RESOURCE TRACKING AND DISTRIBUTION TYPES

Introduction

As you assign your resources to tasks, you also assign a specific *Distribution Type* to the resource assignment. The purpose of the distribution types is to specify how PS8 behaves as you make adjustments to your schedule with respect to *Duration*, *Total Units*, and/or *Rate*. Generally speaking, distribution types have no effect during the planning stages of your project. However, they do have a big impact when you are performing what-if analysis, tracking, or updating your schedule. The remainder of this article is devoted to demonstrating the effects of the differing distribution types when tracking your resources.

Distribution Types

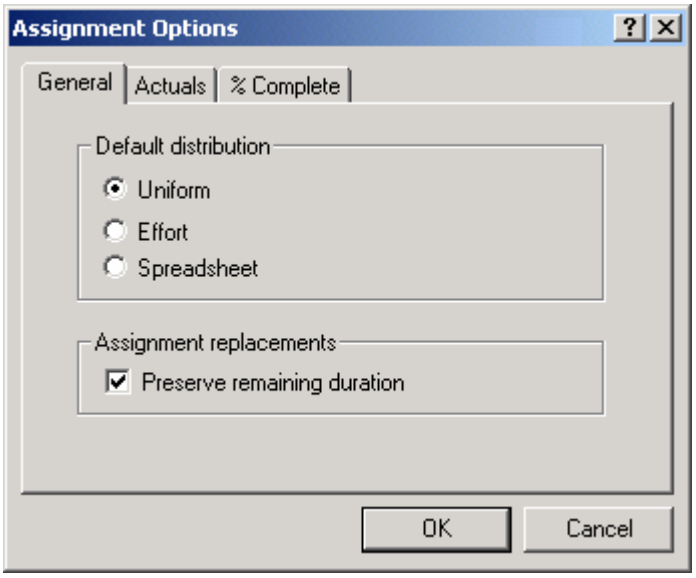
The function of the distribution type is to distribute this assignment across the duration of the task. The value of this field determines how the resource is allocated to the task and what field is recalculated (*Rate* or *Total Units*) if the duration of the task is later altered. In order to understand the different Distribution Types, it is important to understand the following equation:

Duration x Rate = Total Units

For example, if you have a task that is scheduled for 5 days (Duration) and assign a resource to work on the task 6h/d (Rate), then the resource will be scheduled a total of 30 hours (Total Units).

Another important aspect of Distribution Types is that they are assigned at the Assignment level. This means that as you assign a resource to a task, you can adjust their *Distribution Type* within either *Assignments* tab of the *Task Template* as well as within the *Resource* tab of the *Distribution Spreadsheet* view. This is an important concept that denotes that a resource assigned to multiple tasks can use different distribution types for each task assignment.

There are three different distribution types: *Uniform*, *Effort*, and *Spreadsheet.* There is always a default type which is used as you assign resources to tasks. This default setting is found within the *General* tab of the *Assignment Options* dialog box.



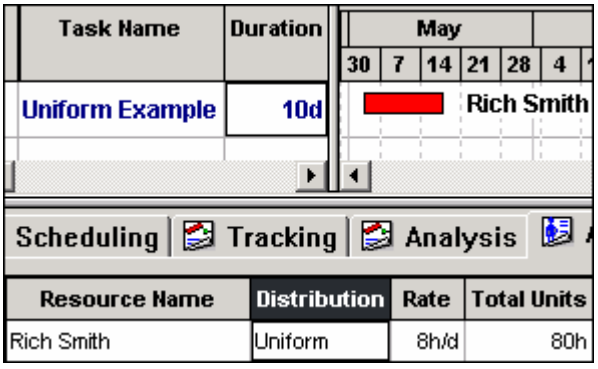
When you initially install PS8, the *Uniform* distribution type is automatically selected.

Uniform Distribution Type

The *Uniform* distribution type is the most commonly used. By selecting *Uniform*, you are telling PS8 that *Rate* is held constant. Below is a guide to how PS8 behaves when using the *Uniform* distribution type and making adjustments to the schedule.

As You Adjust….	PS8 Automatically Adjusts…
Duration	Total Units
Total Units	Duration
Rate	Total Units

For example, the task below is scheduled for 10 days, with Rich scheduled 8h/d for a Total Units of 80 hours.



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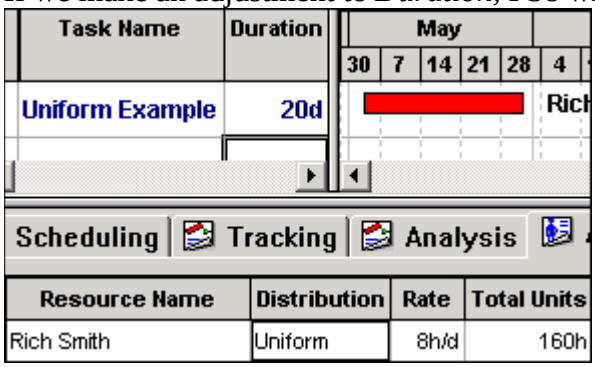
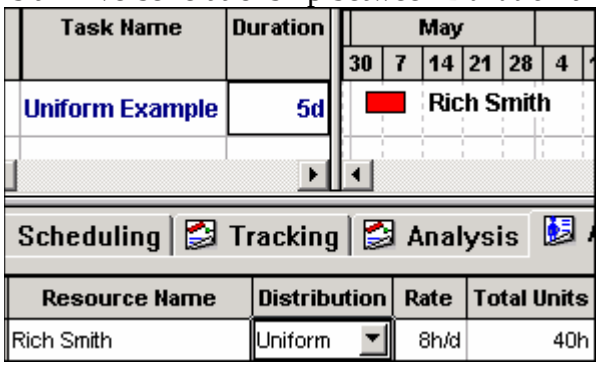
If we make an adjustment to *Duration*, PS8 will automatically adjust *Total Units*.



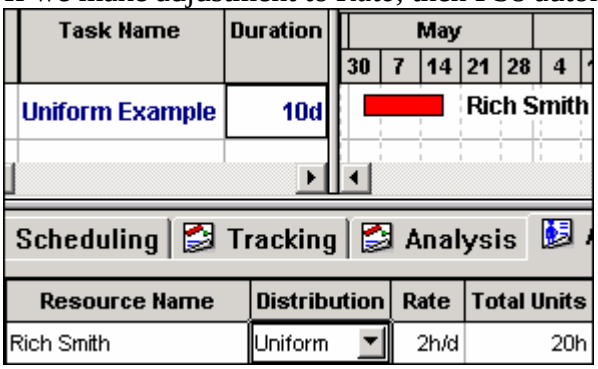
Notice how *Total Units* has increased to 160 hours, since the *Duration* was adjusted to 20 days.

If we make an adjustment to *Total Units*, PS8 will automatically adjust *Duration*. As you can see there is an inverse relationship between *Duration* and *Total Units* when using the *Uniform* distribution type.



Notice how *Duration* has decreased to 5 days, since the *Total Units* were adjusted to 40 hours.

If we make adjustment to *Rate*, then PS8 automatically adjusts *Total Units*.



Notice how *Total Units* decreased to 20 hours as *Rate* was adjusted to 2h/d.

The key things to remember about the *Uniform* distribution type are

- *Rate* is the constant in the **Duration x Rate = Total Units** equation.
- *Duration* is adjusted when *Total Units* is changed. (This will be more evident when resource tracking is discussed.)

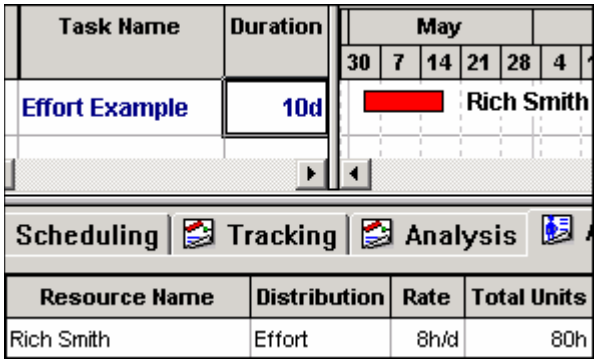
- As the task's *Duration* increases, more work is assigned to the resource at the currently assigned *Rate*. As the task's *Duration* decreases, work is removed from the resource assignment.
- Generally used for Level of Effort type of assignments

Effort Distribution Type

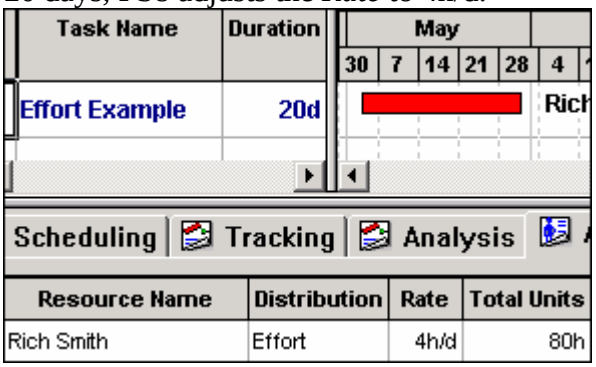
The *Effort* distribution type holds *Total Units* constant as you adjust either *Rate* or *Duration*. This distribution type is generally used when there is a fixed level of effort which needs to be accomplished over a given period of time. The table below summarizes PS8's behavior with respect to changes within the **Duration x Rate = Total Units** equation.

As You Adjust….	PS8 Automatically Adjusts…
Duration	Rate
Total Units	Rate
Rate	Duration

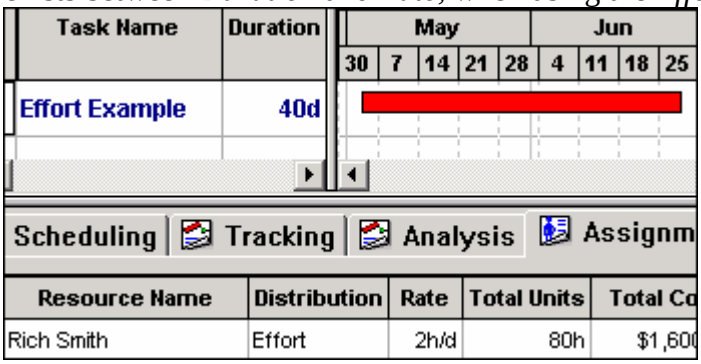
We'll use the same starting example as last time. The task below is scheduled for 10 days, with Rich scheduled 8h/d for a Total Units of 80 hours.



With an Effort distribution type, Total Units is held constant within the equation. When *Duration* is adjusted, PS8 automatically recalculates the assignment's *Rate*. For instance, if we change *Duration* to 20 days, PS8 adjusts the *Rate* to 4h/d.

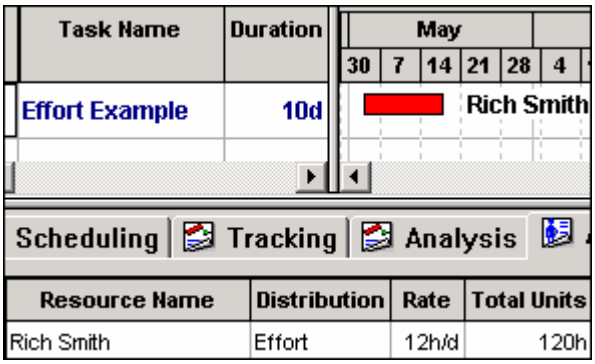


If we would adjust *Rate*, PS8 adjusts *Duration*. As you can see there is an inverse relationship that exists between *Duration* and *Rate*, when using the *Effort* distribution type.



Notice how *Duration* changed to 40 days, as the *Rate* was changed to 2h/d. *Total Units* did not change. Or in other words, the resource was given more time to accomplish the same amount of work.

There will be certain times that *Total Units* needs to be adjusted. When *Total Units* are adjusted when using an *Effort* distribution type, PS8 automatically recalculates the *Rate*.



Notice in the above figure that the *Rate* jumped to 12h/d for the assignment when *Total Units* were increased to 120 hours. In essence, the resource has more work to do in the same amount of time allotted for the task.

The key things to remember about the *Effort* distribution type are:

- *Total Units* is the constant in the **Duration x Rate = Total Units** equation.
- *Rate* is adjusted when *Total Units* is changed. (Again, this will become more relevant, when resource tracking is discussed.)
- As the task's *Duration* increases, the resource is allotted more time to accomplish the same amount of work (*Rate* decreases). As the task's *Duration* decreases, the resource has less time to accomplish the same amount of work (*Rate* increases), and may subsequently over allocate the resource.
- Generally used for tasks which their scheduled finish date is fixed.

Spreadsheet Distribution Type

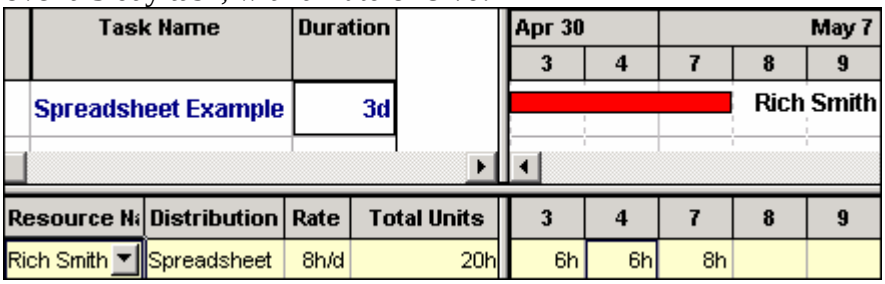
The *Spreadsheet* distribution type provides a more robust method for scheduling your resource assignments. While using either *Uniform* or *Effort*, the resource is scheduled at a constant *Rate* over the life of the task. By using *Spreadsheet*, you are afforded the ability to assign a resource at uneven rates across the life of a task. For instance, on certain tasks you may wish to front-load (schedule the majority of their assigned hours to the beginning period of the task) the assignment, or you may need to rear-load (schedule the majority of their assigned hours to the ending period of the task) the assignment, or assign the resource in an infinite number of other combinations. No matter how you want to assign the resource, if you need to schedule them at un-even rates across the life of a task, the *Spreadsheet* distribution type is the ticket.

Since the *Spreadsheet* distribution type offers the most flexibility in assigning your resources, you will need to utilize the *Distribution Spreadsheet* view to alter their time-period allocation levels. This technique is very useful when resources are multi-tasking and you need to "fill in gaps" within their available time.

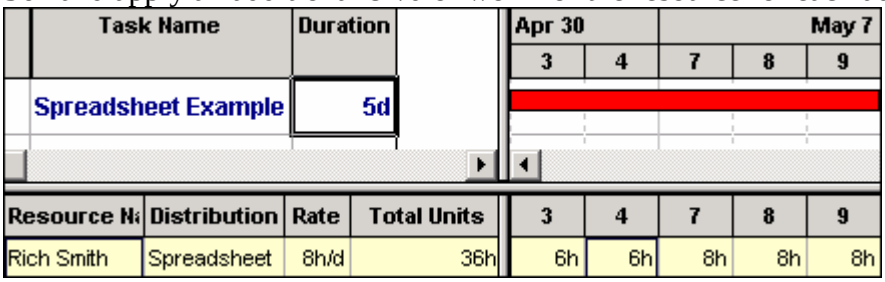
The Spreadsheet distribution type follows the **Duration x Rate = Total Units** algorithm, but there are a few additional behaviors that exist in order to make it comply with the formula. In general, the *Spreadsheet* distribution type most closely resembles the *Uniform* distribution type.

As You….	PS8 Automatically…
Increase Duration	Increases Total Units based on the assignment's Rate value (i.e. If you increase Duration by 2 days and the assignment's Rate is 6h/d, then the Total Units will increase by 12 hours.)
Decrease Duration	Decreases Total Units by the assigned rate for each of the time periods removed (i.e. If you have a resource assignment scheduled for 6h/d, 4h/d, and 8h/d over a three day task, and you decrease Duration to one day, then the assignment's Total Units will be equal to 6h.)
Increase Total Units	Increases Duration by applying the additional units based on the current value in the assignment's Rate field
Decrease Total Units	Decreases Duration based on the number of hours removed and how they were allocated across the task.
Adjust Rate	Does nothing. The changed Rate will only be used when either Duration or Total Units are adjusted in the future.

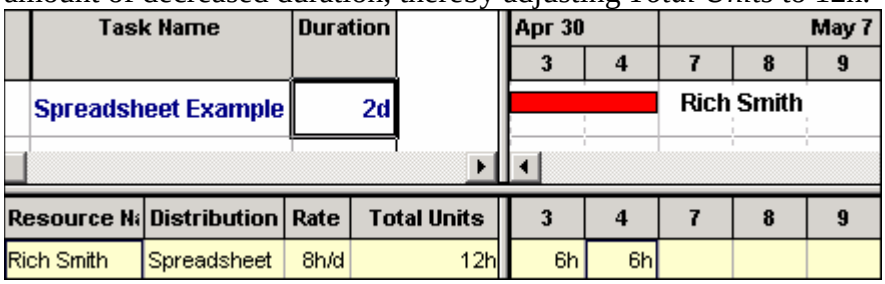
Let's take a look at an example. Here the resource is assigned at an uneven rate of 6h/d, 6h/d, and 8h/d over a 3 day task, with a *Rate* of 8h/d.



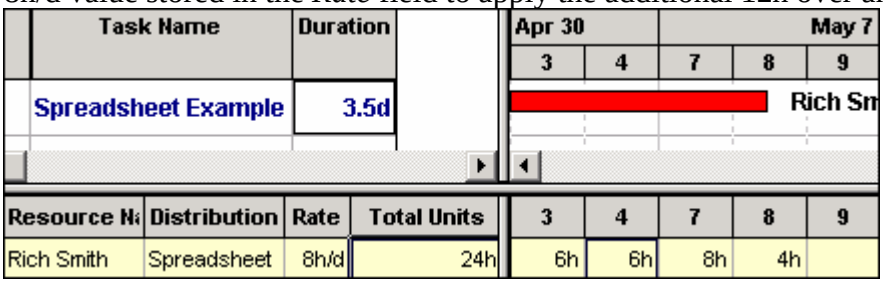
Based on the *Rate* of 8h/d, if *Duration* is increased to 5d, PS8 will automatically increase *Total Units* to 36h and apply an additional 8h/d of work for the resource for each additional day.



If *Duration* is decreased to 2d, then PS8 automatically truncates the resource assignment hours by the amount of decreased duration, thereby adjusting *Total Units* to 12h.



If *Total Units* are increased, PS8 uses the value stored in the *Rate* field to apply the additional hours thereby increasing the task's *Duration*. For example, if *Total Units* are adjusted to 24h, PS8 will use the 8h/d value stored in the *Rate* field to apply the additional 12h over an additional 1.5 days of *Duration*.



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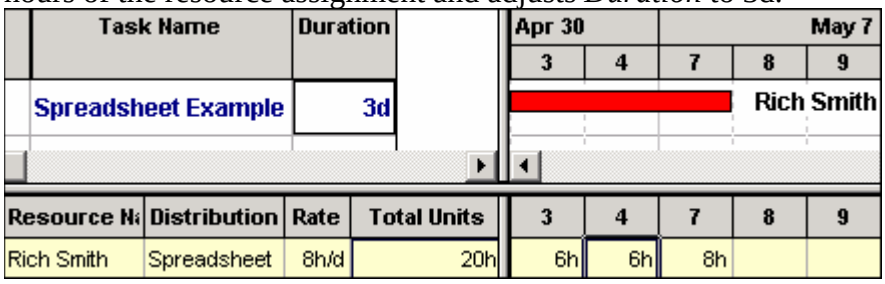
If *Total Units* are decreased, PS8 truncates the task's duration based on how the hours were allocated across the life of the task. For instance, if *Totals Units* are decreased to 20h, PS8 removes the last 4 hours of the resource assignment and adjusts *Duration* to 3d.



When *Rate* is adjusted, PS8 does nothing until either *Duration* or *Total Units* are adjusted again. And when they are, PS8 follows the same rules as aforementioned.

The key things to remember about the *Spreadsheet* distribution type are:

- It should be used for creating uneven resource allocations across the life of a task.
- You must use the *Distribution Spreadsheet* view to manipulate the resource hours.
- The resource's hours are truncated when *Duration* is decreased.
- The resource's hours are increased when *Duration* is increased.
- *Duration* is increased when *Total Units* are increased.
- Useful when performing manual resource leveling.

Tracking Resources

Author's note: Before you can track your resources, you should always track your schedule first. For more information on scheduling tracking, please review the Schedule Tracking support white paper.

Initial Settings

No two projects are the same. Some projects need to be closely monitored, while others can proceed with minimal tracking data. For instance in a minimal tracking environment, if you are interested in tracking your resource assignments' effort and cost, and are not interested in tracking them on a time period-by-time period basis, the *Assignments* tab of the *Task Template* is the method for you.

The *Assignments* tab offers a convenient location to track your assignments on a lump-sum basis. Typically, the *Assignments* tab is used when you are not concerned with the details of when the resource worked and how much each time period cost, but merely how much time and money were spent on the assignment as a whole.

When you choose to track your resources using the *Assignments* tab, you need to be aware of the tracking settings that govern how PS8 behaves as you record your data. These settings are found within the *Actuals* tab of the **Assignment Options** dialog box. The *Entering lump-sum actual units* section governs the effect on your schedule when you track the resource progress using the *Assignments* tab.

The *Entering time-distributed actual units* section governs tracking in the *Distribution Spreadsheet.* Here, we are concerned with the lump-sum section.

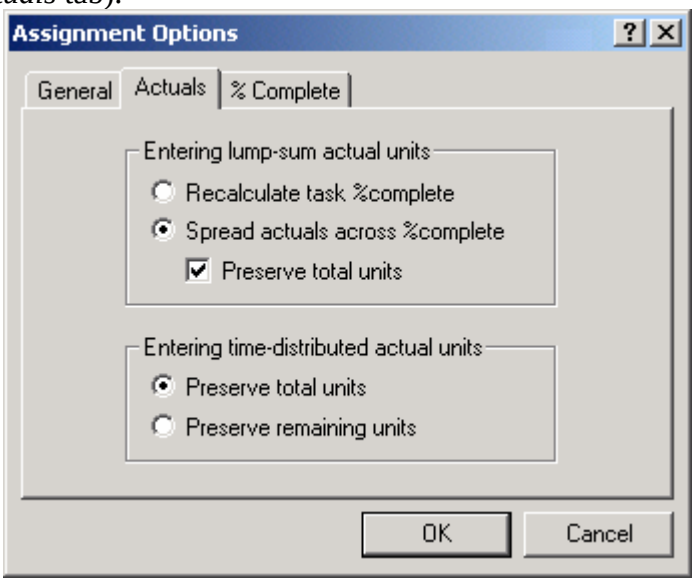
SPREAD ACTUALS ACROSS PERCENT COMPLETE

One alternative of tracking your actuals in the *Assignments* tab is to spread your *Actual Units* and *Actual Costs* over the amount of time that the task is in progress. By spreading out your true actuals, you are able to effectively display any differences between how work was planned and what actually occurred.

For instance, suppose you scheduled a 5 day task with a resource assigned at a rate of 8 h/d. At the end of the third day, the resource should have charged 24 hours to the task. However, in actuality the resource was only able to work 20 hours. As a benefit of spreading the actuals across the task percent complete, you are able to see that the work is falling behind schedule.

There is a relationship that exists between *Actual Units*, *Remaining Units*, and *Total Units*.
Simply stated: **Actual Units + Remaining Units = Total Units**

Of the three variables, PS8 provides you the choice of whether you want *Remaining Units* or *Total Units* to remain constant when you enter *Actual Units*. Whatever is held constant, the other field is recalculated by PS8 when *Actual Units* are entered. This option is selected within the **Assignment Options** dialog box (*Actuals* tab).



In the *Entering lump-sum actual units* section, when you select to **S**pread actuals across %complete, the **P**reserve total units checkbox becomes enabled. By opting to **P**reserve total units, PS8 holds your *Total Units* constant and adjusts your *Remaining Units* as you enter the *Actual Units*. If you deactivate **P**reserve total units (checkbox is de-selected), then PS8 holds your *Remaining Units* constant and adjusts your *Total Units* as you enter project actuals.

The procedure for using this tracking option is defined in its name. The objective is to spread actuals across percent complete. Therefore, you need to enter a percent complete for the task prior to entering assignment actuals. If you do not, PS8 will not accept your resource assignment entry.

Implications of Distribution Types

Now that you understand the implications of the distribution types and the initial assignment tracking options, let's explore how the different distribution types are taken into consideration when tracking the resources.

Remember the equation, **Duration x Rate = Total Units**. And remember how the different distribution types behave when *Total Units* are adjusted…

- **Uniform:** Duration is adjusted
- **Effort:** Rate is adjusted
- **Spreadsheet:** Duration is adjusted

Now, when you track your resources there are two important pieces of information that need to be acquired: *Actual Units* and *Remaining Units*. These two values added together equal *Total Units*. As you can see by tracking your resources with their assigned distribution type, different schedule behaviors will occur. The following nine scenarios will help illustrate this point with each distribution type.

Note: All these scenarios are based on a single resource assigned to a task. This has been done to help clarify PS8's behavior in a controlled environment. If more than one resource is assigned to the task, the task's *Duration* may not change due to how the other resource(s) are allocated across the remainder of the task.

Scenario	Uniform	Effort	Spreadsheet
Resource works less time than initially planned and no adjustments to the total hours are required.	Task's *Duration* increases due to a higher remaining units than what was initially planned.	Assignment's *Rate* increases to accommodate the extra work in a fixed amount of time.	Task's *Duration* increases due to a higher remaining units than what was initially planned.
Resource works less time than initially planned and more work hours are required.	Task's *Duration* increases due to a higher remaining units than what was initially planned.	Assignment's *Rate* increases to accommodate the extra work in a fixed amount of time.	Task's *Duration* increases due to a higher remaining units than what was initially planned.

Scenario	Uniform	Effort	Spreadsheet
Resource works less time than initially planned and less work hours are required.	Task's *Duration* decreases due to lower remaining units than what was initially planned.	Assignment's *Rate* decreases to accommodate the less work required in a fixed amount of time.	Task's *Duration* decreases due to lower remaining units than what was initially planned.
Resource works more time than initially planned and no adjustments to the total hours are required.	Task's *Duration* decreases due to lower remaining units than what was initially planned.	Assignment's *Rate* decreases to accommodate the less work required in a fixed amount of time.	Task's *Duration* decreases due to lower remaining units than what was initially planned.
Resource works more time than initially planned and more work hours are required (Assumption that the additional required hours are greater than the additional hours the resource worked.)	Task's *Duration* increases due to a higher remaining units than what was initially planned.	Assignment's *Rate* increases to accommodate the extra work in a fixed amount of time.	Task's *Duration* increases due to a higher remaining units than what was initially planned.
Resource works more time than initially planned and less work hours are required.	Task's *Duration* decreases due to lower remaining units than what was initially planned.	Assignment's *Rate* decreases to accommodate the less work required in a fixed amount of time.	Task's *Duration* decreases due to lower remaining units than what was initially planned.
Resource works as initially planned and no adjustments to the total hours are required.	Nothing Changes	Nothing Changes	Nothing Changes
Resource works as initially planned and more work hours are required.	Task's *Duration* increases due to a higher remaining units than what was initially planned.	Assignment's *Rate* increases to accommodate the extra work in a fixed amount of time.	Task's *Duration* increases due to a higher remaining units than what was initially planned.

Scenario	Uniform	Effort	Spreadsheet
Resource works as initially planned and less work hours are required.	Task's *Duration* decreases due to lower remaining units than what was initially planned.	Assignment's *Rate* decreases to accommodate the less work required in a fixed amount of time.	Task's *Duration* decreases due to lower remaining units than what was initially planned.