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# Using the IBM Tivoli Monitoring 6.x Warehouse Load Projections Spreadsheet

## Document version 3.0

*Tivoli SAPM Performance & Scalability*



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# REVISION HISTORY

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Date	Version	Revised By	Comments
2006/02/20	1.0	JTJ	Original document for ITM 6.1
2008/02/21	2.1	JTJ	Updated for ITM 6.2, including new agent types, shift and vacation parameters, and a parameter to see the potential savings with trailing white space trimming.
2008/05/16	2.2	JTJ	Updated screenshots with revised spreadsheet layout, and use of print area and page setup to support use of sheets for requirements gathering forms.
2009/04/15	2.3	JTJ	Added information about the custom agent worksheet
2009/09/21	2.4	JTJ	Added information about how to reflect multiple collections for an attribute group (section 3.2.4).
2011/02/02	2.5	JTJ	Added information about how to reflect row filtering for an attribute group (section 3.2.5)
2012/04/24	2.6	JTJ	Added parameters to show the potential savings with the ITM 6.2.3 features for compression before upload and database compression of tables and indexes
2013/09/25	3.0	JTJ	Added information about how to reflect multiple retention settings for an attribute group (section 3.2.6)

# 1 Introduction

This document describes how to use the ITM 6.3 Warehouse Load Projections spreadsheet.

The *ITM 6.3 Installation and Setup Guide* contains information on estimating the disk space requirements for the Tivoli Data Warehouse. To follow the steps required to produce an estimate, the user is required to look in the User's Guide for each agent type to be used in the configuration to gather attribute group row lengths and information on estimating the number of rows that will be generated at each data collection interval.

The ITM 6.3 Warehouse Load Projections spreadsheet was created to simplify the task of producing a disk space estimate for the Tivoli Data Warehouse. This spreadsheet includes the attribute group information for more than 100 different agent types, and allows the user to perform "what-if" exercises to see the effect of different historical data collection configuration options. The spreadsheet includes four predefined charts showing the contribution of each agent type to the total TDW estimate. Because it is implemented in a standard spreadsheet format, other charts can be generated easily.

The total data size estimate given in the Summary worksheet ("Total GB of data in TDW (based on retention settings)") should be comparable to one produced by following Steps 1 through 5 of the section "Estimating the required size of your database" in the "Tivoli Data Warehouse Solutions" chapter of the *ITM 6.3 Installation and Setup Guide*. The instructions in the *ITM 6.3 Installation and Setup Guide* recommend increasing this value by 50% to accommodate uncertainty, and then comparing this number to the Database data row in the "Database size examples" table to determine the number of disks you need for your database.

Projections produced by this spreadsheet should be viewed as rough estimates, but should be useful in making configuration planning decisions and in performing sensitivity analysis and what-if exercises. The actual disk storage required for a given monitoring configuration will depend on complex interrelationships among many variables, not all of which have been, or could be, modeled. It is the responsibility of the user to validate the spreadsheet inputs and outputs.

THE TOOL IS PROVIDED ON AN "AS IS" BASIS. IBM CORP. DOES NOT GUARANTEE THE PERFORMANCE OF THE TOOL OR THE RESULTS CALCULATED BY THE TOOL.

## 2 What's new in version 3.0

In version 3.0, a new section was added describing how to reflect multiple retention settings for an attribute group (see section 3.2.5). In the spreadsheet, updates were added for numerous agent versions, and the worksheets for the KTM integration agent were removed.

In the previous version 2.6, there were changes to the calculations made by the spreadsheet to reflect two new features in ITM 6.2.3:

- **Database compression for Tivoli Data Warehouse tables and indexes**

You can now enable database compression for Tivoli Data Warehouse tables and indexes to reduce the amount of disk space used by the database, and improve database performance. This functionality is for newly created tables only and might require additional Relational Data Base Management System licensing. For more information, see the IBM Tivoli Warehouse Proxy Agent User's Guide and the IBM Tivoli Summarization and Pruning Agent User's Guide.

- **Compression before upload feature**

New in Tivoli Monitoring V6.2.3 is the compression before upload feature that allows you to compress the data uploaded to the Warehouse Proxy Agent.

Two new parameters on the Summary workspace allow the user to vary the compression percentage for uploads to the Warehouse Proxy agent, and vary the compression percentage for database table compression. These parameters allow the user to do sensitivity analysis to see the effect on warehouse space usage and network bandwidth usage for these two new features.

In the previous version 2.5, a new section was added describing how to reflect row filtering for an attribute group (see section 3.2.5). In the spreadsheet, updates were added for 42 upgraded agent versions, and 21 new agents were added.

In the previous version 2.4, a new section was added describing how to reflect multiple collections for an attribute group (see section 3.2.4). In the spreadsheet, support was added for ITM 6.2.2 and new agent types, including Tivoli Network Manager IP Edition, ITCAM for Transactions and Monitoring for Microsoft Applications. Retention setting units were changed to more closely reflect product behavior (for example, hourly retention is specified in days rather than hours).

In the previous version 2.3, support was added for ITM 6.2.1 and new agent types, including the Energy Management agents. "Custom" worksheets were also added to support custom agents, such as might be created using the Agent Builder. For more information on using the custom worksheets, see the section "Adding custom agents" on page 20.

In the previous version 2.2, there were changes to the layout and calculations made by the spreadsheet:

1. In previous versions, the number of agents for each agent type was specified on the Summary worksheet. Since data collection for attribute groups may be started on a subset of the monitoring servers, it is possible to have a different number of agents collected data from different attribute groups for the same agent type. In the updated version, the agent count is specified separately for each attribute group, which allows more precise control over the calculations.
2. In previous versions, the warehouse retention intervals were specified for every attribute group, which required many more entries. In the updated version, default retention intervals can be specified on the Summary worksheet, and these values can be overridden at the agent level and at the attribute group level. If you use the same retention intervals for all of the attribute groups, you only need to specify the retention intervals on the Summary worksheet.
3. If shift information and vacation days are specified in the Summarization and Pruning agent configuration parameters, the number of aggregate records created in the database can increase significantly. In previous versions, the impact of specifying shift information and vacation days was not reflected in the calculations.



In the updated version, input parameters on the Summary worksheet can be used to show the increased storage demands when shift information and vacation days are specified.

4. The Warehouse Proxy agent has been enhanced to trim white space from character strings before inserting them into the database. For database tables created by ITM 6.2, character fields that are 16 bytes or longer are created in the database as VARCHAR fields. When white space is trimmed from character strings before inserting into VARCHAR fields, the amount of storage space can be reduced significantly. The amount of white space that would be trimmed is highly variable, and will differ from one environment to the next. In the updated spreadsheet, the amount of space for each attribute group that is comprised of VARCHAR fields is shown in the far right column in each agent worksheet. A new parameter on the Summary workspace allows the user to vary the percentage of VARCHAR fields that might be trimmed. This parameter allows the user to do a sensitivity analysis to see the effect on warehouse space usage for different trim percentages. The main purpose of this spreadsheet is to project the space usage for the warehouse, and it would be more conservative to assume no white space trimming. Note that database tables that were created prior to the installation of ITM 6.2 will not see the same behavior.
5. The spreadsheet layout has been revised, and the worksheet print areas and page setup have been defined. You can print selected worksheets (or the entire workbook) and use the output as requirements gathering forms. (Many thanks to Michael Vesich for making these changes).

## 3 How the spreadsheet works

The spreadsheet is made up of several dozen worksheets. For all of the worksheets within the spreadsheet, input cells are shown with a green background. Cells showing calculations based on the input parameters are shown with a yellow background.

The spreadsheet consists of the following worksheets:

- The *ReadMe* worksheet describes the model and the limitations of its use.
- The *StgBarGraph* worksheet shows a bar graph of the amount detailed and aggregate data projected for the Tivoli Data Warehouse, based on the agent usage parameters specified in other worksheets.
- The *StgPieGraph* worksheet shows the same data as *StgBarGraph* worksheet, except in pie graph format.
- The *InsertBarGraph* worksheet shows a bar graph of the hourly insert rate by each agent type projected for the Tivoli Data Warehouse, based on the agent usage parameters specified in other worksheets.
- The *InsertPieGraph* worksheet shows the same data as *InsertBarGraph* worksheet, except in pie graph format.

- The *Summary* worksheet is the main worksheet, showing a list of agent types (both distributed and z/OS-based). The user enters information about the default retention intervals for data in the warehouse, and indicates whether shift information and vacation days are specified in the Summarization and Pruning agent configuration parameters. For warehouse tables created by ITM 6.2 or later, the user can also specify a parameter indicating the percentage of VARCHAR fields that would be trimmed as trailing white space by the Warehouse Proxy agent. (In ITM 6.2, character fields which are 16 bytes or greater in length are created as VARCHAR fields in the database. The Warehouse Proxy agent trims trailing white space characters from strings inserted into these fields, which can save a considerable amount of space.) Yellow cells show summary calculations based on input parameters on this and other worksheets.
- There is a separate agent worksheet for each agent type listed on the Summary worksheet (Windows, Unix, Linux, etc.). There are more than 100 separate agent worksheets.

To move from one worksheet to another, click on one of the tabs along the bottom of the spreadsheet, which are show in Figure 1 below.


42	KA4	i5/OS	6.2.3.1	0	0.0%	0.0%
43	KR2	Agentless Monitoring for Windows	6.2.3.1	0	0.0%	0.0%
44	KR3	Agentless Monitoring for AIX	6.2.3.1	0	0.0%	0.0%
45	KR4	Agentless Monitoring for Linux	6.2.3.1	0	0.0%	0.0%
46	KR5	Agentless Monitoring for HP OS	6.2.3.1	0	0.0%	0.0%
47	KR6	Agentless Monitoring for Solaris	6.2.3.1	0	0.0%	0.0%
						

Figure 1 Worksheet tabs appear at the bottom of the spreadsheet

The arrow buttons on the bottom left corner of the spreadsheet allow you to scroll through the different worksheets.

### 3.1 Typical Usage Scenario

In a typical usage scenario, the user brings up the Summary worksheet. The user specifies the following parameters on the Summary worksheet:

- Default retention intervals for detailed and aggregate data,
- An indication of whether shift information and vacation days are specified in the Summarization and Pruning agent configuration file (these add extra overhead)
- Optionally, an estimated percentage of the amount of white space that the Warehouse Proxy agent might trim from character strings inserted into VARCHAR fields. This should only be used when the warehouse database tables were created with ITM 6.2 (as opposed to earlier levels of ITM 6.1). The amount of white space that will be trimmed is data dependent, and will vary from one environment to another. Measurement results in the ITM performance lab suggest that 30% is a reasonable estimate for the percentage of VARCHAR white space trimming.

- Optionally, an estimated percentage can be specified for the amount of compression achieved for the upload to the Warehouse Proxy agent (WPA). The option to compress data for uploads can be set in the Warehouse Proxy agent configuration. The amount of compression is data dependent, and will vary from one environment to another. Measurement results in the ITM performance lab suggest that 30% is a reasonable estimate of the compression rate that can be achieved.
- Optionally, an estimated percentage can be specified for the amount of compression achieved if the tables have compression enabled. This spreadsheet only gives an estimate of table storage, and not index storage. The amount of compression is data dependent, and will vary from one environment to another. Measurement results in the ITM performance lab suggest that 50% is a reasonable estimate of the compression rate that can be achieved.

For each agent type to be monitored in the configuration, the user switches to the corresponding agent worksheet to specify details about what will be monitored for agents of that type. For each attribute group that will be collected for a given agent type, the user specifies the following parameters on the agent worksheet:

- The number of agents that will collect historical data for this attribute group. This is determined based on which monitoring servers have started collecting historical data for the attribute group, and the number of agents of the given agent type reporting to each monitoring server.
- The collection interval, specified in minutes. Valid values are 60, 30, 15, 5 and 1.
- The expected number of data rows that will be generated by each agent for the attribute group. Some attribute groups generate a single row of data at each collection interval, while others generate multiple rows, and some can generate a large number of rows.
- If desired, the default retention intervals that were specified on the Summary worksheet can be overridden at the “agent type” level or at the attribute group level.

Once input parameters have been given for each agent type to be used in the monitoring configuration, the Summary worksheet contains the total disk space estimate for data to be stored in the warehouse.

## 3.2 Usage Notes

### 3.2.1 Selecting Average Rows/Interval values

For attribute groups that return multiple rows, the number of instances recorded at each interval is configuration dependent, and can be different from one monitoring environment to another. Deciding on appropriate values for the *Average rows/interval* for each attribute group can be a challenge. There are several approaches that you can use to come up with this number.

- Using the portal client, build a table view for the monitoring agent and define a query to obtain data from the desired attribute group. The number of rows shown in the table view is the number of instances that would be recorded at each interval. For details on how to define table views in the portal client, refer to the IBM Tivoli Monitoring User's Guide.

- Issue a SOAP call to collect data for this attribute group from the monitoring agent. The number of data rows returned by the SOAP call is the number of instances that would be recorded at each interval. For details on how to issue SOAP calls, refer to Appendix A “Tivoli Enterprise Monitoring Web services” in the IBM Tivoli Monitoring Administrator’s Guide.
- If you have a test environment, you can create a monitoring server to use in historical data collection testing. Enable historical data collection for the desired attribute group under this remote monitoring server, and configure a representative agent to connect to this monitoring server. When the agent uploads data to the Warehouse Proxy agent, you can query the WAREHOUSELOG table to see how many rows were written by the agent for the attribute group.

For some agent types, such as the CICS agent, multiple instances (CICS regions, for example) are monitored as managed systems using sub-nodes. For these agents, you should specify the number of managed systems for the *Number of Agents* value on the agent worksheet.

### 3.2.2 Hiding unused agent types to make the graphs more legible

Because the spreadsheet includes attribute group information for a large number of agent types, the bar and pie graphs will contain many agent types that are not being used. To remove these unused agent types from the graphs, you can hide the rows for the unused agent types in the Summary worksheet. To hide a row, click on the row number at the left of the row to select it, then right-click and select Hide from the pop-up menu. You can hide multiple rows in one operation by using the Ctrl and Shift keys when selecting the rows. To “unhide” rows that are hidden, select the rows before and after the hidden rows, right click and select “Unhide” from the pop-up menu.

Figure 2 on page 7 shows an example of the storage bar graph with the unused agent types included.

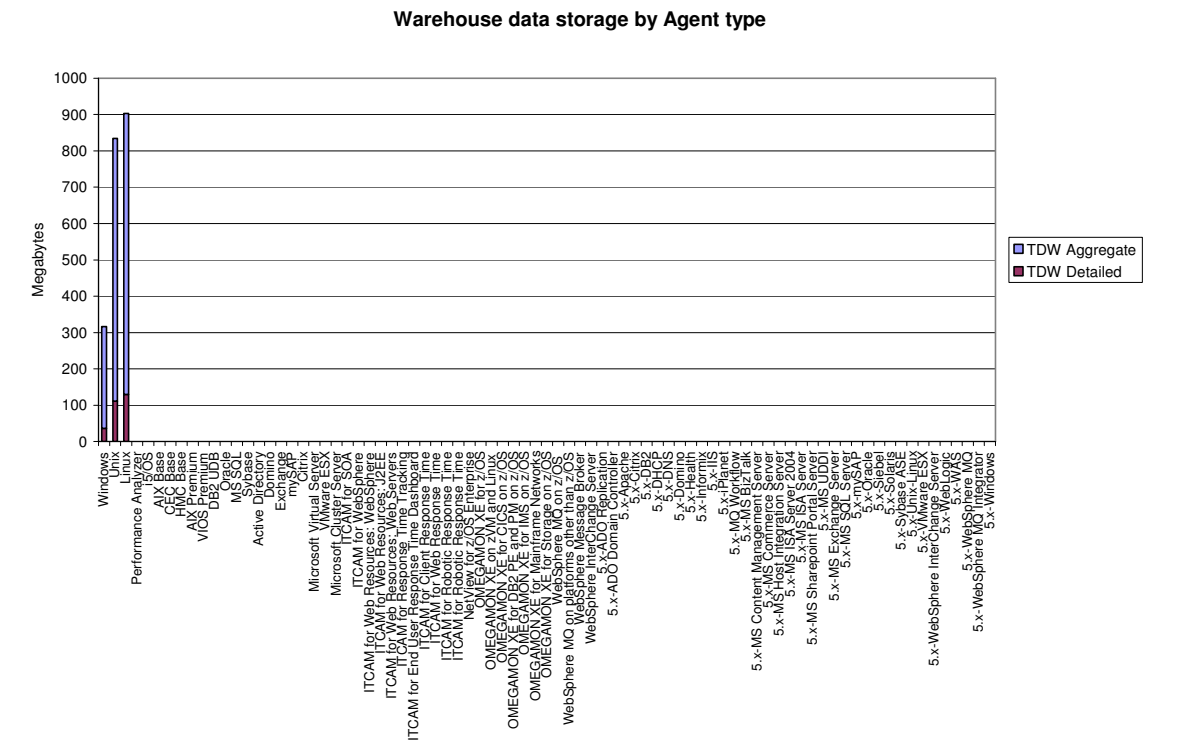


Figure 2 Storage bar graph with all agent types displayed



Figure 3 Storage Bar Graph with unused agent types hidden

Figure 3 shows a much more legible graph, with the unused agent types hidden.

### 3.2.3 Estimating network bandwidth usage for warehousing data

Results from the spreadsheet can be used to estimate the amount of network bandwidth used in moving historical data from the agent to the Warehouse Proxy agent, and from the Warehouse Proxy agent to the warehouse database.

- To estimate the amount of network bandwidth used by the agent to send historical data to the Warehouse Proxy agent, use the *TDW KB inserted/hour/agent* value from the top of the agent worksheet.
- To estimate the amount of network bandwidth used by the Warehouse Proxy agent to receive historical data from all of the agents, use the *Total MB of detailed data uploaded per hour* value from the Summary worksheet.
- To estimate the amount of network bandwidth used by the Warehouse Proxy agent to insert historical data into the warehouse database, use the *Total MB of detailed data inserted per hour* value from the Summary worksheet.

### 3.2.4 Reflecting multiple collections for an attribute group

Functional enhancements in ITM 6.2.2 allow the user to configure multiple historical collections for a single attribute group. For example, a set of 100 Linux servers could be configured to collect the Linux KLZ\_CPU attribute group every 5 minutes, while a different set of 200 Linux servers could be configured to collect this attribute group every 30 minutes.

The agent worksheet has a row for each of the agent attribute groups. To reflect more than one collection for an attribute group, you can insert additional rows in the agent worksheet and copy the row for the desired attribute group.

Attribute Group / TDW Tablename	Agent Tablename	Number of Agents	Collection Interval (1 5 15 30 60) Interval	Average Rows / Interval	Expected number of instances/rows	Retention interval override for attribute group							% of TDW inserts for agent type	% of TDW space for agent type
Detail	H	D	W	M	Q	Y								
KLZ_CPU	KLZCPU	100	5	3	1 row per CPU								54.5%	26.0%
KLZ_CPU	KLZCPU	200	30	3	1 row per CPU								18.2%	32.5%

Figure 4 Reflecting multiple collections for a single attribute group

Figure 4 illustrates how you would reflect two collections of the Linux KLZ\_CPU attribute group, one with 100 agents collecting data every 5 minutes, and one with 200 agents collecting data every 30 minutes. In this illustration, a new blank row was inserted below the row for the KLZ\_CPU attribute group, and then the entire KLZ\_CPU row was copied onto the new row.

If you use multiple collections in the spreadsheet, make sure that the data retention intervals are the same for each of the collections. In the History Collection Configuration dialog, data retention intervals are specified at the attribute group level, and not for each collection. All collections for a given attribute group use the same data retention interval settings.

When specifying multiple collections for a given attribute group, you should ensure that the distributions for the two collections do not have any managed systems in common.

### 3.2.5 Reflecting row filtering for an attribute group

Functional enhancements in ITM 6.2.2 Fix Pack 2 allow the user to write filter criteria to specify the data to collect. The new **Filter** tab in the Historical Collection Configuration editor has a formula editor much like what you have in the Situation editor. Historical collection of a data sample occurs only if the values in the data row fulfill the filter criteria.

To reflect row filtering for an attribute group in the load projection spreadsheet, adjust the value for *Average Rows/Interval* to reflect how many data rows will be collected after the filter criteria is applied.

### 3.2.6 Reflecting multiple retention settings for an attribute group

Functional enhancements in ITM 6.3 allow the user to configure multiple retention settings for a single attribute group. The technique to reflect this in the spreadsheet is similar to that described in section 3.2.4 for reflecting multiple historical collection settings. You insert a blank row below the attribute group, and copy the row for the attribute group to the blank row. Parameters for the set of agents affected by each retention setting should be specified on each row.

## 4 Detail for the Agent worksheets

For each agent type shown on the Summary worksheet, there is a separate worksheet which lists the attribute groups that are eligible for historical data collection and warehousing. Figure 5 shows a sample agent worksheet for the Unix agent.

Microsoft Excel - WarehouseLoadProjections.v2.6.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

100%

Arial

10

B I U

Reply with Changes - End Review

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Unix	6.2.3.1	KUX										
2		108	TDW record inserts/hour/agent										
3		89.8	TDW KB inserted/hour/agent										
4		1080	Total TDW record inserts/hour (across all agents)										
5		898	Total TDW KB uploaded/hour (across all agents)										
6		898	Total TDW KB inserted/hour (across all agents)										
7		2.0	Agent HDC Disk Space (MB - per agent, across all attribute groups)										
8		147.3	TDW Disk Space - Detailed data (MB - total across all attribute groups for all agents)										
9		423.9	TDW Disk Space - Aggregate data (MB - total across all attribute groups for all agents)										
10		857	Average size for detailed records (bytes)										
11		1625	Average size for aggregate records (bytes)										
12													
13	Agent Description	Version	ID										
14	Unix	6.2.3.1	KUX										
15													
16													
17													
18													
19	Attribute Group / TDW Tablename	Agent Tablename	Number of Agents	Collection Interval (1 5 15 30 60)	Avg. Rows / Interval / Agent	Expected number of instances/rows	Retention interval Detail	Hourly	Daily	Weekly	Monthly	Qtrly	Yearly
20	AIX_AMS	UNIXAMS		15	1	1 row per active memory sharing (AMS) pool							
21	AIX_Defined_Users	UNIXDUSERS		15	20	1 row per defined user							
22	AIX_DEVICES	UNIXDEVIC		15	7	1 row per network adapter or disk							
23	AIX_LPAR	UNIXLPAR		15	1	1 row per interval							
24	AIX_WPAR_CPU	UNIXWPARCP		15		1 row per workload partition (WPAR)							
25	AIX_WPAR_FileSystem	UNIXWPARFS		15		1 row per filesystem per WPAR							
26	AIX_WPAR_Information	UNIXWPARIN		15		1 row per WPAR							
27	AIX_WPAR_Network	UNIXWPARNE		15		1 row per WPAR							
28	AIX_WPAR_Physical_Memory	UNIXWPARPM		15		1 row per WPAR							
29	Disk	UNIXDISK	10	15	10	1 row per disk							
30	Disk_Performance	UNIXDPERF	10	15	10	1 row per disk							
31	KCA_UX_Agent_Active_Runtime_Status	KUXPASSTAT		15	3	1 row per monitored agent							
32	KCA_UX_Agent_Availability_Management_Status	KUXPASMGMT		15	3	1 row per monitored agent							
33	KCA_UX_Alerts_Table	KUXPASALRT		15		1 row per watchdog alert							
34	KCA_UX_Configuration_Information	KUXPASCAP		15	3	1 row per monitored agent							
35	Machine_Information	UNIXMACHIN		15	1	1 row per interval							
36	N_F_S_and_R_P_C_Statistics	UNIXNFS		15	1	1 row per interval							
37	Network	UNIXNET	10	15	2	1 row per network interface device and network device alias							
38	Process	UNIXPS		15	50	1 row per process							
39	SMP_CPU	UNIXCPU	10	15	2	1 row per CPU							
40	Solaris_Zones	UNIXSOLZON		15		1 row per zone plus one row for global zone							
41	System	UNIXOS	10	15	1	1 row per interval							

ReadMe / StgBarGraph / StgPieGraph / InsertBarGraph / InsertPieGraph / Summary / Windows

Unix / Linux / I5-OS / Ag

Ready Circular

NUM

Figure 5 Sample agent worksheet

The first line of the agent worksheet lists the agent name, the version number reflected in the spreadsheet, and the product code. The next ten lines contain summary calculations for the agent, which are discussed in section 4.3 *Agent Summary Calculations* on page 15.

Before describing the summary calculations, the next two sections describe the agent attribute group input parameters and calculations.

#### 4.1 Attribute Group Input Parameters

Beneath the summary calculations is an area listing the agent attribute groups that are eligible for historical data collection.

- *Attribute Group / TDW Tablename* (column A) shows the attribute group name, which corresponds to the table name used in the warehouse database. Attribute groups that are part of the “default group” for historical data collection are shown in Bold. The default group is not enabled by default, but if the user selects “Show Default Groups” from the TEP Historical Data Collection Configuration Panel, these are the attribute groups that show up.
- *Agent Tablename* (column B) is the short table name used by the agent for the short-term historical data file, and is also the name of the attribute group used in the Query Editor.



- *Number of Agents* (column C) is an input column. The user should specify the number of agents that will be collecting data for this attribute group. Historical data collection can be specified to start on all or a subset of the monitoring servers. The user should specify the total number of agents of this type which are configured to connect to monitoring servers which will have historical data collection started for this attribute group.
- *Collection Interval* (column D) is an input column. For each attribute group to be collected, the user should specify the data collection interval to be used in minutes. Valid values are 1, 5, 15, 30 or 60. Lower values increase the frequency of data collection, which increase the load and storage requirements for the warehouse database. If the data collection interval is not specified, the attribute group is not included in any summary calculations.
- *Avg. Rows / Interval / Agent* (column E) is used to specify the expected number of rows to be written at each data collection interval. Some attribute groups (such as Unix System and Unix Network) only write one record per interval. Other attribute groups can write multiple records per interval. For attribute groups that only write one row per interval, the cell in this column contains a "1" and it does not have a green background.
- *Expected number of instances/rows* (column F) contains information from the agent documentation (if available) that may be helpful in estimating how many rows will be written per interval for each attribute group. This column is "help" information to be used in specifying values for Column E.
- Column G is used to specify how many days of detailed data will be kept in the warehouse for this attribute group. This assumes that the user has the Summarization and Pruning agent or some other mechanism in place to remove old data from the warehouse.
- The next six columns (H through M) are used to specify how many aggregate records will be kept in the warehouse for the attribute group. The columns correspond to Hourly, Daily, Weekly, Monthly, Quarterly and Yearly aggregation periods. Tables for these aggregation periods are created by the Summarization and Pruning agent, based on specified configuration parameters.
  - Retention intervals for Hourly and Daily periods are specified in "number of days".
  - Retention intervals for Weekly and Monthly periods are specified in "number of months".
  - Retention intervals for Quarterly and Yearly periods are specified in "number of years".

## 4.2 Attribute Group Calculations

The remainder of the columns and cells in the agent worksheets represent calculated values based on the input parameters given in the green cells.

To the right of the input columns, Columns N through AN contain several calculated values, which are shown in Figure 6 and Figure 7 below.

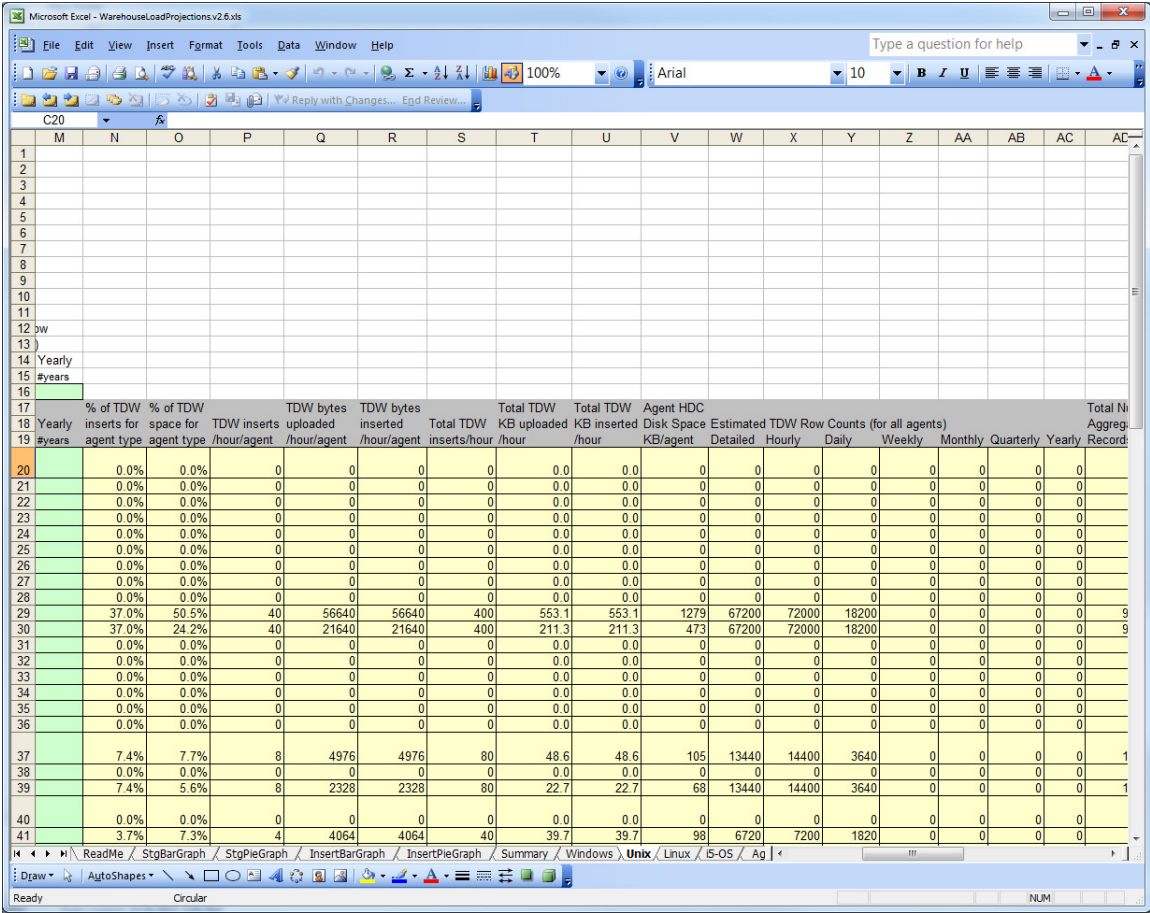


Figure 6 First set of attribute group calculated values

	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU
17	Total Num.																	
18	Aggregate Estimated TDW Table Size (MB for all agents)																	
19	Records	Detailed	Hourly	Daily	Weekly	Monthly	Quarterly	Yearly	Total TDW Aggregate Size (MB)	Trimmed Detailed Row size	Trimmed Aggregate Row size	Agent Row Size (bytes)	Detailed Row Size (bytes)	Aggregate Row Size (bytes)	Untrimmed VARCHAR Size (bytes)			
20	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	189	265	160	189	265	128			
21	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	189	265	160	189	265	128			
22	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	189	265	160	189	265	128			
23	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	189	265	160	189	265	128			
24	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	189	265	160	189	265	128			
25	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	189	265	160	189	265	128			
26	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	189	265	160	189	265	128			
27	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	189	265	160	189	265	128			
28	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	189	265	160	189	265	128			
29	90200	90.7	157.7	39.9	0.0	0.0	0.0	0.0	198	1416	2297	1364	1416	2297	1120			
30	90200	34.7	82.5	20.9	0.0	0.0	0.0	0.0	103	541	1202	504	541	1202	416			
31	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	1427	1464	1382	1427	1464	1266			
32	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	542	579	510	542	579	478			
33	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	516	553	484	516	553	448			
34	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	3108	3145	3062	3108	3145	2990			
35	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	189	265	160	189	265	128			
36	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	449	3138	492	449	3138	64			
37	18040	8.0	28.7	7.3	0.0	0.0	0.0	0.0	36	622	2090	560	622	2090	284			
38	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	2734	3590	2776	2734	3590	2220			
39	18040	3.7	22.3	5.6	0.0	0.0	0.0	0.0	28	291	1627	360	291	1627	64			
40	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	638	855	598	638	855	488			
41	9020	6.5	28.0	7.1	0.0	0.0	0.0	0.0	35	1016	4083	1040	1016	4083	392			

Figure 7 Second set of attribute group calculated values and estimated row sizes

The white columns on the far right of Figure 7 contain estimated rows sizes for the agent attribute groups. The following is a description of these four columns:

- **Agent Row Size** (column AO) is the estimated row length in bytes for storing a row of attribute group information at the agent.
- **Detailed Row Size** (column AP) shows the estimated row length in bytes for storing a row of detailed data for the attribute group in the warehouse.
- **Aggregate Row Size** (column AQ) shows the estimated row length in bytes for storing a row of aggregate data for the attribute group in the warehouse. The aggregate records are produced by the Summarization and Pruning agent.
- **Untrimmed VARCHAR Size** (column AR) shows the estimated number of bytes from a row that are part of VARCHAR fields. In ITM 6.2, the Warehouse Proxy agent trims trailing white space characters from characters strings prior to inserting into these fields. Values in this column are used in the calculations of related to white space trimming.

Columns N through AN have a yellow background, and contain calculations based on the input parameters (with a green background) and the attribute group row sizes (with a white background). The following is a description of each of these columns:

- *% of TDW inserts for agent type* (column N) shows the relative contribution of this attribute group to the total insert rate from this agent type. This value is calculated by dividing the total attribute group insert rate (*Total TDW inserts/hour* in column S) by the total insert rate across all of the attribute groups for this agent type.
- *% of TDW space for agent type* (column O) shows the relative contribution of this attribute group to the total space usage for this agent type. This value is calculated by dividing the sum of the detailed and aggregate table sizes for this attribute group by the sum of the detailed and aggregate table sizes across all attribute groups for this agent type.
- *TDW inserts/hour/agent* (column P) is calculated in the following manner:

$$(60 / \text{collection interval}) * \text{average rows/interval}$$

Dividing 60 (the number of minutes in an hour) by the collection interval (in column D) in minutes gives the number of data collection intervals per hour. Multiplying this by the average rows per interval (column E) gives the average number of TDW row inserts per hour for each agent.

- *TDW bytes uploaded/hour/agent* (column Q) is calculated by multiplying the *TDW inserts/hour/agent* value (column P) by the *Detailed Row Size* value (column AP), and multiplying the result by  $(1 - \text{upload compression \%})$ .
- *TDW bytes inserted/hour/agent* (column R) is calculated by multiplying the *TDW inserts/hour/agent* value (column P) by the *Trimmed Detailed Row Size* value (column AM), and multiplying the result by  $(1 - \text{table compression \%})$ .
- *Total TDW inserts/hour* (column S) is calculated by multiplying the number of agents (column C) by the *TDW inserts/hour/agent* value (column P).
- *Total TDW KB uploaded/hour* (column T) is calculated by multiplying the number of agents (column C) by the *TDW bytes inserted/hour/agent* value (column Q) and dividing by 1024 (to convert the result from bytes to Kbytes).
- *Total TDW KB inserted/hour* (column U) is calculated by multiplying the number of agents (column C) by the *TDW bytes inserted/hour/agent* value (column R) and dividing by 1024 (to convert the result from bytes to Kbytes).
- *Agent HDC Disk Space KB/agent* (column V) shows an estimate of the amount of disk space (in KB) required for the short-term historical data collection (HDC) for the attribute group on the agent. This would be the approximate size of the file with the filename shown in column B (*Agent Tablename*). This value is calculated by multiplying the *TDW inserts/hour/agent* value (column P) by the *Agent Row Size* value (column AO), multiplying by 24 (the number of hours of short-term historical data kept on the agent), and dividing by 1024 (to convert the result from bytes to Kbytes).
- *Estimated TDW Row Counts (for all agents) – Detailed* (column W) shows an estimate of the number of rows expected in the attribute group detailed (or raw) table in the warehouse database. This value is calculated by multiplying the number agents (column C) by the *TDW inserts/hour/agent* value, multiplying by 24 (for 24 hours of short-term data), and multiplying by the number of days specified as the retention period for detailed data.

- The *Estimated TDW Row Counts (for all agents)* values (columns X through AC) show an estimate of the number of rows expected in the attribute group aggregate tables (hourly, daily, weekly, etc.) in the warehouse database. These values are calculated by multiplying the number agents (column C) by the expected rows per interval (column E), and multiplying the result by the retention interval for the aggregation period.
  - For aggregation periods other than Hourly (i.e., Daily through Yearly), if shift information is specified, the result is multiplied by 3 (one row for on shift, one row for off-shift, and one row across values).
  - For aggregation periods other than Hourly or Daily (i.e., Weekly through Yearly), if vacation days are specified, the result is multiplied by 3 (one row for vacation days, one row for non-vacation days, and one across values).
  - If shift information and vacation days are specified, aggregation periods other than Hourly or Daily (i.e., Weekly through Yearly) are multiplied by 9.

To minimize the load and space requirements for the warehouse database, you should consider NOT specifying shift information or vacation days in the Summarization and Pruning agent configuration parameters.

- *Total Num. Aggregate Records* (column AD) is the sum of values in columns X through AC.
- *Estimated TDW Table Size – Detailed* (column AE) shows the estimated size in MB to keep the specified number of days of detailed data in the warehouse for this attribute group for all of the agents to be monitored. This estimate is calculated by multiplying the estimated total rows of detailed data (column W) by the *Trimmed Detailed Row Size* (column AM), multiplying by (1 – table compression %), and dividing by 1024 \* 1024. This calculation yields a result in MB.
- Columns AF through AK show the estimated TDW table size for each of the aggregate tables (hourly, daily, etc.). These estimates are calculated by multiplying the estimated total rows for the aggregate table by the *Trimmed Aggregate Row Size* (column AN), multiplying by (1 – table compression %), and dividing by 1024 \* 1024. This calculation yields a result in MB.
- *Total TDW Aggregate Size* (column AL) shows the sum of the estimated sizes of all the aggregate tables for the attribute group.
- *Trimmed Detailed Row Size* (column AM) shows an estimate of the attribute group detailed row size assuming the trimming percentage specified on the Summary worksheet, using the following calculation

$$\text{Detailed Row Size} - \text{Trim \%} * \text{Untrimmed VarChar Size}$$

- *Trimmed Aggregate Row Size* (column AN) shows an estimate of the attribute group detailed row size assuming the trimming percentage specified on the Summary worksheet, using the following calculation

$$\text{Aggregate Row Size} - \text{Trim \%} * \text{Untrimmed VarChar Size}$$

## 4.3 Agent Summary Calculations

The top portion of the Agent workspace shows a set of estimated values, which are based on results of the formulas described in section 4.2 *Attribute Group Calculations* on page 11. Figure 8 contains a screen capture which shows these values.

	A	B	C	D	E	F
1	Unix	6.2.3.1	KUX			
2		108	TDW record inserts/hour/agent			
3		89.8	TDW KB inserted/hour/agent			
4		1080	Total TDW record inserts/hour (across all agents)			
5		898	Total TDW KB uploaded/hour (across all agents)			
6		898	Total TDW KB inserted/hour (across all agents)			
7		2.0	Agent HDC Disk Space (MB - per agent, across all attribute groups)			
8		147.3	TDW Disk Space - Detailed data (MB - total across all attribute groups for all agents)			
9		423.9	TDW Disk Space - Aggregate data (MB - total across all attribute groups for all agents)			
10		851	Average size for detailed records (bytes)			
11		1825	Average size for aggregate records (bytes)			

Figure 8 Agent Summary Calculations

The following values are shown at the top of the agent worksheet:

- *TDW record inserts/hour/agent* is the sum of the attribute group *TDW inserts/hour/agent* estimates contained in column P of the agent worksheet.
- *TDW KB inserted/hour/agent* is the sum of the attribute group *TDW bytes inserted/hour/agent* estimates contained in column R of the agent worksheet, divided by 1024 to convert the result to Kbytes.
- *Total TDW record inserts/hour (across all agents)* is the sum of the attribute group *Total TDW inserts/hour* estimates contained in column S of the agent worksheet.
- *Total TDW KB uploaded/hour (across all agents)* is the sum of the attribute group *Total TDW bytes uploaded/hour* estimates contained in column T of the agent worksheet.
- *Total TDW KB inserted/hour (across all agents)* is the sum of the attribute group *Total TDW bytes inserted/hour* estimates contained in column U of the agent worksheet.
- *Agent HDC Disk Space (MB – per agent, across all attribute groups)* is the sum of the attribute group *Agent HDC Disk Space KB/agent* calculations, converted to a MB result.
- *TDW Disk Space – Detailed data (MB – total across all attribute groups for all agents)* is the sum of the attribute group Detailed data disk space estimates (column AE).
- *TDW Disk Space – Aggregate data (MB – total across all attribute groups for all agents)* is the sum of the attribute group aggregate table disk space estimates (column AL).
- *Average size for detailed records (bytes)* is calculated by multiplying the *TDW Disk Space – Detailed data* result by 1024\*1024 (to convert it to bytes), and then dividing the result by the sum of the estimated row counts for detailed data (column W) across all of the attribute groups.
- *Average size for aggregate records (bytes)* is calculated by multiplying the *TDW Disk Space – Aggregate data* result by 1024\*1024 (to convert it to bytes), and then dividing the result by the sum of the *Total Num. Aggregate Records* values across all of the attribute groups.

Most of the values from top portion of the agent worksheet are referenced from the Summary worksheet.

Figure 9 shows a screen capture of the Summary worksheet.

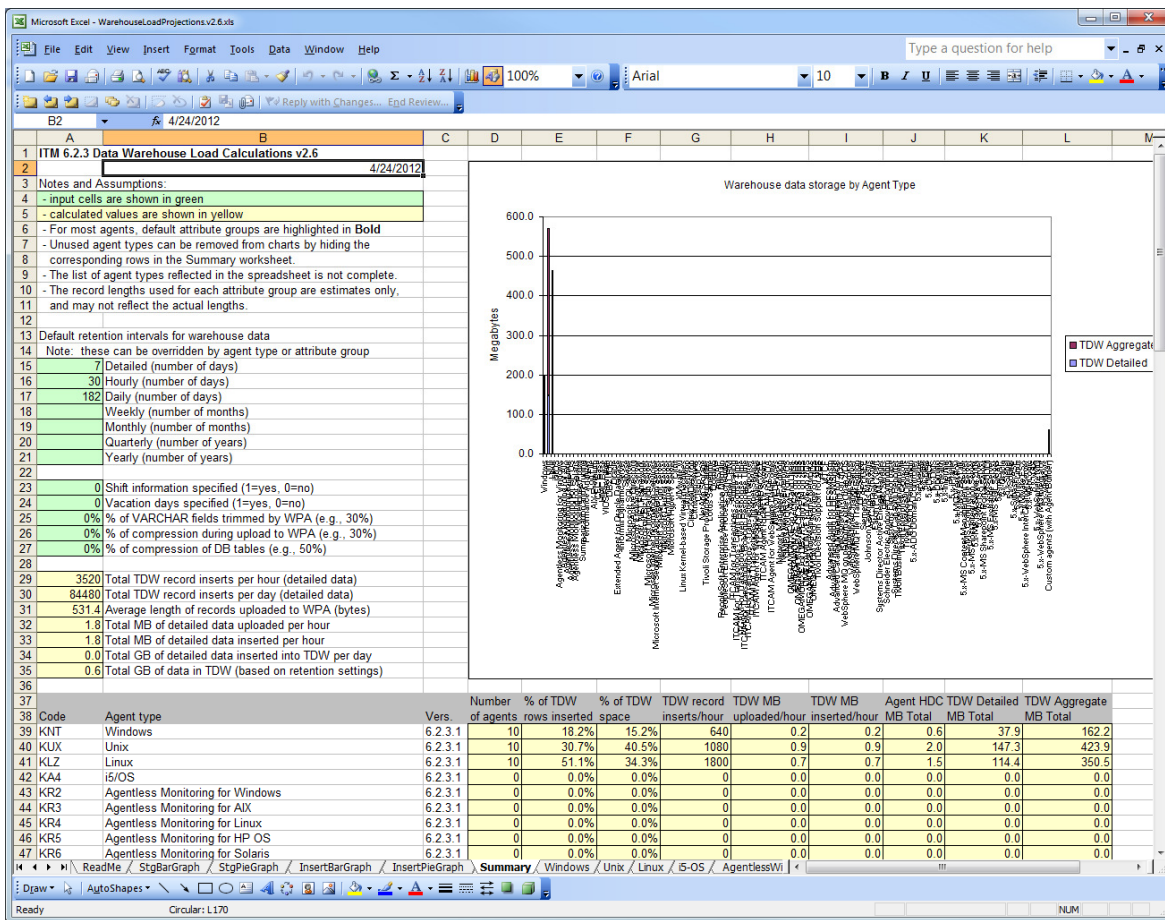


Figure 9 Summary worksheet

There are three main areas in the Summary worksheet. The upper left portion lists some brief notes and assumptions, and lists input parameters and summary results. The upper right portion shows a bar graph of the disk space estimates by agent type. This graph is a smaller version of the graph shown on the *StgBarGraph* worksheet.

The lower portion shows a list of the available agent types, along with the agent product codes and release levels. For each agent type, a set of cells with a yellow background show summarized values based on results from the individual agent worksheets (described previously in section 4 *Detail for the Agent worksheets*). Figure 10 shows a close-up of the calculated values for each agent type on the Summary workspace.

Number of agents	% of TDW rows inserted	% of TDW space	TDW record inserts/hour	TDW MB uploaded/hour	TDW MB inserted/hour	Agent HDC MB Total	TDW Detailed MB Total	TDW Aggregate MB Total
10	18.2%	15.2%	640	0.2	0.2	0.6	37.9	162.2
10	30.7%	40.5%	1080	0.9	0.9	2.0	147.3	423.9
10	51.1%	34.3%	1800	0.7	0.7	1.5	114.4	350.5
0	0.0%	0.0%	0	0.0	0.0	0.0	0.0	0.0
0	0.0%	0.0%	0	0.0	0.0	0.0	0.0	0.0

Figure 10 Summary worksheet agent calculations



## 4.4 Agent Summary Calculations

The following summary calculations are shown for each agent type:

- *Number of agents* is the maximum value from the column Number of agents on the agent worksheet.
- *% of TDW rows inserted* shows the relative contribution of this agent type to the total row insert rate for the warehouse database. This value is calculated by dividing the row insert rate for this agent type by the sum of the insert rates across all agent types.
- *% of TDW space* shows the relative contribution of this agent type to the total space usage for the warehouse database. This value is calculated by dividing the space usage for this agent type by the sum of the space usage across all agent types.
- *TDW record inserts/hour* is an estimate of the total number of detailed records inserted into the warehouse database per hour for the given agent type. This value is a cell reference to the *Total TDW inserts/hour (across all agents)* value on the agent worksheet.
- *TDW MB uploaded/hour* is an estimate of the total amount of detailed data (in MB) uploaded from agent type per hour. This value does not show the effect of trimming trailing white space characters from strings inserted into VARCHAR fields. This value is a cell reference to the *Total TDW KB uploaded/hour (across all agents)* value on the agent worksheet, dividing by 1024 to convert to MB.
- *TDW MB inserted/hour* is an estimate of the total amount of detailed data (in MB) inserted into the warehouse database per hour for the given agent type. If specified, this value shows the effect of trimming trailing white space characters from strings inserted into VARCHAR fields. This value is a cell reference to the *Total TDW KB inserted/hour (across all agents)* value on the agent worksheet, dividing by 1024 to convert to MB.
- *Agent HDC MB Total* is an estimate of the total amount of storage required at the agent to keep 24 hours of historical data. This value is a direct cell reference to the same value on the agent worksheet.
- *TDW Detailed MB Total* is an estimate of the total amount of detailed data (in MB) that will reside in the warehouse database for the given agent type, based on the specified warehouse retention settings. This value is a reference to the *TDW Disk Space - Detailed data (MB - total across all attribute groups for all agents)* value from the agent worksheet.
- *TDW Aggregate MB Total* is an estimate of the total amount of aggregate data (in MB) that will reside in the warehouse database for the given agent type, based on the specified warehouse retention settings. This value is a reference to the *TDW Disk Space - Aggregate data (MB - total across all attribute groups for all agents)* value from the agent worksheet.

## 4.5 Summary Calculations

Figure 11 shows the left portion of the Summary worksheet, which contains a set of summary calculations across all agent types.



29	3520	Total TDW record inserts per hour (detailed data)
30	84480	Total TDW record inserts per day (detailed data)
31	531.4	Average length of records uploaded to WPA (bytes)
32	1.8	Total MB of detailed data uploaded per hour
33	1.8	Total MB of detailed data inserted per hour
34	0.0	Total GB of detailed data inserted into TDW per day
35	0.6	Total GB of data in TDW (based on retention settings)

Figure 11 Summary calculations

The following summary calculations are shown:

- *Total TDW record inserts per hour (detailed data)* is an estimate of the total number of row inserts of detailed data that will be performed per hour by the Warehouse Proxy agent. This value is calculated by summing the *TDW record inserts/hour* values for each agent type shown in the lower portion of the Summary worksheet.
- *Total TDW record inserts per day (detailed data)* is an estimate of the total number of row inserts of detailed data that will be performed per day by the Warehouse Proxy agent. This value is calculated by multiplying the *Total TDW record inserts per hour* value by 24.
- *Average length of records uploaded to WPA (bytes)* is an estimate of the average length of attribute group rows that are uploaded to the Warehouse Proxy agent. This value is calculated by dividing the *Total TDW record inserts per hour* value by the *Total MB of detailed data inserted into TDW per hour* value (which is described below).
- *Total MB of detailed data uploaded per hour* is an estimate of the total amount of detailed data (in MB) uploaded to the Warehouse Proxy agent(s) across all agent types. This value is calculated by summing the *TDW MB uploaded/hour* values for each agent type shown in the lower portion of the Summary worksheet.
- *Total MB of detailed data inserted per hour* is an estimate of the total amount of detailed data (in MB) inserted into the warehouse database per hour across all agent types. This value is calculated by summing the *TDW MB inserted/hour* values for each agent type shown in the lower portion of the Summary worksheet. If the *% of VARCHAR fields trimmed by WPA* input parameter is set to 0 (the default), indicating that no trimming occurs, this value will be equal to the *Total MB of detailed data uploaded per hour* value.
- *Total GB of detailed data inserted into TDW per day* is an estimate of the total amount of detailed data (in GB) inserted into the warehouse database per day across all agent types. This value is calculated by multiplying the *Total MB of detailed data inserted per hour* value by 24 (hours/day) and dividing by 1024 (to convert from MB to GB).
- *Total GB of data in TDW (based on retention settings)* is an estimate of the total amount of detailed data and aggregate data (in GB) to be stored in the warehouse, based on the retention settings specified for each attribute group. This value is calculated by summing the *TDW Detailed MB Total* and *TDW Aggregate MB Total* values across all agent types and dividing by 1024 (to convert to GB).

The *Total GB of data in TDW* result gives an estimate of the total amount of data that will be maintained in the warehouse database. This estimate is similar to that which would be

produced by Steps 1 through 5 in the section *Estimating the required size of your database* of the *ITM 6.2 Installation and Setup Guide*. The instructions in the *ITM 6.2 Installation and Setup Guide* recommend increasing this value by 50% to accommodate uncertainty, and then comparing this number to the *Database data* row in the *Database size examples* table to determine the number of disks you need for your database.

## 5 Adding custom agents

To accommodate custom agents, such as those built using the Agent Builder, a Custom worksheet is included at the far right of the worksheet tables. The Summary worksheet contains an entry at the end of the list of agent types showing totals from the Custom worksheet, shown in Figure 12 below.

27	KIMI_AMVW	5.X-VVINDOWS	6.1.0	0
28	Custom	Custom agents (with Agent Builder)	1.0.0	10
29				

Figure 12 Row in Summary worksheet for Custom agents

The Custom worksheet is shown below in Figure 13.

	A	B	C	D	E	F	H
1	Custom agents (with Agent Builder)	1.0.0	Custom				
2		8 TDW record inserts/hour/agent					
3		13.6 TDW KB inserted/hour/agent					
4		80 Total TDW record inserts/hour (across all agents)					
5		136 Total TDW KB uploaded/hour (across all agents)					
6		136 Total TDW KB inserted/hour (across all agents)					
7		0.3 Agent HDC Disk Space (MB - per agent, across all attribute groups)					
8		22.4 TDW Disk Space - Detailed data (MB - total across all attribute groups for all agents)					
9		17.0 TDW Disk Space - Aggregate data (MB - total across all attribute groups for all agents)					
10		1746 Average size for detailed records (bytes)					
11		2270 Average size for aggregate records (bytes)					
12							
		<b>Notes:</b> To add attribute groups for custom agents built with the Agent Builder, locate the file with the name <product code>.summary, where <product code>is the three letter product code. In the compressed agent install file (.zip or .tgz), it is located in "ira\agent\common". In the Solution Install image, it is located in "CD_ROOT\<product_code\UA_APP\BUNDLE\ira\agent\common"					
13		The summary file is a tab-separated file that can be opened directly with Excel. Paste the contents of the summary file into columns A through F in the table. If you will have multiple custom agents, you can paste the attribute group information for additional agents below each other.					
14		For each attribute group that will have historical data collection enabled, specify the number of agents, the collection interval, and the average number of rows per interval that are expected (in columns H, I and J).					
15		Retention intervals for detailed and summarized rows are specified in the same way as other agent types.					
16							
17	Agent Description	Version	ID				
18	Custom agents (with Agent Builder)	1.0.0	Custom				
19							
20							
21							
22	Agent	Attribute Group /	Agent	Detailed	Aggregate	Single or	
23	Tablename	TDW Tablename	Row Size (bytes)	Row Size (bytes)	Row Size (bytes)	Multiple Instances	Number of Agents
24	KQRWIN32PR	KQR_WIN32_PROCESSOR	2072	2111	3084	S	10
25	KQRSYSTEM	KQR_SYSTEM	1360	1380	1456	S	10
26	KQRTCPCONN	KQR_TCPCONNTABLE	152	153	190	M	
27	KQRPKTROLL	KQR_OUTCAST_PACKETS_ROLLUP_WITH_LONG_NAME	96	97	209	S	
28	KQRIFTABLE	KQR_IPTABLE	548	566	924	M	
29	KQRIPADDR	KQR_IPADDRTABLE	152	153	235	M	
30							
31							

Figure 13 Custom agent worksheet

The worksheet includes some sample data to illustrate how the worksheet will look once data has been entered. You can delete this sample data when you start using this worksheet.

To represent attribute groups for a custom agent in the load projections spreadsheet, the row lengths for each attribute group are needed. Fortunately, this information is readily available for agents created using the Agent Builder. The Agent Builder produces a summary file with a name of the form "<product code>.summary" where <product code> is the 3 letter product code for the custom agent.

- In the compressed agent install file (.zip or .tgz), the agent summary file can be found in the directory "ira\agent\common".
- In the Solution Install image, the agent summary file can be found in the directory "CD\_ROOT\<product\_code>\UA\_APP\BUNDLE\ira\agent\common"

A sample agent summary file is shown in Figure 14.

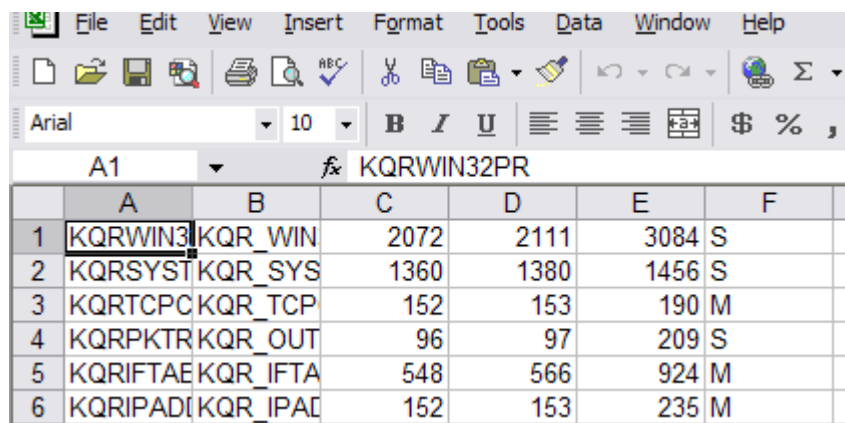
KQRWIN32PR	KQR_WIN32_PROCESSOR	2072	2111	3084	S				
KQRSYSTEM	KQR_SYSTEM	1360	1380	1456	S				
KQRTCPCONN	KQR_TCPCONNTABLE	152	153	190	M				
KQRPKTROLL	KQR_OUTCAST_PACKETS_ROLLUP_WITH_LONG_NAME	96	97	209	S				
KQRIFTABLE	KQR_IFTABLE	548	566	924	M				
KQRIPADDR	KQR_IPADDRTABLE	152	153	235	M				

Figure 14 Sample agent summary file

Each row in the summary file contains information about an attribute group, with the following six columns of information:

1. The agent table name that will be used as the filename for short-term historical data collection.
2. The attribute group name that will be used as the tablename in the warehouse database.
3. The row size (in bytes) for the attribute group as stored in the short-term historical data collection file at the agent (or TEMS).
4. The row size for detailed rows that are uploaded and inserted into the warehouse database.
5. The row size for aggregate records that are produced by the Summarization and Pruning agent.
6. An indication of whether the attribute group will generate only a single row or instance per collection interval (indicated by 'S') or potentially multiple rows or instances per collection interval (indicated by 'M').

Getting the attribute group information into the load projections spreadsheet is a simple two step process. The agent summary file is a tab-separated file which can be opened directly from Excel, as shown in Figure 15 below.



	A	B	C	D	E	F
1	KQRWIN32PR	KQR_WIN	2072	2111	3084	S
2	KQRSYST	KQR_SYS	1360	1380	1456	S
3	KQRTCPCK	KQR_TCP	152	153	190	M
4	KQRPKTR	KQR_OUT	96	97	209	S
5	KQRIFTAE	KQR_IFTA	548	566	924	M
6	KQRIPADI	KQR_IPAD	152	153	235	M

Figure 15 Sample agent summary file opened with Excel

1. With the summary file open in Excel, select the cells containing columns A through F for each of the attribute group rows, and copy them (Ctrl-C) as illustrated in Figure 16 below.

	A1						
	A	B	C	D	E	F	G
1	KQRWIN3	KQR_WIN	2072	2111	3084	S	
2	KQRSYST	KQR_SYS	1360	1380	1456	S	
3	KQRTCPCK	KQR_TCP	152	153	190	M	
4	KQRPKTR	KQR_OUT	96	97	209	S	
5	KQRIFTAE	KQR_IFTA	548	566	924	M	
6	KQRIPADI	KQR_IPAD	152	153	235	M	

Figure 16 Select columns A through F for the attribute group rows, and copy (Ctrl-C)

- Paste the copied cells into the Custom worksheet table, starting in column A on an empty green row, as shown in Figure 17 below.

21							
22	Agent	Attribute Group /	Agent	Detailed	Aggregate	Single or	
23	Tablename	TDW Tablename	Row Size (bytes)	Row Size (bytes)	Row Size (bytes)	Multiple Instances	
24	KQRWIN32PR	KQR_WIN32_PROCESSOR	2072	2111	3084	S	
25	KQRSYSTEM	KQR_SYSTEM	1360	1380	1456	S	
26	KQRTCPCONN	KQR_TCPCONNTABLE	152	153	190	M	
27	KQRPKTROLL	KQR_OUTCAST_PACKETS_ROLLUP_WITH_LONG_NAME	96	97	209	S	
28	KQRIFTABLE	KQR_IFTABLE	548	566	924	M	
29	KQRIPADDR	KQR_IPADDRTABLE	152	153	235	M	
30							

Figure 17 Paste copied cells into column A of an empty green row

If you will have multiple custom agents, you can paste the attribute group information for the agents below one another on the same worksheet.

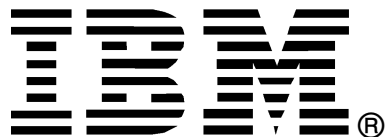
Once the attribute group information has been copied to the Custom worksheet, you are ready to start making projections using the spreadsheet.

- For each attribute group that will have historical data collection enabled, specify the number of agents, the collection interval, and the average number of rows per interval that are expected (in columns H, I and J).
- Retention intervals for detailed and summarized rows are specified in the same way as other agent types.

The total calculations at the top of the Customer worksheet should update automatically as you specify information for the attribute groups you plan to collect. The totals on the Summary worksheet should update automatically as well.

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