in a diagram by using groups, because groups not only serve decorative purpose, but also additionally systemize data.

Diagramming technique

Starting to build a diagram, we usually have a good idea only about our goals and our initial resources. To successfully build new diagrams, use a simple procedure.

Step 1. Put your goals as resources in the lower right corner of the diagram.

Step 2. Mark the available resources as objects in the upper part of the diagram.

Step 3. Put the prospective interim goals as resources in the middle of the diagram.

Step 4. In front of goals existing on the diagram, put the processes that lead to the achievement of these goals, and connect new processes with their goals.

Step 5. Draw links from the resources available on the diagram to the processes that use them. If a resource required for the process is not on the diagram, add a new goal, returning to **Step 3** ↑.

Step 6. Draw links between processes, the execution of which depend on each other.

Step 7. Make sure the diagram is easy to read and contains not more than 20 objects. If it is not so, group a few contextually related objects into one object of the appropriate type with a nested diagram containing this group (use the feature of folding a group of objects).

Step 8. Make sure that the objects are of a type appropriate to their essence, visually separate information and physical flows. If the diagram contains a few contextually related objects, mark them out with a group. In areas that require explanation, place objects of type comment.

Step 9. For processes that are not elementary operations, build a nested diagram starting from **Step 1** ↑.

Step 10. For individual resources, where necessary, add a nested diagram of preparation of the resource for use. For chosen goals add a diagram on checking the required qualities of the goal achieved.

After the 10-th step we should get a detailed guide to achieving the desired result in the form of a structured set of diagrams ready for execution.

Adequacy of workflows

This section describes the functionality that is not currently available in the public version of the application, but the material described provides an overview of the general direction of development of the inShort paradigm.

Different systems of development and monitoring of workflows often overlook the fact that the main requirement to the description of a workflow is to comply with the actual situation. Processes do not always proceed according to the original plan, as it is very difficult to anticipate all the possible ways of development of the situation, at least, it is expensive. Moreover, in some cases, it is harmful to restrict opportunities of achieving the result to a limited set of techniques.

Most often facing problems in following the workflow, an executor knows how to achieve goals, when breaking the established order. At best, the executor raises an exception, due to which the problem is resolved in a special order. At worst, he decides to act contrary to the regulations. In such situations, the description of the workflow does not correspond to reality, and it cannot be used neither for registration purposes, nor in order to optimize processes.

Particular difficulties arise if the processes are governed by the template-instance method, when the description of the process is in a fixed number of templates, and each instance contains a reference to the template and certain parameters of template execution. In such a system it is difficult to take account of changes occurred in the individual case, as template modification may affect other processes.

All diagrams in the inShort program are unique. After copying the initial structure from the template diagram, an instance diagram can evolve independently. Such an arrangement allows adequate reflection of the workflow for any development of the situation, which with due accuracy ensures full compliance of the description with the actual state of affairs.

Several types of modality can be distinguished for objects.

Fixed objects

Such objects must be executed in strict accordance with the prescription, inability to execute such an object leads to the refusal to execute the whole process. Typically, such objects are the processes regulated by external regulators and the methods of compliance with safety requirements. Fixed objects are not subject to editing, their links and nested diagrams are protected from changes.

Required objects

Objects that can be executed in an alternative way, but it is unacceptable to completely exclude them from execution. For a required object, arbitrary parameters can be changed, except for the name of the object.

Recommended objects

Objects that are recommended to fulfill for optimal achievement of the goal, but if there are alternative ways to achieve goals, such objects can be replaced by others, or entirely excluded from execution.

Intolerable objects

Objects that clearly indicate intolerable ways of achieving the goals. Execution of such an object leads to the refusal to execute the whole process.

To date, it is impossible to specify the modality of objects in inShort, but this option is part of the inShort paradigm, which will be implemented within the framework of organizing joint work with diagrams.

However, information about the adequacy of workflows and the modality of objects gives a better idea about the concept of the application and ways of its development in the future.

Having the diagram and being guided by the information on modality of the processes, an executor can adapt the process for a specific case or for his own individual traits without stifling his creativity, but remaining within the prescribed framework and without violating the general provisions. Subsequent analysis of different ways of achieving the same goal will help accumulating practical experience, as well as identify and additionally motivate the most valuable workers.

3. Execution time control for tasks

Diagram schedule

At this stage, we learned how to organize workflows with the help of inShort, ensuring secure and complete achievement of the goal, let us now consider mechanisms to achieve these goals on time.

Since accentuation on the timing is one of the characteristic features of project management, the planning functions will be based on design techniques.

Types of schedules

Each executable object can have its own **schedule**: start date of execution and completion date. Aggregate of schedules of the objects constitutes the **diagram schedule**, and the diagram schedule supplemented with the schedule of the nested diagrams is the **project schedule**

Usually during the lifecycle a project has more than one schedule, let us consider their varieties.

Baseline

Usually work on any project begins with producing a baseline: in accordance with the established procedure of project, project participants are interviewed, on the basis of their data a planned schedule is formed, which is approved by an authorized person or a collective body. Baseline captures the intentions of all participants in the project and is the document, with the help of which the success of work on the project is checked. This type of schedule changes very rarely, only in cases of detection of significant circumstances preventing from compliance to the schedule. After edits the baseline once again passes the established procedure for approval. Note that any change in the baseline indicates an error of planning and requires research into the causes of errors in order to avoid them in the future.

Actual schedule

Upon execution of the work the real, or the actual schedule is formed, it contains concrete dates of work execution and bears the accounting function. In accordance with the actual schedule the cost of the work done is calculated and the other parameters of resource consumption are determined. It is the actual schedule that is compared with the baseline to determine the quality of planning. The real schedule is complemented as works are getting ready.

Planned schedule

Planned schedule contains the current situation on project planning. The basis of the planned schedule is the baseline, and, as works are getting ready, the planned schedule is adjusted according to the latest data. If some factors influencing the planned dates are

identified, the adjustments to the planned schedule are made immediately. For a project, boundary conditions of conformity of the planned schedule with the baseline should be defined. If these conditions are violated, the procedure of revision of the baseline should be initiated.

inShort allows keeping two schedules simultaneously for one diagram, one of which is the actual and the other is the planned or the baseline. By default, the diagram keeps track of the actual and the planned schedule so that changes of the real schedule are immediately reflected on the planned. If you open the card of the diagram and disable the switch of synchronizing the planned schedule with the real, then any changes of the real schedule will not affect the planned, thus the logic of the baseline is realized.

As the baseline is the most formal and static, it makes sense to keep it as a separate copy of the diagram, since the work schedule is usually subject to operational changes and additions that should not affect the approved baseline.

Mac OS

To switch the current view of schedule from planned to actual and back, you can use the «Mode» menu or take advantage of the control element on the top toolbar of the application.

iOS

To switch the current view of schedule from planned to actual and back, you can use a switch in the Settings section or take advantage of the control element on the top panel of the application. When the schedule of the diagram is switched to the planned mode, the top panel becomes pink.

Start date

Scheduling an object begins with determining the start date. When an object is activated, the latest date of completion among the preceding objects is selected, it is the **default start date**. If the object was activated by multiple ports simultaneously, the earliest default start date among the activated ports is selected. If the object does not have predecessors, the default start date is the date of beginning of diagram execution. If the diagram is placed in a folder, the start date for objects without predecessors and nested diagrams can be set arbitrarily.

Fixed start date

Sometimes the real date of beginning of the process can be later than the default start date, in such cases, the start date can be marked as fixed in the card of the object, after which it will be possible to move it to a later date. However, you will not be able to move the previously set date to an earlier date. So, fixing the start date guarantees that the process will commence no earlier than the date fixed.

Late starts

In the «Schedules» section of the object properties card,

Procrastination

late start by one day
▶ +1.00 d

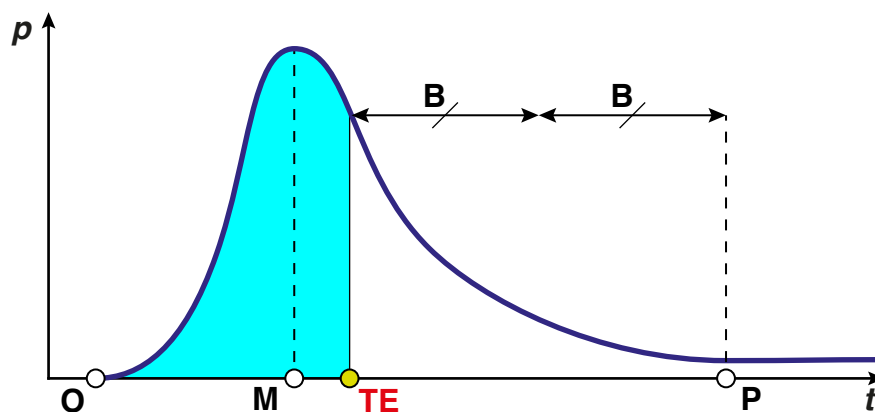
you can set the parameter **Late Start**, which defines a fixed delay of the object execution in relation to the default start date. Thus, the start date will move together with the default start date and will be away from it for a specified interval. The presence of the late start is marked with the symbol «Pause & Execute» on the object.

Execution time

Execution time is the time between the beginning and the end of the execution of the object. Actual time of execution is the interval calculated from the actual dates, planned time of execution is the interval of the planned dates.

Expected time of execution

To calculate the execution time, you can specify the **expected time of execution**, by which is meant the average time required for the task at repeated execution over an extended period of time. Estimate of the expected time is given empirically; to refine the assessment, you can take advantage of PERT¹, method implemented in the program. To do this, you have to specify a few extra parameters.



Optimistic time (**O**) – Minimum possible execution time of the task, assuming that everything goes better than would normally be expected.

Pessimistic time (**P**) – Maximum possible execution time of the task, assuming that everything goes wrong (but excluding major disasters).

Most likely time (**M**) – Best estimate of execution time of the task, assuming that everything goes as expected.

Expected time **TE = (O + 4M + P) ÷ 6**

Buffer time (**B**) – Reserve of time put into the buffer of the project for the execution of the task.

Thus, the task with a probability of 50% will be completed in the expected time. Additionally, the program calculates the buffer time, this is such a period of time that after adding it to the expected period we obtain the period with a probability of completion of the

¹ Program (Project) Evaluation and Review Technique

task, equal to 80%. Buffer time is widely used in the analysis of projects, what will be discussed later.

Estimated time of execution

Based on the parameters of the object and its schedules, the program tries to calculate the **estimated time of execution**.

Step 1. If the object has the **actual time of execution**, it is considered the estimated time of execution.

Step 2. If the object has the **planned time of execution**, it is considered the estimated time of execution.

Step 3. If the object has the **expected time of execution**, it is considered the estimated time of execution.

Step 4. At this stage, it is considered that the estimated time of the object execution is undefined.

End date

When an object is executed, the **estimated end date**, which is determined by adding the estimated time of execution to the start date, is automatically displayed in its schedule. If the estimated time of execution is undefined, then the current date becomes the end date. For the actual schedule, the estimated time of execution cannot be later than the current date, but the user can specify an arbitrary end date, which should be later than the date of beginning of object execution.

Integration with the program «Calendar»

On the basis of the planned schedule inShort can generate events in the standard «Calendar» application.

For this, you need

Mac OS: to toggle the «Add to Calendar» switch in the object schedules tab.

iOS: to toggle the «Add to Calendar» switch in the object card, when in the mode of the planned schedule

When the object receives a planned schedule with concrete start and end dates, a new event will be created in the «Calendar» application.

The name and description of the event created corresponds to the diagram object. Any changes to the diagram object will be immediately reflected in the event of the «Calendar».

In cases where among multiple copies of the same process there are many objects with the same name, you can use the settings to add the name of the folder, in which the process is located, to the event name.

Calendars

No one can work around the clock, even equipment requires outages for routine maintenance. Typically, the work is performed according to the work schedule. Usually such a schedule is made on a weekly basis, defining a schedule of work for each day of the week.

To account for this practice, the program uses **working calendars**, which can be managed in the application settings.

Working calendars

A working calendar has the following parameters:

Name

Serves to identify the calendar.

Weekly schedule

The schedule is broken down by days of the week, containing a list of daily time periods during which the work is carried out. Additionally, for each period, you can specify productivity, what, if necessary, will allow taking account of changes in work productivity during the day.

Calendar exceptions

Calendar exceptions allow you to specify dates and periods when following the weekly schedule gets broken. Exceptions are of the following types:

- **Special day.** A day having a special daily schedule. For this exception you need to specify a particular day and enter a new daily schedule.
- **Non-working period.** Fits well to describe vacation and other break from work.
- **Annual date.** A combination of day and month that is non-working year after year is specified.

When entering exceptions, you can use an option that automatically adds entries on the standard annual holidays.

Natural calendar

If no working calendar is specified, it is assumed that the work is carried out continuously all day and every day.

Specifying a working calendar

In the parameters of the object, you can specify a working calendar, then the object execution will follow the new schedule. When a new object is created, its calendar is set to the parent's calendar, and if the latter is not specified, then to the default calendar.

For more information on the impact of working calendars on the schedule see the next section devoted to work resources.

Work resources

Managing work resources

To complete any process, an executor is required, indication of the task executor is important information for process control tasks. It should be noted that the user of the application, noting the execution of tasks, acts as an implicit executor of processes, and in the case of automatic processes (for example, the date or the delay trigger) the application itself acts as an executor.

Obviously, the executor is a necessary factor for process execution, therefore, the executor plays the role of a resource. However, since the executor can be associated with many processes of different diagrams, in order to not overload the scheme with additional links, instead of creating a resource object on the diagram, information about executor is included in the process itself.

Such a resource used by many diagrams and not distinguished explicitly as a diagram object is called **shared resource**. A resource explicitly indicated as an object in the diagram is called **dedicated resource**.

A shared resource that determines information about the executor or the means of execution is called **work resource**.

Work resources are divided into three types.

- **Human resource.** Used to describe a particular person involved in the execution of tasks.
- **Equipment.** Indicates the necessary equipment used in the execution of multiple diagrams.
- **Organization.** Defines a structured group of people with the necessary equipment for the work..

List of work resources can be kept in the corresponding section of the application settings. Besides the type of a work resource, you need to specify the other parameters of the resource.

Full and short names

Short name will be indicated on the diagrams and in the reports. Full name will be available when selecting a work resource from the lists.

Email address

When entering human resources and organizations, the program allows selecting a record in the address book of the device that corresponds to the resource, what significantly speeds up entering data on the name and the address.

Key of the work resource

Unique text key of the resource that allows you to map resource information from various devices. When you import a diagram from another device, all work resources with the same key are considered as one resource. It is advisable to always specify the resource key, at that it is important to achieve the uniqueness of the entered information. Good candidate for use as a key of a human resource is a personal email address.

If when loading a diagram the program failed to match a work resource being loaded with previously entered ones by key, it attempts to carry out matching by resource name. If a resource can be matched neither by key, nor by name, a new record is added to the list of resources..

Color of the work resource

If an opaque color is defined for the resource, then when you assign the resource to an object of type 'group', the color of the group area blends with the color of the resource, so groups using this resource will always have a similar hue.

Calendar of the work resource

For the work resource, a working calendar containing the schedule of work of the resource is indicated.

Calendar exceptions of the work resource

Calendar exceptions of the work resource allow you to modify basic working calendars to account for individual features of working schedule of the resource.

Assigning work resources

Assignment settings

Mac OS: In the tab of the Inspector containing the properties of an object in the project, ...
iOS: In the object card, ...

...you can assign work resources for the execution of the tasks described with the object.

Besides the work resource itself, in the assignment you need to specify the **resource workload** that defines the percentage share of the overall productivity of the resource that is used for the task. Thus, allocating the percentage of workload, you can use one work resource for multiple tasks simultaneously or account for underemployment of the resource by this project.

Assignment mode defines how a resource will interact with other resources during the execution of the task. You can choose one of three assignment modes in the program.

Summation of productivity

The performance of the resource is added to the performance of the other resources. This mode reflects the situation where two staff members independently execute the same task and the result of their work is added.

+ Controlled summation

The performance of the resource is added to the performance of the other resources, but the work can be carried out only in the presence of this resource. For example, a few students can work only in the presence of the mentor or, at worst, it is employees who work only when the boss is around.

● Multiplication of productivity

The productivity of the resource multiplies the productivity of the other resources. This mode reflects the situation where the worker's productivity depends on the performance of the machine used for work.

When you enter a new assignment, inShort forms the current calendar of the object which is the result of adding calendars of the assigned resources with account for the assignment modes.

iOS: You can view the current calendar in the object card.

Direct and indirect assignments

An assignment specified directly in the object is called **direct assignment of a work resource**.

If an object that contains a diagram, has direct assignments, then all objects of this diagram will have the same assignments, it is called assignments by diagram. Also, if an object is included in a group having direct assignments, the object will have the same assignments called assignments by group. Assignments by diagram and by group are **indirect assignments of work resources**.

If there is sufficient space available, direct assignments are displayed directly on the diagram object. Indirect assignments can be seen among the object properties, where they are displayed dimmed and contain relevant notes.

In some cases, to save the output area, assignments by diagram are marked with combination of symbols **[d]**, and assignments by group with combination **[g]**.

Be careful when assigning work resources to avoid simultaneous workload of a resource by more than 100%.

Mac OS: While working with reports...

iOS: When in the card of a work resource...

... you can list all of its assignments, use this list to analyze the workload. Particular attention should be paid to indirect assignments, as in complex diagrams it is easy to overlook

a situation with parallel branches of execution that will be simultaneously assigned to one work resource by diagram.

Material resources

Managing material resources

To specify a resource used by a process, it suffices to place an object of type 'resource' and link it with the process. However, there is a large group of resources, for which not only the fact of their use is important, but also a quantitative measure of used resource. Typically, such resources have the material nature, so it seems appropriate to define them as material resources.

Shared resource having a quantitative measure and consumed or produced by a process is called **material resource**.

Unlike the material one, the resource dedicated on a diagram has a unique character, being the goal of the process execution. For example, the goal of the task «Construct 3 engines» is a dedicated resource, and 3 engines will be a material resource associated with the achievement of the goal.

It is also important to distinguish between work and material resources, the main distinguishing criterion here is the fact that during the process execution a material resource undergoes quantitative transformation, and for a work resource, only qualitative changes are possible. For example, in a store, computers for sale are material resource, and their number should change over time, while in a classroom, computers are work resource, and it is desirable that in the process of work their number should remain unchanged.

Material resources can be divided into six types.

- **Means of payment.** Typically, this is money, estimated in a particular currency.
- **Consumable item.** A material resource that has limited use and is fully expended during use. Easy to recover and widespread.
- **Energy resource.** A consumable item being a source of energy necessary for the implementation of works.
- **Natural resource.** A resource, the replenishment period of which is determined by natural factors. May have regulatory restrictions on use.
- **Part/Component.** A resource that is not a separate article or a product.
- **Product.** A resource that is the end result of the execution of a work phase.

List of material resources can be kept in the corresponding section of the application settings. Besides the type of a material resource, you need to specify the other parameters of the resource.

Full and short names

Short name will be indicated on the diagrams and in the reports. Full name will be available when selecting a work resource from the lists.

Key of the material resource

Unique text key of the resource that allows you to map resource information from various devices. When you import a diagram from another device, all material resources with the same key are considered as one resource. It is advisable to always specify the resource key, at that it is important to achieve the uniqueness of the entered information.

If when loading a diagram the program failed to match a material resource being loaded with previously entered ones by key, it attempts to carry out matching by resource name. If a resource can be matched neither by key, nor by name, a new record is added to the list of resources.

Name and designation of units of the resource

Settings for units in which the resource is estimated. In addition, you should specify the number of digits after the decimal point for numbers representing the amount of material resource. For example, for the indivisible resources you need to enter 0 to estimate the resource in integers.

For means of payment representing currencies, it is recommended to enter the currency code according to ISO 4217 classification (for example: USD, EUR,...) as the key of the resource, then the program will automatically detect the name of the currency and its designation.

Using material resources

Use settings

Mac OS: In the tab of the Inspector containing the properties of an object in the project,...

iOS: In the object card,...

...you can specify material resources used for the execution of the tasks described with the object. For a resource, you have to specify the nature of the use of the resource: consumption or production, as well as to determine the quantitative parameters of use.

Production of the resource is marked with the «+» sign before the value of the resource amount.

Expected amount

The expected amount means the average amount required for the task at repeated execution over an extended period of time. Estimate of the expected amount is given empirically; to refine the assessment, you can take advantage of PERT method, similar to one which was used to estimate the expected time of execution previously discussed. To do this, you have to specify a few extra parameters.

Optimistic amount (**O**)— Minimum possible amount of resource required for the execution of the task, assuming that everything goes better than would normally be expected.

Pessimistic amount (**P**) — Maximum possible amount for the execution of the task, assuming that everything goes wrong (but excluding major disasters).

Most likely amount (**M**) — Best estimate of the amount of resource, assuming that everything goes as expected.

Expected amount **E** = **(O + 4M + P) ÷ 6**

Buffer amount (**B**) — Reserve of resource put into the project for the execution of the task.

Expected amount can be specified both as a fixed sum, and as a time rate, for which you need to specify the time period of use of a given amount of resource. After determining the expected execution time of the object, the absolute amount of resource will be calculated based on the specified rate. When you enter a rate, the calculated quantitative parameters are not entered, as they are determined based on the time parameters.

Planned amount

Amount of material resource put into the plan with the most current estimate possible at the moment, given the already made works.

Actual amount

Promptly updated amount actually used in the course of work.

Direct and indirect use

Use of material resource specified directly in the object is called **direct use of a material resource**.

For an object that contains a diagram, the total amounts of using material resources by all the objects of the nested diagram will be indicated, it is the indirect use by diagram.

If there is sufficient space available, the use of material resources is displayed directly on the diagram object. Indirect use is displayed dimmed and contains relevant notes.

In some cases, to save the output area, use by diagram is marked with combination of symbols **[d]**.

Analysis of the use of material resources

If you have entered the calculation parameters for the amount of the material resource, then inShort, besides the expected amount of the resource, also calculates the reserve, which is necessary to guarantee the execution of the task under normal conditions. If the resource consumption exceeds the expected values, availability of the reserve will allow you to continue executing the task.

The program calculates the total value of reserve of consumption or production for all material resources of the object's subdiagram. If the planned and the actual schedule are synchronized in the card of the diagram, inShort determines the level of use of reserves as a

percentage, use this level for operational control of demands to the amount of material resources. If the level of reserves is above 50%, the situation is considered normal. When the level of reserves falls below this point, the situation demands attention – the resource icon is displayed in alarming blue, and the work with the resources needs to be optimized. When the reserves are below 25%, the situation is considered dangerous, the icon is displayed in red, and the order of use of material resources should be reconsidered. The level value can always be seen in the record related to the indirect use of the resource by diagram.

For consumption of a material resource, reduction of reserve means that the amount of resources spent is greater than expected, and a certain saving of resource might be needed. For production of a resource, reduction of reserve means that fewer resource units are produced than it was expected, and probably the production efficiency needs to be increased.

Working with projects

Project life cycle

Project is a set of processes leading to the achievement of a certain goal in a limited period of time. Let us consider a highly simplified procedure for working with a project.

Project initiation

After the decision to start the project it is necessary to describe in detail the goal of the project and to define the criteria for its achievement, according to which it can be unambiguously identified that the goal is achieved. These criteria should include the following formal parameters.

- **Maximum date of the beginning of works.** If the works have not been initiated before this date, the project is considered closed.
- **Maximum date of the end of works.** If the project was not completed by this date, the project should be considered failed and be closed.
- **Minimum amount of initial resources.** If this amount of resources was not collected by the maximum start date of the project, then the project is considered closed.
- **Maximum amount of resources used.** If the project has not been completed, and this amount of resources was used, the project should be considered failed and be closed.

Note here that unsuccessful closure of the project does not always mean the **rejection of achieving the project goal**, this aspect will be discussed in more detail in the section devoted to project closure.

You should also compose the initial list of available useful resources and determine the list of executors included in the project team.

If the team consists of more than three members, you should create a document that defines the relationship between the team members and their responsibilities in the project process, this document will be the project charter.

Decomposition

The process of drafting a set of diagrams to achieve the goals of the project has already been discussed in detail, here we only note that this process is called **decomposition**, and the resulting set of diagrams is a kind of PERT¹ network diagram.

Baseline

The resulting diagrams should be supplemented with information on assignments of work resources, and also the expected execution times of diagram objects should be indicated. Then you should switch the diagram to the planning mode and sequentially execute all planned processes simulating the course of the project. When the goal of the project is achieved in the process of simulation, the diagram will contain the planned schedule of the project. This schedule should be evaluated according to the criteria for the achievement of the project goals, and if there are no discrepancies, this schedule should be approved as the **baseline of the project**. Save a separate version of the diagram with the baseline.

Execution

Mark the real execution of processes in the actual schedule, correcting possible changes of plans in the planned schedule. Compare the planned schedule with the baseline and in the event of significant discrepancies start the procedure for revision of the baseline. If the subsequent analysis reveals a significant change in the structure of the baseline, start the process of closing the project.

For quality monitoring of project status you should single out a few key indicators and continuously monitor them. It is impossible to keep track of all aspects of a complex project, so you need to focus on the key points and indicators of the project. Different techniques define these indicators in different ways, the inShort program following the project methodology of the Theory of Constraints². The process of project execution by this method will be discussed later in the section devoted to execution of projects.

Termination

If the goal of the project is achieved in a given time frame using an acceptable amount of resources, then the project is considered a success and is closed as successfully executed. Schedules of such projects should be stored, as they contain a successful experience of planning, which can be useful in the future.

If during the execution of a project you reveal a mismatch of the project parameters with the criteria for the achievement of the goal or that the structure of the existing baseline does

¹ Program (Project) Evaluation and Review Technique

² Eliyahu M. Goldratt, Jeff Cox. The Goal: A Process of Ongoing Improvement.

not ensure the achievement of the goal, you should refuse to continue work on the project. Then you have to revise the possibility and the need to achieve the project goals under the new conditions and, after adjusting the goal if necessary, start a new project.

There is a pernicious practice of permanent modification of the project showing all signs of failure instead of recognizing the project as unsuccessful and creating a new project. However, you cannot start over the same project, any modification of a potentially failed project means merely an attempt to restart the old project under the new conditions, but since the initial design conditions are not revised in such cases, there is a significant risk of complete inaccessibility of the project goals.

Unsuccessful closure of a project does not mean the fallacy of the goals, but points to errors of planning. Closing a project should not necessarily lead to the abandonment of project goals, but encourages revision of the manner of actions for achieving the success under the new conditions and with the new criteria of planning. Timely closure of a project in disputed circumstances is most often the best management decision.

Gantt chart

In 1910, Henry L. Gantt proposed a kind of a bar graph to represent the project schedule. To date, these diagrams have become the standard of graphical representation of projects. Of course, the inShort program can also represent schedules as Gantt charts.

Mac OS

To switch the current view of the diagram to the Gantt representation, you can use the «Mode» menu or take advantage of the control element on the top toolbar of the application.

iOS

In the Options section, there is a switch that allows you to select the current view of the diagram. When working on the iPad, the switch of the diagram view is available on the top panel of the application.

To get a visual Gantt chart, you must first produce a planned schedule, which will appear in the form of horizontal columns on the diagram and will become its basis. As the project is being executed, the planned columns in pink are replaced with blue columns of the actual schedule, allowing you to visually conceive the progress of the project.

iOS

By tapping the name of the object on the left side of the diagram, you can activate the panel that allows you to:

- open the object card;
- go to the flow chart of the object;
- go to the Gantt subdiagram;
- remove the object.

Activation of the object icon with a subdiagram will unfold its contents, and touch of the title of the rolled diagram will move to it.

You can manage the timing of an object by activating the schedule items on the main field of the diagram.

WBS code

A dotted rectangle in front of the object name in the Gantt chart is used to indicate the serial number of the diagram item. Within one diagram the serial number is unique and uniquely identifies the object. If you record in the structure of diagrams the serial numbers of all the parent diagrams that have been drilled down to reach the object, separating them with dots, you will get a unique address for this object. In such a way all objects of the project can receive a unique numeric address, which is conventionally called the work breakdown structure code, or WBS code.

Mac OS

The «Assign Numbers» item of the «Diagram» menu automatically assigns numbers for the current diagram in accordance with the current order.

iOS

Button with the # symbol on the top panel automatically assigns numbers for the current diagram in accordance with the current order.

In the flow chart mode the last index of the WBS code is displayed above the upper left corner of the object. Showing WBS codes next to an object can be turned off when setting up the application.

Project execution

The project methodology used in the application was first presented in the book by Eliya M. Goldratt "Critical Chain". This book is essential reading for all users, it is not only informative, but also written in a fascinating literary style.

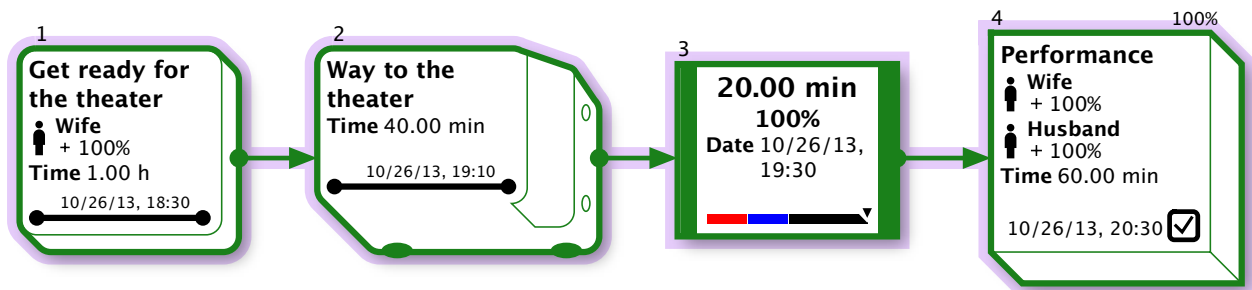
Time buffers

In real life, there is always a place for uncertainty, it is often expressed in violation of the scheduled dates. In cases where there is a reason to believe in inaccuracy of terms, it can be anticipated with the help of a special object, **time buffer**, which should be put in a place of the diagram where violation of terms is possible. As the name implies, time buffer allows you to provide for a time margin that compensates for violations in the timing of the execution of the preceding processes.

To get started with a time buffer, it is necessary to configure it properly. The configuration must be carried out in two phases: first, specify the expected time duration of the buffer, and then execute the diagram together with the buffer in the planning mode. In the planning mode, a time buffer is executed automatically and takes a period of time equal to the

expected time of execution. For the following correct operation of the time buffer it is recommended to make sure that the planned schedule is synchronized with the real.

Let us consider an example: a married couple has decided to attend a small performance at a theater. The husband, knowing from experience that his wife often does not fit in an hour allotted for preparation and traffic jams are possible on the roads, provided for a time margin of 20 minutes before the first bell in the theater.



Time buffer is displayed with thick sides, like a capacitor in electrical circuits, as these objects are similar in nature. On the field of the time buffer the remaining reserve of time is displayed, and the bottom of the field shows a scale indicating the degree of spending the time margin.

After executing the diagram in the planning mode he got the baseline, wherein the time buffer is set to 20 minutes, and thus fixed the end time of the buffer at 7:30 pm.

Later, having switched to the actual mode, he noted that this time his wife spent 10 minutes more than it was planned. Let us consider a few of Gantt charts describing this case.

Time buffer	17 10/26/13	18	19	20
<input checked="" type="checkbox"/> [1] Basic schedule				
<input type="checkbox"/> [1] Get ready for the theater	17:30			
<input type="checkbox"/> [2] Way to the theater		18:30	19:10	
<input checked="" type="checkbox"/> [3] 100%			19:30	
<input type="checkbox"/> [4] Performance				20:30
<input checked="" type="checkbox"/> [2] Schedule with a delay				
<input type="checkbox"/> [1] Get ready for the theater		18:40		
<input type="checkbox"/> [2] Way to the theater			19:20	
<input checked="" type="checkbox"/> [3] 50%				
<input type="checkbox"/> [4] Performance				
<input checked="" type="checkbox"/> [3] Actual schedule				
<input type="checkbox"/> [1] Get ready for the theater				
<input type="checkbox"/> [2] Way to the theater				
<input checked="" type="checkbox"/> [3] 50%				
<input type="checkbox"/> [4] Performance				

The first schedule is the baseline. In the second one you can notice that preparation took longer, as the planned schedule is synchronized with the actual, the planned dates have been shifted, and the time buffer has shrunk by half.

When a time buffer is activated in the actual mode, it is executed automatically with execution time equal to zero, so in a real schedule a time buffer never takes extra time. This feature can be noted on the actual schedule of our example.

Thus, a time buffer allows providing for a time margin and keeping track of it during the execution of the diagram. If the buffer size is halved, the time value on the buffer will be displayed in alarming blue, when the buffer is less than a quarter, the color will become red. The object introduced by this section, is widely used to control execution of sequential tasks.

Sequential execution

Suppose our project consists of three identical processes that follow each other. Each process has a reliable time of execution of three days, which means that with a probability of 90% the process will be completed within three days, then the entire project with a probability of 90% will be completed within nine days. It is reasonable to make a reliable plan, according to which the second process will begin three days later, and the third — six days later.

It would seem that we have done a good job and made a quality plan, but when you consider that our processes have an expected execution time of two days, then the goodness of the plan becomes not so obvious. The expected execution time means the time for which the process will be completed with a probability of 50%, that is in our example in half of the cases the time can be less by one day. If the first process is successful and is fulfilled before the time scheduled by the reliable plan, we will get a day of downtime before the next process. Obviously, this is a bad practice, which leads to a variety of adverse effects.

- **Low reliability of plans.**
- **Overestimation of required expenses.** Time and materials are reserved according to an overestimation blocking the necessary resources and increasing the costs for storage and maintenance of the possible surplus of materials.
- **The effect of the «last day».** When because of an excess of time planned within the terms, works are not carried out constantly, but closer to the end of the term, as a result ruining the reliable time as well.

If you make a plan based on the expected time of execution, the project will take only six days, but this period will be valid only in half of the cases, since the expected period of execution has the reliability of only 50%, which is also unacceptable as a quality plan. However, if we add another object in the form of a time buffer with duration of three days at the end of our project, we will get a nine-day plan with certainty of 90%, not overstating the timing for individual processes at that.

Let us understand how a buffer period of three days was formed. For each process, you can define the **buffer time**, this is a term to be added to the expected time to get the reliable time of execution. Since every process in our example had a buffer time of one day, the total buffer for three processes was three days.

In such a way we got a methodology for planning a group of sequential processes, let us consider how it can be applied to processes with a complex structure.

Critical path

To fully work with projects, an understanding of the concept of the critical path is required. **Critical path** is the longest sequence of tasks leading to the achievement of the project goal.

It is important to note the special significance of the tasks situated on the critical path, since any increase in the timing of such tasks inevitably leads to an increase in the execution time of the whole project.

Thus, in any project you can always identify a sequential group of tasks the execution of which determines the execution of the whole project. Of course, you can apply the methodology for planning the execution of a group of sequential processes from the previous section to the tasks on the critical path. Let us plan the timing of the tasks in accordance with the expected time, and at the end of the critical path place a time buffer with a value equal to the sum of reserve buffers for all the tasks on the path.

As a result, we will get a plan with a time in which the project is completed with a probability of 90%. The time buffer of the critical path will be a convenient indicator of project execution control: until the buffer is exhausted by more than 50%, you can be sure that the critical tasks of the project proceed in the normal way. When the reserve of the control time buffer falls below 50%, you need to pay attention to the tasks on the critical path and reallocate resources. If the control buffer of the project is exhausted, and the project is not yet fulfilled, you should start a procedure for revision of the baseline, what may possibly lead to estimation of appropriateness of continuing the project.

Feeding paths

Besides the critical path, a project may contain shorter paths, the result of execution of which is used by tasks on the critical path. Such paths are called **feeding**. A feeding path can have its own beginning or begin with a task on the critical path, but as to the ending, feeding paths must do it on tasks of the critical path.

Thus, an arbitrary graph of the project network can be broken down into one critical path and several feeding like tributaries flow into the river bed of the critical path. There is a risk that an increase of timing for tasks on a feeding path can make it part of the critical path, exceeding the duration of the project along the original critical path. To protect the critical path of the problems on the feeding ones, you should put a buffer of the feeding path in every place where a feeding path enters the critical. Using the method of planning sequential tasks, we construct an execution plan for tasks on a feeding path and determine the size of the control time buffer.

Obviously, tasks on a feeding path should take less time than tasks on the critical one executed in parallel, so the first task of the feeding path must begin with a delay in relation to the possible beginning of works. This delay is called **late start**. If you do not take into account the possibility of a late start when planning, it means that the result of the execution of the feeding path will be unclaimed for some time. In practice, this is expressed in the form of

finished units occupying the warehouse and requiring resources for safekeeping. In addition, the late start allows to postpone the purchase of resources needed for the feeding path, what helps to dispose the circulating assets more optimally.

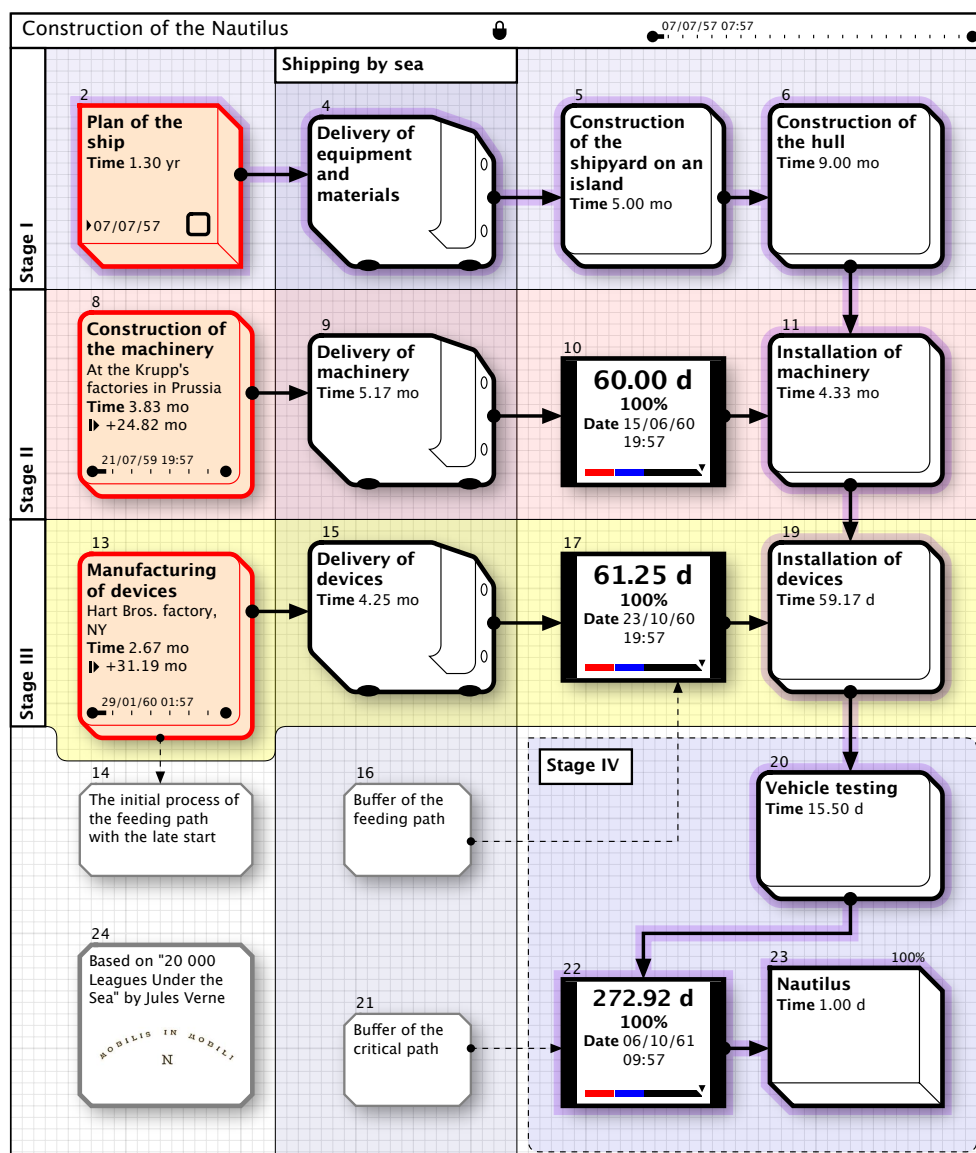
By monitoring the state of the reserve of time for a feeding path, you can timely notice the problem areas of the project and concentrate on them, thereby not allowing the change of the critical path. If the control buffer of a feeding path is exhausted, and the feeding path itself is not completed, it means that the critical path of the project has been changed and the existing baseline of the project is invalid and requires revision.

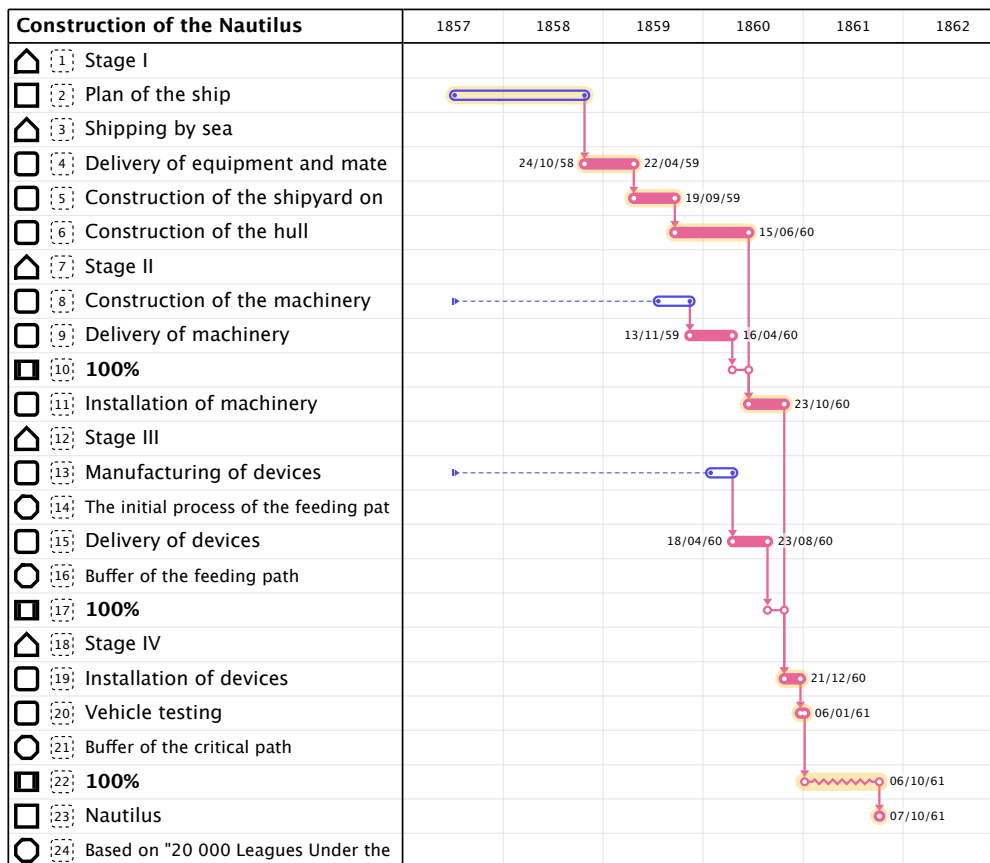
Control of project execution

When managing a large project, it is important to focus on certain areas of the project requiring intervention. Timely identifying tasks in trouble and concentrating efforts on them, you can achieve the successful completion in whole.

Properly places control time buffers will become reliable indicators of the state of the project. Correctly selected values of late starts for feeding paths will allow focusing on the most important tasks during the most difficult initial phase of the project.

Examine the project below as an example of using the methodology discussed





Automatic analysis of the diagram as a project

To simplify the work according to the methodology stated, inShort has a special feature of analyzing the diagram as a project, activated from...

Mac OS: the «Diagram» menu.

iOS: the application options.

Work on the project with the use of this feature should be built as follows.

Stage 1. **Decomposition.** Build the structure of the diagrams by following the work decomposition technique.

Stage 2. **Baseline.** If necessary, specify calendars and work resources for the objects of the project. Activate the analysis feature, the program will mark the objects for which you have to specify the expected time of execution. Activate the diagram prompts to enter the expected time of execution.

Stage 3. **Critical path.** Activate the analysis feature, the program will highlight the tasks and the links of the critical path by blue edging, will mark the places where it is necessary to put the control time buffers. Put the time buffers in the marked places, no adjustment of the placed buffers should be made.

Stage 4. **Calculation of control buffers.** Activate the analysis feature, the program will calculate the required size of the placed buffers and will set late starts in the origins of the feeding paths.

Limitations

- The feature of analyzing the diagrams can work with failures for diagrams containing proxy objects.

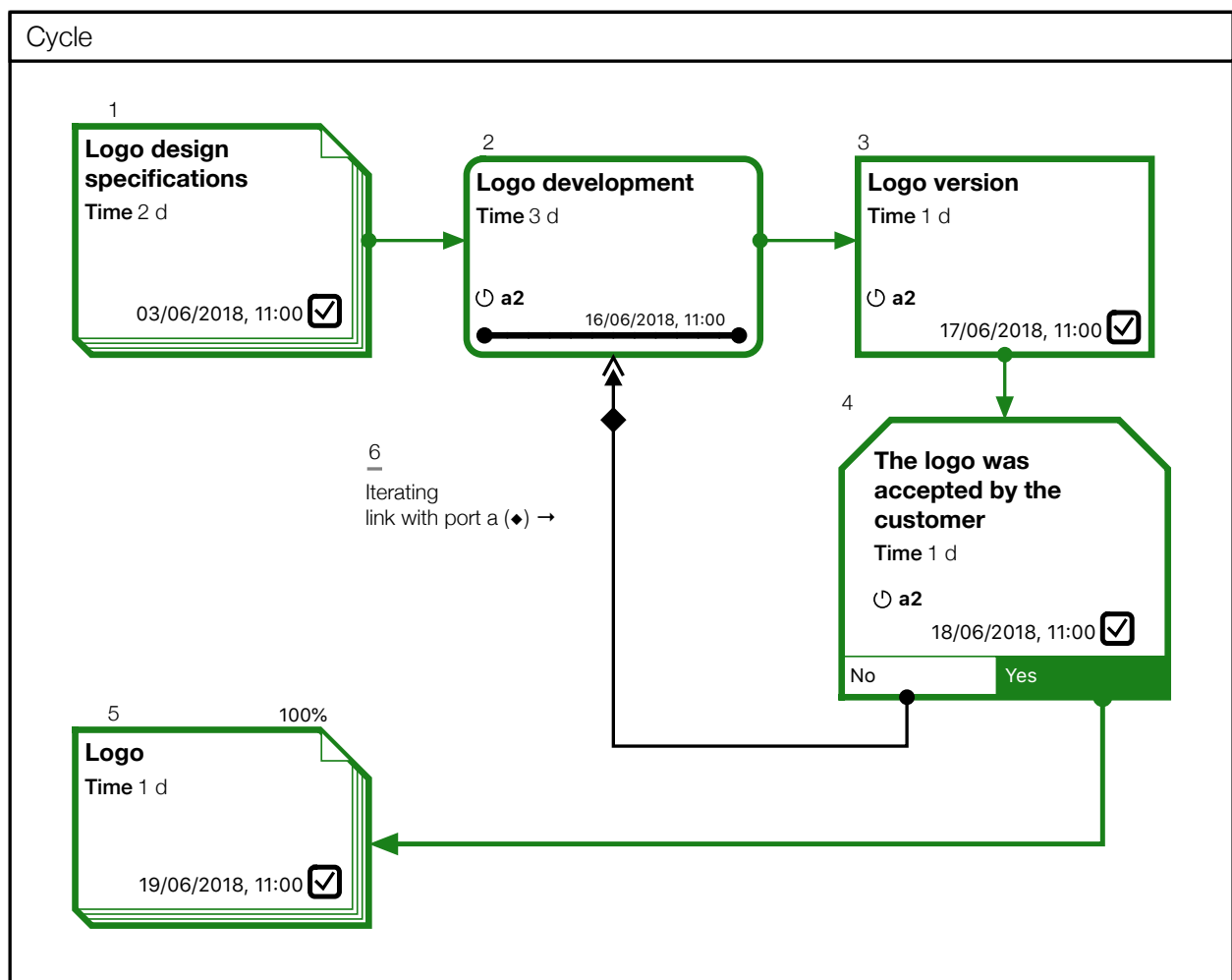
- When determining the critical path of diagrams containing decision-making steps, the program activates the decision that contains the longest path among possible.
- For objects that contain complex calendars, the analysis of time estimates may contain inaccuracies, what can affect the setting of time buffers and late starts.
- The feature does not analyze the load of work resources.

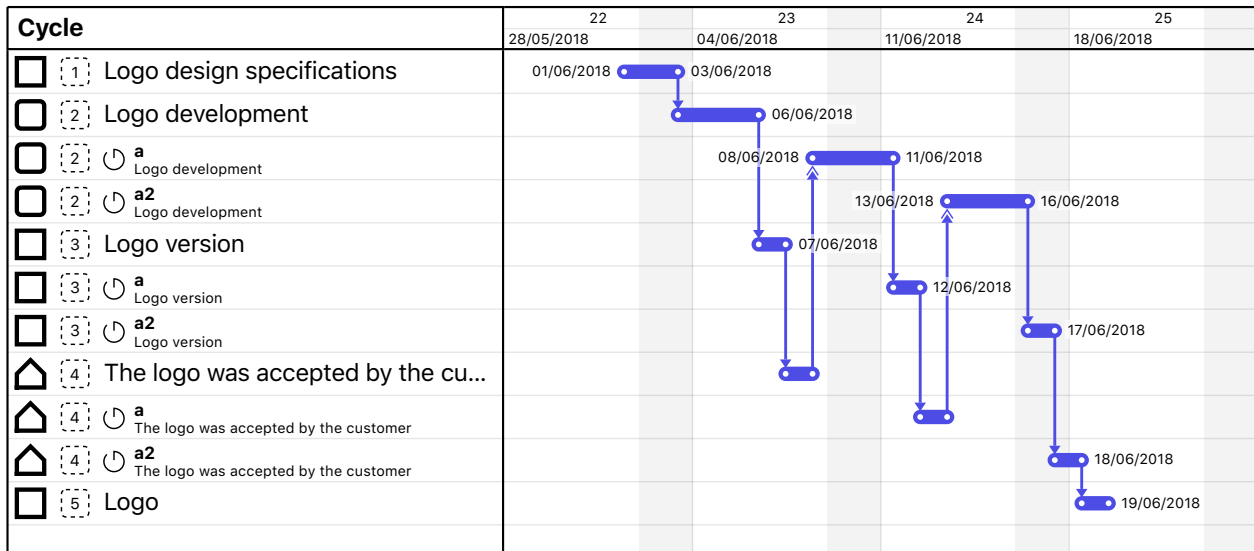
At this stage, you will get a diagram of the project with the highlighted critical path, localized and activated time buffers. The planned schedule will contain a complete time schedule of the project, which can be assessed in a Gantt chart.

Thus, a user can focus his attention on the structure of the project tasks and on the expected execution times of the tasks, all other parameters will be determined by the program without user intervention.

Cycles and threads of execution

A lot of real tasks in projects and work processes have a cyclic nature, let us consider a typical example.





In this case, the customer accepted the logo after two additional iterations. Such order of resource approval after additional refinement cycles is often a common occurrence. Usually in project management packages, each additional cycle is taken into account by creating a new set of tasks, which only complicates the structure of the project tasks. The cycles accounting subsystem allows inShort to eliminate this drawback from your projects, let us consider in detail the design of a cycle in the application.

Threads of execution

As is easy to see in the example above, the link from the decision step leading to the re-development of the logo has a double arrow at the end – this is the way **the iterative input** is denoted, and the corresponding mark in the link properties make the link iterating.



When an object is activated by a link with the iterator input, a new thread of execution is created, which is an independent set of schedules associated with the individual cycle. When the diagram is activated for the first time, it is assigned **the main thread of execution** and all subsequent schedules are included in this thread. However, starting from the cycle activation point, a separate thread of schedules is created, which are processed independently of the main thread and all the others.

Objects executed within the thread activate the schedules of this thread in subsequent tasks, spreading the execution of this thread on the diagram. Thus, an object can have several actual and planned schedules, one for each thread to which it was included.

Thread labels

To distinguish schedules, each thread (except the main one) has **a label** that is formed by adding the activation port name (a,b,c,d,s) to the original thread label. For example, if a new cycle was started from the main thread on port **a**, then the thread label will be **a**, now when the new thread again activates an iterator on the same port, the label of the subsequent generated thread will be **a2**, and so on.

If an object included in the execution thread has a nested diagram, a separate parent thread is created for it with a **parent label**, which is formed by adding the character **/** to the original thread label, for example, **a2/**.

If an object has several schedules, then it displays the data of the schedule that was activated with a later start date, and the thread label is shown above the schedule data and is marked with the cycle icon. In the Gantt chart, the schedules of the different threads are shown in separate lines. In the object schedule properties, you can manage the object schedules across all threads.



Mode of operation of the object in the cycle

In the **normal cycle processing mode**, an object is included in the execution thread, creating a separate schedule for each thread.

However, in the schedule properties for the object, you can specify **the mode of modal completion of the cycles**. Such a modal object is executed only in the main thread and considers all the threads by which it was activated the common main thread. Thus, within the parent thread, this object will have no more than one actual or planned schedule, the start date of which will be shifted to the end date of the latest of the threads that have spread to it. Modal objects allow you to limit the spread of threads, keeping them in areas where their application is necessary.

If a link is adjacent to a modal object, then the line next to the link arrow clearly indicates that the cycles will not propagate farther.



By combining the activation ports and the iterating links, you can create a fairly complex structure of nested and mutually overlapping loops, sometimes this can lead to confusing cases of cycle interference, modal objects make it easy to avoid this.

Since the structure of the threads of different diagrams can differ significantly, proxy objects can synchronize schedules only for the main thread.

Shared resources in cycles

The work resources or the locations assigned to an object will be used equally for all active threads of the object.

The material resources assigned at a time rate are also distributed across all schedules, depending on their duration. When a new thread is activated for an object with consumption of a material resource at a fixed rate, the amount of the resource used will increase by **the share of iteration**, which can be specified as a percentage when assigning the resource. If the share is set to 70%, the first execution of the object will use the full amount of the resource, and for each subsequent iteration 70% of the initially specified amount will be used. If you set the share as 0%, subsequent iterations will not consume the resource at all. This reflects the frequent situation when the revision or alteration of the results of previous work uses previously involved material resources.

Cycles in projects

Usually it is difficult to plan in advance how many iterations of the cycle will be used in the project, but if you include the maximum cycle time multiplied by the probable number of iterations in the pessimistic execution time of a cyclic process on the critical path, the buffer time of the object will contain the margin required for possible cycles. Thus, the main buffer of the project will be initialized taking into account the existence of cycles.

It should be noted that time buffers may work incorrectly outside the main thread of the project, if possible, avoid the inclusion of time buffers in cycles.

Reporting system

Data exchange

An important part of working with tasks and projects is the exchange of information. The most complete information on the diagram can be transmitted via a file of **inShort diagram data exchange**, having extension «ish». Such a file, except information about diagrams and their schedules, contains data of calendars and work resources, what allows transmitting all information about tasks that is available in the application. Unfortunately, to work with such a file, the recipient must be far-sighted enough to use the inShort application, which is a significant limitation.

Overall structure of tasks of the diagram can be conveyed by means of a data file of **structured lists of OPML** format. Such a file stores information about the name of the task, its description and place in the overall hierarchy of tasks. There are many applications for managing lists that can work with data in OPML format, but for a full exchange and analysis of data about tasks, the capabilities of this format are not enough.

For flexible solving of tasks of transmitting data to other applications, inShort has a **Report management system**, which allows you to generate reports on diagrams with a customizable set of data. You can work with generated reports directly in the application, print them or unload to a file of **PDF, CSV, HTML** or **XML** format, which significantly expands the list of applications where you can transmit information on diagrams.

Configuring a report

Mac OS

To switch the current view of the diagram to the reports view, you can use the «Mode» menu or take advantage of the control element on the top toolbar of the application. In the application settings, you can configure the set of available reports.

In the Options section, there is a switch that allows you to proceed to working with reports. Using the control element on the top toolbar, you can open a window for selecting available reports, here you can also configure them.

Structure of a report

By their structure, reports are divided into four types.

Report on a diagram

A table containing the fields with the parameter values for objects of one diagram. Each object is represented by a single line.

Sequential report

Contains the report on the diagram supplemented with individual reports on each nested diagram.

Tree type report

Reflects the structure of all objects in the diagram, including nested diagrams and their objects. Each nesting level is distinguished by indentation in the name of the object.

Report on the Gantt tree

Similar to the tree type report, but if the diagram was rolled up in the Gantt representation, in the report it will also be presented rolled up, without nested elements.

Report fields

Selecting a set of object parameters, you can configure the fields of the reporting forms. The report can display almost all object data, common for all object types. You can configure the output format for the report fields, as well as specify the conditions for selecting objects.

When the condition **«skip if empty»** is chosen, then if this field does not contain a value, the line of the report containing the data of the current object will not get into the resulting report. For example, if you check this condition in the field «End date», then only the fulfilled objects will get into the report, as only they have an end date in the real schedule.

When the condition **«skip if filled»** is chosen, it will skip the line if this field contains a value. For example, if you check this condition in the same field «End date», then the fulfilled objects will not get into the report, because they have an end date in the real schedule.

Generating a report on a diagram

Selecting rows of the report, you can view and, if necessary, edit the parameters of the object that corresponds to the line, in the tabs of the Inspector. If you select an empty field of the report or its header, the Inspector will contain parameters of the report.

Use the «Right», «Left» keys to turn pages, the «Up», «Down» keys to select lines.

If after the report had been generated application data changed, the program will automatically update the report. However, if the report is generated for the large volume of data, automatic update is disabled and the user must initiate an update of the report by itself via a button in the parameters of the report.

iOS

When a report is generated, you can view its pages, selecting the desired one from the list at the bottom of the screen.

Configuring page settings

Mac OS

You can set the format of the output area of report by changing the page settings. Page setup dialog is opened via an item of the «File» menu.

iOS

In the application options, you can choose the format of the output area of report. In preparing the report, the application automatically detects the preferred orientation of the page out of portrait or landscape.

Search for data

Filter for data of the reporting form is only available for Mac OS

From time to time there arises the task of finding objects according to certain criteria, in inShort this function is implemented with the help of the Report management system. In the tab of the Inspector containing parameters of the report, you can specify criteria for selecting objects.

Search string

Allows you to select objects, in the title or description of which there is a certain line. Instead of a string, you can specify a regular expression according to the ICU standard.

For example.

- Expression **.at** matches any string of three letters ending in "at", including "hat", "cat" and "bat".
- **[^b]at** matches all strings satisfying pattern .at, except for the string "bat".
- Expression **H(ä|ae?)ndel** matches any of the following strings "Handel", "Händel" and "Haendel".
- **s.*** matches any character set starting with the character s, for example: "saw" and "seed".

The line found in the report is marked in bold.

Assigned work resource

If you specify a work resource, the report will contain only the objects to which this work resource has been assigned.

Object state

Allows you to select objects that are in a particular state: active, passive, fulfilled and so on.

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