Ultimus BPM Database Size Estimation

The Ultimus BPM Suite 7 and earlier releases use the Ultimus BPM Database to save all information necessary to control workflow processes. This document will help estimate the size needed for your Ultimus BPM Server database.

There are several factors that contribute to the size of the Ultimus BPM Database:

- Size of Main Spreadsheet
- Size of Local Spreadsheets
- Number of steps in the workflow process
- Number of active ("live"), completed, and archived incidents

Some of this information may not be readily available to you as you continue to develop and mature your workflow processes. Therefore in this document we will give you suggestions of how you can estimate and arrive at the total size of the Ultimus BPM Database.

Components of Ultimus BPM Database

Ultimus BPM Database has three categories of incidents that consume space: active incidents, completed incidents, and archived incidents. Therefore, to estimate the size of Ultimus BPM Database, you must estimate the size of the database taken up by each type of incident and add them together. Specifically:

Ultimus BPM Database size = Active Incidents + Completed Incidents + Archived Incidents

In the following sections we will first discuss how to estimate the size of the spreadsheets, and then show you how to estimate the size of the database that will be consumed by each category of incidents.

Estimating the Size of Spreadsheets in a Workflow Process

Every Ultimus workflow process has one Main Spreadsheet and a Local Spreadsheet for each step. Each time a new incident is initiated, a Main Spreadsheet is created for the incident, and a Local Spreadsheet is created for every step when the step is activated. Thus, the size of the database consumed by the incident is equal to the size of the Main Spreadsheet plus the size of all the Local Spreadsheets for the steps that have been activated. The size of the spreadsheet is therefore one of the major factors that contribute to how much database space will be consumed by every incident.

There is no obvious way to determine the size of the Main Spreadsheet and the Local Spreadsheet. In our observation the average spreadsheet ranges between 2KB and 250KB The only way to estimate

these sizes is to compare your spreadsheets with the sample Workflow processes that are shipped with Ultimus. Below we have listed the sizes for the Local and Main Spreadsheets of the Purchase Requisition sample and the Vacation Leave Request sample applications:

	Purchase Requisition Process	Vacation Leave Request Process
Main Spreadsheet Size (MSS)	65KB	15KB
Avg. Local Spreadsheet Size (LSS)	15KB	5KB

By comparing the contents of your spreadsheets with these two processes you will be able to get a pretty good estimate of the size of your spreadsheets.

Finding the Number of Steps in a Workflow Process

Finding the number of steps in a workflow process is easy. You simply count them from the workflow map. When you count the number of steps please keep in mind the following:

i. Each User, Flobot and Maplet step counts as a step
ii. A User step that is assigned to a normal group (but NOT sequential or weighted group) counts as a step for each member in the group. Similarly a 'dynamic group" created by using Cell Contents as recipients counts for the number of members in the Cell range.
iii. Junction steps do not count as a step since they do not have a spreadsheet
iv. The "End Step" does not count as a step

Thus, if you have 10 steps in a workflow process and ALL the steps have either been completed or have been activated at least once, the size of the database consumed will be equal to MSS+ 10*LSS. This is the worst-case estimate because:

i. It assumes that every step has been activated at least once. In practice, an incident that has not been completed may only have some steps activated (or previously activated).
ii. You many have many steps in your workflow process that are activated only under certain conditions and these conditions may not be true for every incident.

Estimating the Number of Incidents

Above we showed you how can estimate the size of Ultimus BPM Database consumed by one incident. However, at any given time in the database, you will have many incidents in various stages of completion. It is therefore important for you to be able to estimate the number of incidents.

To estimate the number of incidents, you need to estimate two numbers:

i. The approximate number of new incidents initiated every day
ii. The approximate number of days that an incident will take to complete

For example, if 100 new incidents of a workflow process are initiated every day and the life of an average incident is 5 days, then:

- on the first day there will be 100 active incidents
- on the second day there will 200 active incidents
- on the third day there will be 300 active incidents
- on the fourth day there will be 400 active incidents
- on the fifth day there will be 500 active incidents
- on the sixth day there will also be 500 active incidents because 100 new ones will be initiated but 100 will also be completed
- on each successive day the number of active incidents will stabilize around 500

This growth pattern is further described below:

	Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**
Active Incidents	100	100	100	100	100	100	100
		100	100	100	100	100	100
			100	100	100	100	100
				100	100	100	100
					100	100	100
Completed						100	200
Total Active	100	200	300	400	500	500	500

Therefore, in order to estimate the number of active incidents in the database when the workflow process has reached a "steady state", multiply the number of incidents created in a day by the number of days the incident takes to complete. The formula is further described below.

$$N = \text{Number of active incidents} = X * Y$$

Where

X = Number of days to complete an incident
Y = Number of Incidents created in one day

From the above discussion it is also apparent that in "steady state" the number of incidents completed every day will be equal to the number of incidents initiated every day, i.e. Y. Likewise, the number of incidents that are being archived every day will be equal to Y, and those that are being removed from archive will also be equal to Y.

Estimating Ultimus BPM Database for Active Incidents

So far in this document, we have introduced the following:

MSS = Main Spreadsheet Size
LSS = Average Local Spreadsheet Size
S = Number of steps in the process
N = Number of Active Incidents

To calculate the size of Ultimus BPM Database for active incidents, we need to make one more assumption. That is, we need to know the percentage of steps in an active incident at any given time that has been activated at least once. This percentage depends a lot on your workflow process (for example, how long each step takes and the conditions under which various steps are executed.). We will call this percentage "P" and describe it as follows:

P = Percentage of steps activated at least once during the course of the incident

Once you have this estimate, the size of Ultimus BPM Database for active incidents may be estimated by the formula:

$Size_{\mathbf{A}} = [MSS + (S \times P \times LSS)] \times N$

Example

MSS = 10KB
LSS = 10KB
N= 500
S = 35
P = .5

Active Incident Size = [10KB + (35 x 0.5 x 10KB)] x 500
= [10KB+175KB] x 500
= 185KB x 500 = 92500KB
= 92.5MB

Estimating Ultimus BPM Database Size for Completed Incidents

To estimate the size of Ultimus BPM Database for completed incidents, we need three other pieces of information:

i. **The "Delete Completed Incidents" setting in Ultimus BPM Suite:** This number can be determined from Ultimus Administrator, "Delete Completed Incidents" setting.
ii. **The number of incidents completed every day:** It is reasonable to assume that if 100 incidents of a workflow process are being initiated every day, 100 incidents will also be completed on the average when the process is in "steady state". This number should also include the incidents that have been aborted.
iii. **The percentage of steps that will have been activated at least once during the incident:** This percentage is very dependent on the design of your workflow process. If you want to be very conservative in estimating the maximum Ultimus BPM Database size, you can assume that all steps in each incident will be active during the course of an incident. In other words, the percentage will calculate to 100%.

The number of competed incidents in the Ultimus BPM Database is equal to the number of incidents initiated every day multiplied by the number of days they are saved. If company initiates 100 incidents of a workflow process every day and keeps completed incidents for 5 days, the number of completed incidents in the Ultimus BPM Database will be 500.

With this information, the formula used for calculating the size of Ultimus BPM Database for completed incidents is:

$$Size_C = [MSS + (S \times P \times LSS)] \times N \times D$$

Where

MSS= Main Spreadsheet
LSS=Local Spreadsheet
D=Number of days completed incidents are saved
S= Number of steps in the incident
P= Percentage of steps activated during the incident
N=Number of incidents initiated per day (that we have assumed is equal to the number of incidents completed per day)

Example

MSS = 10KB
LSS = 10KB
D=5
S=35
P=80%
N=100

Completed Incident Size = [10KB + (35 x 0.8 x10KB)] x 100 x 5
= [10KB+280KB] x 500 = 290KB x 500
= 145000KB or 145MB

Estimating Ultimus BPM Database Size for Archived Incidents

Estimating the size of Ultimus BPM Database for archived incidents is very similar to how you estimate the size of Ultimus BPM Database for completed incidents (as described above). Three important things to remember are:

i. A completed incident of a workflow process is achieved if and only if at least one user step in the workflow process is marked as “Archive” via the “Archive” setting in the properties of a user step.
ii. Once completed incidents become older than the configured number of days to keep completed incidents, they become marked for archived.
iii. When an incident is archived, only the Main Spreadsheet and the Local Spreadsheets for all user steps marked as Archive are saved.

iv. Completed incidents are kept archived for a specified number of days, calculated by subtracting the "Delete Completed Incidents" value from the "Delete Archived Incidents" value (both of which are found in Ultimus Administrator). Thus, if you have configured Ultimus BPM Suite to keep Completed Incident for 30 days and Archived Incidents for 180 days, then Archived Incidents will be kept for an additional 180-30, or 150 days.

The size of Ultimus BPM Database consumed by Archived Incidents is calculated by the following formula:

$Size_{\mathbf{AR}} = [MSS + (S \times LSS)] \times N \times D$

Where

MSS= Main Spreadsheet
LSS=Local Spreadsheet
D= Number of Days Incidents are kept as Archived
N= Number of Incidents Archived/ Day= Number of Incidents Completed/Day
S= Number of User steps in the Process marked as "Archive"

Example

MSS = 10KB
LSS = 10KB
D= 50
N=100
S = 2

Archived Incident Size = [10KB + (2 x10KB)] x 50 x 100
= [10KB+ 20KB] x 500 = 30KB x 5000
= 150000KB
= 150MB

Guidelines for Reducing Ultimus BPM Database Size

In the previous sections, we have provided information about how to estimate the size of Ultimus BPM Database. The estimations that we have shown reveal a number of things that workflow process builders can do to ensure that the size of Ultimus BPM Database is kept as small as possible:

1. **Keep the number of steps in the workflow process map to a minimum:** Each step in the process map introduces a new Local Spreadsheet.
2. **Minimize the size of the spreadsheets:** As noted above, the spreadsheets consume most of the database space. Therefore, workflow process builders should try to keep the size of the spreadsheets to a minimum, in particular the size of the local spreadsheets. Spreadsheet size can be reduced by:
    a. Building spreadsheets row-wise, rather than column-wise
    b. Keeping labels and comments to a minimum
    c. Avoiding unnecessary use of formatting cell display
    d. Remove long choice lists from the spreadsheet and placing them in databases
3. **Encourage users to complete active incidents quickly**
4. **Configure Ultimus BPM Suite to delete completed incidents as quickly as possible**
5. **Configure Ultimus BPM Suite to delete archived incidents as quickly as possible**