



Comparison of Performance Between Autodesk Inventor 7 and Inventor 8 in Specific Areas Related to Drawings

**A Cyon Research Report
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A Cyon Research Analysis Report

Executive Summary

The performance of any software product has both qualitative and quantitative aspects. While overall performance can be measured in terms of the time it takes a program to perform a given function, the user's experience is often more subjective than simple numbers may imply. Yet when comparing the performance of a new version of a program to the previous version, the software manufacturer often looks to numerical comparisons to justify the purchase decision for the new release.

In the case of comparing the new release of its Autodesk Inventor software to the previous version, Autodesk had determined through its own tests that the software performed faster in a number of areas, particularly in specific areas related to the creation and editing of drawings based on part and assembly models. Our task was therefore to verify these measurements and assess whether improvements in these areas would truly benefit users of the software.

We have performed the tests as described here and have reached the following conclusions. Autodesk Inventor 8 is significantly faster than Inventor 7 in the performance of drawing functions. It opens drawings, creates views, imports STEP data, and enables the creation and modification of drawing annotations significantly faster than the previous version.

In our tests, Inventor 8 opened drawings twice as fast as Inventor 7, created new drawing views from parts and assemblies anywhere from two times to as much as eight times faster than Inventor 7, and created views from imported STEP data as much as 36 times faster than Inventor 7. Common drawing annotation operations that took 15 to 20 seconds to complete with Inventor 7 were practically instantaneous with Inventor 8.

While these conclusions are based on numerical measurements comparing the time it takes to perform these actions in the new version versus the previous version, from a user perspective, many of the improvements in performance are in areas in which customers are likely to be very sensitive to performance issues. In many cases, the time required to perform a given operation has gone from requiring an unacceptably long period of time to being almost instantaneous. In this regard, Autodesk Inventor 8 provides both a quantitative and a qualitative improvement over Inventor 7. This improvement to personal productivity is significant to the extent that many users will find that it alone will justify the cost of transition.

Comparison of Performance Between Autodesk Inventor 7 and Inventor 8 in Specific Areas Related to Drawings

By David S. Cohn

At the request of Autodesk, I conducted a series of tests comparing the performance of Autodesk Inventor 7 (SP1) and Autodesk Inventor 8(M.0.67). These tests focused on areas related specifically to drawings.

The results of this performance comparison are presented below. The report is divided into four sections:

- **Methodology** discusses the general methods used to conduct the analysis, including the computer hardware used and methods by which the tests were conducted and the results were recorded.
- **Procedures** discusses the actual procedures used to perform each test. It is assumed that if another individual were to conduct these tests using similar methods, the ratio of performance change measured between Inventor 7 and Inventor 8 would remain consistent.
- **Results** presents the actual numerical results of the tests.
- **Conclusions** presents an analysis of the numerical results and their significance.

Methodology

This section discusses the general methods used to conduct the analysis, including the computer hardware used and the methods by which the tests were conducted and the results recorded.

All tests were performed on a HP Workstation model xw4100 equipped as follows:

CPU: Intel Pentium 4, 3.2GHz w/512K L2 cache

Motherboard: ATX form factor based on Intel 875P chipset

Memory: 1.5GB

Graphics: NVIDIA Quadro4 980XGL

Hard drive: Maxtor 80GB Ultra ATA/100 (7,200rpm)

Monitor: Compaq TFT8000 LCD monitor (1280x1024, 32-bit color)

The hard drive was defragged prior to beginning test procedures. No other applications were running while testing was being performed.

All tests were conducted using software and datasets provided by Autodesk. The datasets consisted of actual customer data. The datasets included parts, assemblies, drawings, and STEP files, with specific datasets provided for comparing four general areas of performance:

- Opening a large drawing (.idw) file
- Creating a base view from an existing assembly (.iam) file
- Creating a base view from imported STEP data (.stp file)
- Creating and modifying annotations within a large drawing (.idw) file

Autodesk supplied me with four (4) hand-labeled CD-ROMs containing the following:

- Autodesk Inventor 7 (SP1)
- Autodesk Inventor 8 (M.0.67)
- Dataset saved in Inventor 7 format
- Dataset saved in Inventor 8 format

As per Autodesk's instructions, I installed Inventor 7 on the aforementioned system, copied a dataset consisting of files saved in Inventor 7 format to the hard drive. I then started Inventor 7 and performed a series of test, as detailed in the "Procedures" section below. I then uninstalled Inventor 7, installed Inventor 8, and repeated all of the tests.

All tests consisted of performing a specific action or series of actions in Inventor and timing the interval within a single command from the point at which the software performed an action requiring no further human interaction until that specific action was completed (indicated by a graphical event visible on screen) and the Inventor software was ready to perform another operation.

In the case of some tests performed in Inventor 7, specifically creating a *Base View* or *Projected View*, the software first creates a *semi-precise* view and is actually ready to perform another operation while it continues to calculate precise hidden lines as a background process. When testing this procedure in Inventor 7, therefore, I recorded two timings: the split interval from the start of the command until Inventor first displays the semi-precise drawing view (indicated by the addition of a drawing node icon in the Inventor Browser panel, with the icon shown in a red color) and the total length of time required from the start of the command until Inventor has created the precise hidden line view (indicated by the color of the drawing node icon in the Browser panel changing from red to black). Inventor 8 eliminates the intermediate semi-precise view step. The Inventor 8 results therefore list only the total length of time from the start of the command until the software is ready to perform another operation.

All performance was timed using a digital stopwatch. The stopwatch was held in my left hand while I manipulated the computer mouse using my right hand. The stopwatch was started at the same time as I performed the necessary operation using the mouse and stopped when I visually noted the completion of the operation on-screen.

Issues related to timing performance

It is generally accepted that the most accurate methodology for computer benchmark testing is to create a script program that automatically performs the given test and records the results. Because of the nature of the tests performed and the time allocated for producing this report, however, it was not possible to create such a script. The tests were therefore conducted by performing selected actions on the computer, using a stopwatch to record performance times, and manually recording the timed results.

Because of variations in eye-hand coordination, it is impossible to precisely start the stopwatch with one hand while at the same time performing a computer operation using the other hand. It is also impossible to stop the stopwatch at the exact instant at which the operation being monitored is completed, particularly when that operation requires that a person visually ascertain its completion based on a visual event. For example, the person

conducting the test may blink at the instant that the test is completed (stopping the watch late) or may become too familiar with the test (anticipating its completion and stopping the watch early). The resulting times will therefore always vary within a small range. In addition, test results will vary between individuals.

In order to minimize these variations, all tests were performed by a single individual and each test was performed a minimum of five (5) times. When specific test results varied significantly, the results of that iteration of the test were eliminated and the test was repeated several more times.

Times will also vary based upon the performance of the computer system on which the tests are run. In the case of the performance being measured in this study, however, the intention was to measure the variation in performance between two different versions of the software on the same computer. One can reasonably expect that while the times will be different if these tests are performed on a different computer, the ratio of variation in performance will be respectively consistent between computer systems. This last point was verified to my satisfaction by performing a sub-set of the tests on a second, less-powerful computer system.

Issues related to the datasets

As noted, I was provided with two different datasets: one saved in Inventor 7 format and what was described to me as the identical dataset “already migrated from [Inventor] 7 to [Inventor] 8 to save you time.” Upon comparison of the two datasets, I noted that although the filenames were identical, there was considerable variation in the file size when comparing one version of a given file with the other.

In order to verify that the only difference indeed resulted from the migration of the data from one version of Inventor to the other, I performed my own migration of selected portions of the Inventor 7 dataset to Inventor 8. I performed this migration in two ways. In one instance I opened the Inventor 7 dataset in Inventor 8 and allowed Inventor 8 to update the data to the newer format. In the second instance I used the Migration Utility provided by Autodesk as part of the Inventor software. Through these methods I conclude that the data supplied on the two CD-ROM disks represent the same datasets.

Procedures

This section discusses the actual procedures used to perform each test. It is assumed that if another individual were to conduct these tests using similar methods, the ratio of performance change measured between Inventor 7 and Inventor 8 would remain consistent.

The tests are grouped into four general areas:

- **Drawing Open:** Opening a large drawing (.idw) file
- **Base View Creation:** Creating a base view from an existing assembly (.iam) file
- **Import Data:** Creating a base view from imported STEP data (.stp file)
- **Annotations:** Creating and modifying annotations within a large drawing (.idw) file

Drawing Open

The Drawing Open tests time the interval from when Inventor begins to open a selected drawing (.idw) file until that drawing is displayed in Inventor and the software is ready to perform an operation. The exact steps are as follows:

1. Load Autodesk Inventor.
2. Select File > Open.
3. In the Open dialog box, select the drawing file to be opened.
4. Click the Open button (and start the stopwatch).
5. Stop the stopwatch when the drawing is open and Inventor is ready to perform an operation.

I was supplied three datasets, identified herewith as B, H, and M. Each dataset referenced a large number of individual parts and/or assemblies, with each containing a large number of unique parts, as follows:

- **B** 251 unique parts (281 files totaling 63.4MB of data)
- **H** 282 unique parts (337 files totaling 51.3MB of data)
- **M** 420 unique parts (483 files totaling 120MB of data)

The method of measurement in this test was identical in both Inventor 7 and Inventor 8.

Base View Creation

The Base View Creation tests measure the time it takes to create a base drawing view within a new drawing. As previously noted, Inventor 7 first creates a semi-precise drawing view and then calculates the precise hidden lines in the background while the user can use the software to perform other operations. The exact steps used to perform this test are therefore slightly different in Inventor 7 compared to Inventor 8, as noted below. In addition to creating the initial base view, I also created several projected views.

I was supplied with five datasets, identified herewith as M, H, U, D, and B. From these datasets I created six different sets of views, one each from the main assembly for each of the datasets M, H, U, and B, and two sets of views from the two different parts in dataset D (denoted as D1 and D2). Each assembly or part file is detailed below (for assembly files the total number of files and size of the dataset is also listed):

- **M** 269KB assembly (481 files totaling 104MB of data)
- **H** 147KB assembly (339 files totaling 44.9MB of data)
- **U** 510KB assembly (637 files totaling 168MB of data)
- **D1** 4.41MB part file
- **D2** 3.91MB part file
- **B** 5.62MB assembly (643 files totaling 175MB of data)

This set of tests consisted of four sub-tasks, each with its own measurement as explained in the following sections.

Load Assembly:

Since this series of tests measured the time it takes to create views from an assembly that was not already open in Inventor, I first timed how long it took for Inventor to read the assembly into memory so that it could generate a preview of the base image. The exact steps are as follows:

1. Load Autodesk Inventor.
2. Select File > New > Drawing.
3. Activate the Base View command.
4. In the Drawing View dialog box, select the assembly file from which the view will be created.
5. Click the OK button (and start the stopwatch).
6. Stop the stopwatch when the preview image is visible in Inventor.

Because the base view direction has a bearing on the time required to create the base view, in each instance I used the default view orientation provided in the Drawing View dialog box.

Create view:

This sub-test measured the time it takes to create the initial base view. As explained above, the test used a slightly different timing methodology for Inventor 7 and Inventor 8 due to Inventor 7's initial creation of a semi-precise view followed by the subsequent creation of precise hidden lines.

Inventor 7 procedure (continuing from the Load Assembly steps above):

1. Click to position the base view in the drawing (and start the stopwatch).
2. Watch for the creation of the semi-precise base view, also indicated by the initial appearance of the view node icon in the Browser (and freeze and record the split time interval from the stopwatch).
3. Stop the stopwatch when the view node icon color changes from red to black.

Inventor 8 procedure (continuing from the Load Assembly steps above):

7. Left-click to position the base view in the drawing (and start the stopwatch).
8. Stop the stopwatch when the base view appears in the drawing, also indicated by the appearance of a view node icon in the Browser.

Project 2 views:

Although not requested, I also timed how long it took to project two additional views from the base view. Again, due to the differences between Inventor 7 and Inventor 8, the procedures varied slightly.

Inventor 7 procedure (continuing from the previous Inventor 7 steps above):

10. Activate the Projected View command.
11. Click to select the base view previously created.

12. Click to position a projected view.
13. Click to position a second projected view.
14. Right-click and select Create from the shortcut menu (and start the stopwatch).
15. Watch for the creation of the semi-precise views, also indicated by the initial appearance of two new view node icons in the Browser (and freeze and record the split time interval from the stopwatch).
16. Stop the stopwatch when the color of both view node icons changes from red to black.

Inventor 8 procedure (continuing from the previous Inventor 8 steps above):

9. Activate the Projected View command.
10. Click to select the base view previously created.
11. Click to position a projected view.
12. Click to position a second projected view.
13. Right-click and select Create from the shortcut menu (and start the stopwatch).
14. Stop the stopwatch when both projected views appear in the drawing, also indicated by the appearance of two new view node icons in the Browser.

In creating the projected views, the same views were projected for the respective datasets when testing in Inventor 7 and Inventor 8.

Import Data

The Import Data tests measure the time it takes to create a base drawing view from imported STEP data. Again, because Inventor 7 first creates a semi-precise drawing view, the steps for testing in Inventor 7 are slightly different than Inventor 8. In addition to creating a base view, I also created several projected views.

I was supplied with four datasets, identified herewith as A, B, C, and D. I first imported each dataset into Inventor, saved the resulting assembly and part file in Inventor, and then created the base view and subsequent projected views. The STEP files are listed below:

- **A** 9.93MB
- **B** 2.21MB
- **C** 4.93MB
- **D** 4.97MB

After importing the STEP data, the resulting assembly is already open in Inventor. If one immediately creates a new drawing and then creates a base view in that drawing, by default Inventor creates the base view of the open assembly, which is already in memory. If no part or assembly is currently open, the user must specify the part or assembly from which to create the base view, and Inventor must read that data into memory before creating the base view. Recognizing this difference, I therefore performed several variations of this series of tests.

Import STEP file:

In this first step, I imported the STEP file into Inventor by doing the following:

1. Load Autodesk Inventor.
2. Select File > Open.
3. In the Open dialog box, select the STEP file to be imported.
4. Click the Open button (and start the stopwatch).
5. Stop the stopwatch when the file has been imported, the resulting assembly is visible, and Inventor is ready to perform an operation.

Save in Inventor:

In order to subsequently time how long it took Inventor to create a base view from the resulting assembly or part file, I saved the imported data in Inventor by doing the following:

1. Select File > Save.
2. In the Save dialog box, click OK to verify that I want to save changes to the assembly and its dependents (and start the stopwatch).
3. Stop the stopwatch when Inventor is ready to perform another operation.

Create base view from open data:

This sub-test measures the time it takes to create an initial base view from the data currently open in Inventor. The procedures vary slightly in Inventor 7 and Inventor 8.

Inventor 7 procedure:

1. Select File > New > Drawing.
2. Activate the Base View command.
3. Click to position the base view in the drawing (and start the stopwatch).
4. Watch for the creation of the semi-precise base view, also indicated by the initial appearance of the view node icon in the Browser (and freeze and record the split time interval from the stopwatch).
5. Stop the stopwatch when the view node icon color changes from red to black.

Inventor 8 procedure:

1. Select File > New > Drawing.
2. Activate the Base View command.
3. Click to position the base view in the drawing (and start the stopwatch).
4. Stop the stopwatch when the base view appears in the drawing, also indicated by the appearance of a view node icon in the Browser.

Project 2 views:

This sub-test measures the time it takes to project two additional views from the base view. The procedures vary slightly for Inventor 7 and Inventor 8.

Inventor 7 procedure (continuing from the previous Inventor 7 step):

6. Activate the Projected View command.
7. Click to select the base view previously created.
8. Click to position a projected view.
9. Click to position a second projected view.
10. Right-click and select Create from the shortcut menu (and start the stopwatch).
11. Watch for the creation of the semi-precise views, also indicated by the initial appearance of two new view node icons in the Browser (and freeze and record the split time interval from the stopwatch).
12. Stop the stopwatch when the color of both view node icons changes from red to black.

Inventor 8 procedure (continuing from the previous Inventor 8 step):

5. Activate the Projected View command.
6. Click to select the base view previously created.
7. Click to position a projected view.
8. Click to position a second projected view.
9. Right-click and select Create from the Shortcut menu (and start the stopwatch).
10. Stop the stopwatch when both projected views appear in the drawing, also indicated by the appearance of two new view node icons in the Browser.

In creating the projected views, the same views were projected for the respective datasets when testing in Inventor 7 and Inventor 8.

Create base view from part file:

This sub-test measured the time it takes to create a base view in a new drawing based on the STEP data that had previously been saved as an Inventor part file. Three individual times were recorded: the time required to read the part file, the time required to create the base view, and the time required to generate two projected views from the base view. Again, the view creation portion of the test is slightly different for Inventor 7 and Inventor 8.

Read part file

1. Load Autodesk Inventor.
2. Select File > New > Drawing.
3. Activate the Base View command.
4. In the Drawing View dialog box, select the part file created from the STEP data.

5. Click the OK button (and start the stopwatch).
6. Stop the stopwatch when the preview image is visible in Inventor.

Because the base view direction has a bearing on the time required to create the base view, in each instance I used the default view orientation provided in the Drawing View dialog box.

Create base view

Inventor 7 procedure (continuing from the Read Part File steps above):

7. Click to position the base view in the drawing (and start the stopwatch).
8. Watch for the creation of the semi-precise base view, also indicated by the initial appearance of the view node icon in the Browser (and freeze and record the split time interval from the stopwatch).
9. Stop the stopwatch when the view node icon color changes from red to black.

Inventor 8 procedure (continuing from the Read part File steps above):

7. Left-click to position the base view in the drawing (and start the stopwatch).
8. Stop the stopwatch when the base view appears in the drawing, also indicated by the appearance of a view node icon in the Browser.

Project 2 views

Inventor 7 procedure (continuing from the previous Inventor 7 steps above):

10. Activate the Projected View command.
11. Click to select the base view previously created.
12. Click to position a projected view.
13. Click to position a second projected view.
14. Right-click and select Create from the shortcut menu (and start the stopwatch).
15. Watch for the creation of the semi-precise views, also indicated by the initial appearance of two new view node icons in the Browser (and freeze and record the split time interval from the stopwatch).
16. Stop the stopwatch when the color of both view node icons changes from red to black.

Inventor 8 procedure (continuing from the previous Inventor 8 steps above):

9. Activate the Projected View command.
10. Click to select the base view previously created.
11. Click to position a projected view.
12. Click to position a second projected view.
13. Right-click and select Create from the shortcut menu (and start the stopwatch).

14. Stop the stopwatch when both projected views appear in the drawing, also indicated by the appearance of two new view node icons in the Browser.

In creating the projected views, the same views were projected for the respective datasets when testing in Inventor 7 and Inventor 8.

Create base view from assembly file:

This sub-test was identical to the previous test in which I measured the time it takes to create a base view in a new drawing based on the STEP data that had previously been saved as an Inventor part file, except that this time the test used the STEP data that had been previously saved as an Inventor assembly file. Again, three individual times were recorded: the time required to read the assembly file, the time required to create the base view, and the time required to generate two projected views from the base view. Again, the view creation portion of the test is slightly different for Inventor 7 and Inventor 8.

Read assembly file

1. Load Autodesk Inventor.
2. Select File > New > Drawing.
3. Activate the Base View command.
4. In the Drawing View dialog box, select the assembly file created from the STEP data.
5. Click the OK button (and start the stopwatch).
6. Stop the stopwatch when the preview image is visible in Inventor.

Because the base view direction has a bearing on the time required to create the base view, in each instance I used the default view orientation provided in the Drawing View dialog box.

Create base view

Inventor 7 procedure (continuing from the Read Part File steps above):

7. Click to position the base view in the drawing (and start the stopwatch).
8. Watch for the creation of the semi-precise base view, also indicated by the initial appearance of the view node icon in the Browser (and freeze and record the split time interval from the stopwatch).
9. Stop the stopwatch when the view node icon color changes from red to black.

Inventor 8 procedure (continuing from the Read part File steps above):

7. Left-click to position the base view in the drawing (and start the stopwatch).
8. Stop the stopwatch when the base view appears in the drawing, also indicated by the appearance of a view node icon in the Browser.

Project 2 views

Inventor 7 procedure (continuing from the previous Inventor 7 steps above):

10. Activate the Projected View command.

11. Click to select the base view previously created.
12. Click to position a projected view.
13. Click to position a second projected view.
14. Right-click and select Create from the shortcut menu (and start the stopwatch).
15. Watch for the creation of the semi-precise views, also indicated by the initial appearance of two new view node icons in the Browser (and freeze and record the split time interval from the stopwatch).
16. Stop the stopwatch when the color of both view node icons changes from red to black.

Inventor 8 procedure (continuing from the previous Inventor 8 steps above):

9. Activate the Projected View command.
10. Click to select the base view previously created.
11. Click to position a projected view.
12. Click to position a second projected view.
13. Right-click and select Create from the shortcut menu (and start the stopwatch).
14. Stop the stopwatch when both projected views appear in the drawing, also indicated by the appearance of two new view node icons in the Browser.

In creating the projected views, the same views were projected for the respective datasets when testing in Inventor 7 and Inventor 8.

Annotations

The Annotation tests measure the time it takes to create, modify, and delete various annotations within a single Inventor drawing file. Annotations are dimensions, centerlines, text, symbols, etc.

This set of tests is different from those in the previous four sections in that they involve the user performing common tasks within a drawing.

I was supplied with a single dataset consisting of a large drawing—a 3.48MB file based on a dataset consisting of 33 files totaling 5.8MB of data. The drawing was submitted by an actual customer that had reported unacceptable delays when performing various annotation tasks.

I tested four different types of annotations:

- **Linear Dimension** A typical drawing contains a large number of dimensions, the most prevalent being linear dimensions. A user creates a linear dimension by selecting the object (or the endpoints of the object) to be dimensioned, and then positions the dimension line while viewing a preview image of the dimension. A delay of more than a few seconds in adding or manipulating dimensions is likely to be objectionable since this is a repetitive and seemingly simple task.

- **Surface Texture** When creating this object in Inventor, the user first selects the entity representing the surface, then selects points to create the leader, and then right-clicks to complete creation of the leader and proceed to specifying the surface texture by means of a dialog box. There are two pronounced delays in this process: the time from when the leader is complete until Inventor displays the dialog box and the time after closing the dialog box until the surface texture symbol has been created and Inventor is ready to accept a new command.
- **General Note** Drawings often contain textual notes providing general instructions, specifications, or other information. To create a text note, the user activates the command, selects the location of the note within the drawing, enters the note using a dialog box, and then closes the dialog box. A delay of more than a few seconds in adding or modifying a note is likely to be objectionable since this is a repetitive and seemingly simple task.
- **Centerline** A centerline is another typical type of annotation that should be relatively simple to create.

Linear Dimension

This series of tests timed how long it takes to add a linear dimension, move the dimension text and dimension line, move the anchor point of one end of the dimension line, and delete the dimension line. The procedures are detailed below and were performed after initially starting Inventor and loading the drawing provided.

Add a dimension:

1. Activate the General Dimension command.
2. Click to select the object to be dimensioned.
3. Click to position the dimension line (and start the stopwatch).
4. Stop the stopwatch when the dimension has been created and Inventor is ready to perform another operation.

Move dimension text:

1. Activate the Select tool.
2. Click to select the dimension created in the previous step, and use a drag-and-drop action to move the position of the dimension line and dimension text (starting the stopwatch when the mouse button is released).
3. Stop the stopwatch when the dimension line and dimension text have been relocated and Inventor is ready to perform another operation.

Move the anchor point of one end of the dimension line:

1. With the Select tool still active, click to select the anchor point at one end of the dimension extension line, and use a drag-and-drop action to move the position of the anchor point so that it attaches to a new object (starting the stopwatch when the mouse button is released).

2. Stop the stopwatch when the dimension updates and Inventor is ready to perform another operation.

Delete Dimension:

1. With the Select tool still active, right-click on the dimension.
2. In the shortcut menu, select Delete (and start the stopwatch).
3. Stop the stopwatch when the dimension has been deleted and Inventor is ready to perform another operation.

Surface Texture

This series of tests times how long it takes to add a surface texture symbol, relocate the symbol by moving the leader line, and delete the surface texture symbol. Two times were recorded: the time it takes to display the Surface Texture dialog box after defining the leader, and the time it takes to actually create the surface texture symbol after closing the dialog box. The procedures are detailed below and were performed while the drawing remained open after performing the linear dimension tests.

Create surface texture leader:

1. Activate the Surface Texture Symbol command.
2. Click to select the object to which the symbol will be attached.
3. Click to select the points defining the leader.
4. Right-click to display the shortcut menu.
5. In the shortcut menu, click Continue (and start the stopwatch).
6. Stop the stopwatch when the Surface Texture dialog box appears.

Create surface texture symbol:

7. Specify the various parameters within the Surface Texture dialog box.
8. Click OK (and start the stopwatch).
9. Stop the stopwatch when the surface texture symbol is created in the drawing and Inventor is ready to perform another operation.

Move leader:

1. Activate the Select tool.
2. Click to select the surface texture symbol created in the previous step, and use drag-and-drop to move the position of the leader (starting the stopwatch when the mouse button is released).
3. Stop the stopwatch when the surface texture symbol and leader has been relocated and Inventor is ready to perform another operation.

Delete surface texture symbol:

1. With the Select tool still active, right-click on the surface texture symbol.
2. In the shortcut menu, select Delete (and start the stopwatch).

3. Stop the stopwatch when the surface texture symbol has been deleted from the drawing and Inventor is ready to perform another operation.

General Note

This series of tests times how long it takes to add a text notation, edit the text, and delete the text. The procedures are detailed below and were performed while the drawing remained open after performing the surface texture symbol tests.

Add text:

1. Activate the Text command.
2. Click to position the text.
3. Enter the text in the Format Text dialog box.
4. Click OK (and start the stopwatch).
5. Stop the stopwatch when the text appears in the drawing and Inventor is ready to perform another operation.

Edit text:

1. Activate the Select tool.
2. Right-click on the text created in the previous step.
3. In the shortcut menu, select Edit Text.
4. In the Format Text dialog box, edit the text, and then click OK (and start the stopwatch).
5. Stop the stopwatch when the revised text appears in the drawing and Inventor is ready to perform another operation.

Delete text:

1. With the Select tool still active, right-click on the text.
2. In the shortcut menu, select Delete (and start the stopwatch).
3. Stop the stopwatch when the text has been deleted from the drawing and Inventor is ready to perform another operation.

Centerline

This series of tests times how long it takes to add a centerline, edit that centerline, and then delete the centerline. The procedures are detailed below and were performed while the drawing remained open after performing the general note tests. I first zoomed to a detail view illustrating a plate containing several holes.

Add centerline:

1. Activate the Centerline command.
2. Click to select a hole.
3. Click to select a second hole.
4. Right-click and select Create from the shortcut menu (and start the stopwatch).

5. Stop the stopwatch when the centerline appears in the drawing and Inventor is ready to perform another operation.

Edit centerline:

1. Activate the Select tool.
2. Click and drag one endpoint of the centerline to extend the centerline.
3. Release the mouse (and start the stopwatch).
4. Stop the stopwatch when the revised centerline appears in the drawing and Inventor is ready to perform another operation.

Delete centerline:

1. With the Select tool still active, right-click on the centerline.
2. In the shortcut menu, select Delete (and start the stopwatch).
3. Stop the stopwatch when the centerline has been deleted from the drawing and Inventor is ready to perform another operation.

Results

This section details the measured times of all of the tests performed. Each test or sub-test appears on its own line. For each test performed, the average time (measured in seconds) is provided for Inventor 7 and Inventor 8, along with the percentage improvement of Inventor 8 versus Inventor 7.

Note that under the Import Data test, there is no test result shown for Inventor 7 for STEP dataset A because in this instance I was unable to import that dataset. Also note that under the Drawing Open test, there are no test results shown for Inventor 8 for dataset M because I was unable to load the drawing file from that dataset.

Operation/Test	Inventor 7 (time in sec.)	Inventor 8 (time in sec.)	% Improvement (Inventor 8 vs. Inventor 7)
Drawing Open			
B	200.23	91.54	119%
H	183.31	87.56	109%
M	209.50	n/a ¹	
Base View Creation			
M - load assembly	15.81	21.72	-27%
M - create semi-precise base view	57.70	*38.76	49%
M - create base view	112.67	38.76	191%
M - project semi-precise views	127.52	*120.18	6%
M - project views	328.00	120.18	173%

H - load assembly	14.05	22.70	-38%
H - create semi-precise base view	7.41	*3.24	129%
H - create base view	11.78	3.24	264%
H - project semi-precise views	17.02	*7.53	126%
H - project views	24.09	7.53	220%
U - load assembly	31.73	51.77	-39%
U - create semi-precise base view	29.98	*14.91	101%
U - create base view	48.92	14.91	228%
U - project semi-precise views	37.43	*44.49	-16%
U - project views	100.50	44.49	126%
D1 - load part	5.61	3.71	51%
D1 - create semi-precise base view	101.54	*9.18	1006%
D1 - create base view	119.54	9.18	1202%
D1 - project semi-precise views	143.76	*13.48	967%
D1 - project views	182.54	13.48	1255%
D2 - load part	8.08	2.90	179%
D2 - create semi-precise base view	85.38	*19.34	341%
D2 - create base view	100.91	19.34	422%
D2 - project semi-precise views	141.18	*24.54	475%
D2 - project views	171.22	24.54	598%
B - load assembly	20.49	29.06	-29%
B - create semi-precise base view	25.44	*6.52	290%
B - create base view	33.25	6.52	410%
B - project semi-precise views	37.24	*9.73	283%
B - project views	58.66	9.73	503%
Import Data			
A -import	n/a ¹	52.91	
A - save	n/a ¹	8.00	
A - create semi-precise base view while open	n/a ¹	*6.36	
A - create base view while open	n/a ¹	6.36	
A - project semi-precise views while open	n/a ¹	*8.36	

A - project views while open	n/a ¹	8.36	
A - read part	n/a ¹	3.15	
A - create semi-precise base view from part	n/a ¹	*4.45	
A - create base view from part	n/a ¹	4.45	
A - project semi-precise views from part	n/a ¹	*11.77	
A - project views from part	n/a ¹	11.77	
A - read assembly	n/a ¹	1.25	
A - create semi-precise base view from assembly	n/a ¹	*8.78	
A - create base view from assemble	n/a ¹	8.78	
A - project semi-precise views from assembly	n/a ¹	*8.13	
A - project views from assembly	n/a ¹	8.13	
B -import	10.77	6.69	61%
B - save	3.32	2.81	18%
B - create semi-precise base view while open	2.27	*0.5 ²	354%
B - create base view while open	4.77	0.5 ²	854%
B - project semi-precise views while open	5.79	*1.22	375%
B - project views while open	12.86	1.22	954%
B - read part	1.19	0.5 ²	138%
B - create semi-precise base view from part	6.37	*0.5 ²	1173%
B - create base view from part	9.78	0.5 ²	1856%
B - project semi-precise views from part	12.53	*1.31	860%
B - project views from part	19.30	1.31	1379%
B - read assembly	1.03	0.5 ²	106%
B - create semi-precise base view from assembly	2.41	*0.5 ²	382%
B - create base view from assemble	4.79	0.5 ²	858%
B - project semi-precise views from assembly	5.98	*1.16	416%
B - project views from assembly	11.61	1.16	901%
C -import	46.60	29.56	58%
C - save	5.44	5.38	1%
C - create semi-precise base view while open	4.34	*2.30	88%
C - create base view while open	13.35	2.30	480%
C - project semi-precise views while open	13.88	*4.91	183%
C - project views while open	40.62	4.91	727%

C - read part	5.56	1.00	456%
C - create semi-precise base view from part	14.54	*2.86	408%
C - create base view from part	31.34	2.86	996%
C - project semi-precise views from part	29.37	*6.34	363%
C - project views from part	57.82	6.34	811%
C - read assembly	4.57	0.5 ²	814%
C - create semi-precise base view from assembly	4.69	*2.84	65%
C - create base view from assemble	14.47	2.84	409%
C - project semi-precise views from assembly	13.81	*4.97	178%
C - project views from assembly	41.61	4.97	738%
D -import	51.11	33.37	53%
D - save	5.46	4.53	20%
D - create semi-precise base view while open	4.07	*3.10	31%
D - create base view while open	22.89	3.10	640%
D - project semi-precise views while open	11.77	*4.37	169%
D - project views while open	48.96	4.37	1020%
D - read part	2.68	1.50	79%
D - create semi-precise base view from part	14.38	*3.29	338%
D - create base view from part	45.36	3.29	1280%
D - project semi-precise views from part	21.19	*5.65	275%
D - project views from part	51.50	5.65	812%
D - read assembly	1.35	0.5 ²	170%
D - create semi-precise base view from assembly	5.16	*4.26	21%
D - create base view from assemble	22.72	4.26	433%
D - project semi-precise views from assembly	11.90	*4.25	180%
D - project views from assembly	48.28	4.25	1036%
Annotations			
Linear dimensions			
Add dimension	11.83	0.5 ²	2266%
Move dimension	10.38	0.5 ²	1976%
Move anchor	0.5 ²	0.5 ²	0%
Delete dimension	19.38	0.5 ²	3776%
Surface Texture			

Dialog box appears	12.86	0.5 ²	2472%
Symbol created	15.04	0.5 ²	2909%
Move leader	11.66	0.5 ²	2232%
Delete	13.38	0.5 ²	2576%
General Note			
Add note	13.64	0.5 ²	2628%
Edit note	14.91	0.5 ²	2883%
Delete note	15.02	0.5 ²	2904%
Centerline			
Add centerline	15.40	0.5 ²	2979%
Edit centerline	13.17	0.5 ²	2535%
Delete centerline	14.03	0.5 ²	2705%

¹ unable to obtain results due to inability to load file into version of Inventor

² time required to perform the action was so fast as to be immeasurable, a value of ½-second was used for the calculations

* provided for comparison only, see conclusions for description of precise versus semi-precise views

Conclusions

From these results, I have drawn a number of general conclusions. In virtually all operations tested, I have measured significant improvements in the performance of Inventor 8 when compared to Inventor 7.

Opening a drawing:

Inventor 8 opens drawing (.idw) files 2-times faster than Inventor 7.

Creating an initial base view from an assembly not currently open:

In some instances, Inventor 8 takes somewhat longer to read the assembly into memory, but then creates the base view an average of 2/3 faster than Inventor 7. In spite of the small initial delay in displaying the preview image of the base view (while reading the assembly into memory), the net improvement is significant. When compared to the time it takes Inventor 7 to produce a precise hidden line view, Inventor 8 showed an improvement of from 2-times to more than 8-times over Inventor 7.

Creating projected views from a base view of an assembly not currently open:

Inventor 8 creates projected views somewhat faster than Inventor 7 creates the identical view in a semi-precise state, averaging 2/3 faster than Inventor 7. But Inventor 8 is from 2-times to as much as 10-times faster than Inventor 7 in creating projected views when compared to how long it takes for Inventor 7 to complete its hidden line view calculation.

Creating an initial base view from a part not currently open:

Inventor 8 reads part files into memory faster than Inventor 7, and then shows marked improvement in creating an initial base view from those part files. The Inventor 8 times decreased three- to thirteen-fold when creating an initial base view compared to Inventor 7 and from 4-times to 18-times when compared to the time required for Inventor 7 to complete a precise hidden line view.

Creating projected views from a base view of a part not currently open:

Inventor 8 creates projected views from parts even faster than from assemblies. The performance of Inventor 8 averaged nearly 6-times faster than Inventor 7 when simply looking at how quickly the projected views become visible and nearly 10-times faster when compared to how long it takes for Inventor 7 to complete its hidden line view calculation.

Precise versus semi-precise views

One particularly interesting area of improvement comes when comparing the creation of precise hidden line views in Inventor 8 versus Inventor 7. In Inventor 7, the software first creates a semi-precise view, at which point the user can execute other commands while the software continues to calculate hidden lines in the background. Inventor 8 eliminates the intermediate step of generating the semi-precise view, proceeding directly to the precise hidden line view. Inventor 8 shows a 2-times to 4-times improvement in terms of how quickly the base view appears in the drawing compared to when Inventor 7 first displays the semi-precise view (indicated with an asterisk * in the Inventor 8 results column in the accompanying table).

In looking at the 30 separate tests in which this difference can be measured, however, Inventor 8 created the precise hidden line view an average of 7-times faster than Inventor 7. The improvement in individual tests ranged from a 2X improvement to more than 18X.

Drawing annotation performance:

The most significant performance improvement in drawing performance in Inventor 8 compared to Inventor 7 is in the area of drawing annotations. Inventor 8 was 20-times to 30-times faster than Inventor 7 when adding, editing, or deleting annotations in the sample drawing. In all of the situations tested, however, the quantitative measurement of this improvement is less relevant than the qualitative aspect, because these annotation actions have gone from requiring an unacceptably long period of time to being almost instantaneous. (In Inventor 8, the time required to perform these actions was so fast as to be immeasurable; a value of 0.5 seconds was used for the calculations.)

It is my conclusion that Autodesk has significantly improved the performance of drawing functions in Inventor 8 compared to Inventor 7 in areas in which the customer is likely to be very sensitive to performance issues. These changes are likely to be well received as they directly impact the usability of the product. Based on the drawing speed performance alone, the cost of upgrading from Inventor 7 to Inventor 8 is well justified.

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