



# The Benefits of Using AutoCAD® 2025 vs. AutoCAD® 2021



# A productivity study detailing the differences between AutoCAD® 2025 and AutoCAD® 2021

AutoCAD 2021 was a popular version upon release. However, there have been significant new features and commands in subsequent versions, allowing you to work smarter and not harder. This study details the productivity gains a user may experience when using AutoCAD 2025 versus AutoCAD 2021, highlighting the latest features and commands designed to streamline your work and take full advantage of your subscription.\*

## Executive summary

Designed by Autodesk and commissioned by an independent consultant, this study explores common tasks required when preparing designs and documents in AutoCAD 2021 and the subsequent productivity gains using AutoCAD 2025. A set of designs and documents will be showcased using AutoCAD 2021 and AutoCAD 2025—with tasks ranging from hatching along a path to locating objects and converting them to blocks using Smart Blocks.

AutoCAD 2025 provided an **average productivity gain of up to 72%** for key collaboration tasks.\*\*

In addition to the tasks completed for this study, this report's conclusion provides an overview of additional productivity features introduced in AutoCAD 2025, including up to 2x faster file open speeds, enhancements to the user interface, and the new Activity Insights feature.

NOTE (\*): As of March 2024, the earliest AutoCAD version available through your Autodesk Account is AutoCAD 2022. Upgrading to AutoCAD 2025 through your existing AutoCAD subscription allows you to take full advantage of the latest features and commands.

\*\*Depends on user expertise level with AutoCAD and based on experience and training. As with all performance tests, results may vary based on machine, operating system, filters, and even source material. While every effort has been made to make the tests as fair and objective as possible, your results may differ. Product information and specifications are subject to change without notice. Autodesk provides this information "as is", without warranty of any kind, either express or implied.

# Key findings

AutoCAD 2025 was shown to outperform AutoCAD 2021 in all six tasks completed for this study:



Hatching along paths was **69%** faster.



Placement and replacement of blocks was **67%** faster.



Counting block instances was **70%** faster.



Searching and converting objects to blocks was **93%** faster.



Incorporating mark-ups into drawing files was **58%** faster.



Collaborating design changes was **64%** faster.



# The study

This study explores six common design challenges when working in a 2D floor plan of a typical AEC project and directly compares the time and effort required to accomplish each specific task in AutoCAD 2025 versus AutoCAD 2021.\*

The same tasks were completed up to **72% faster** using AutoCAD 2025.\*\*

The performance results in this paper were achieved by one user with expert-level experience, using both AutoCAD 2025 and AutoCAD 2021 and conducting comparative tests on the same AutoCAD sample project. The tasks are comprehensive in nature. The total time it took to complete each task using AutoCAD 2025 and AutoCAD 2021 is documented in each case.

A detailed description of the study follows.

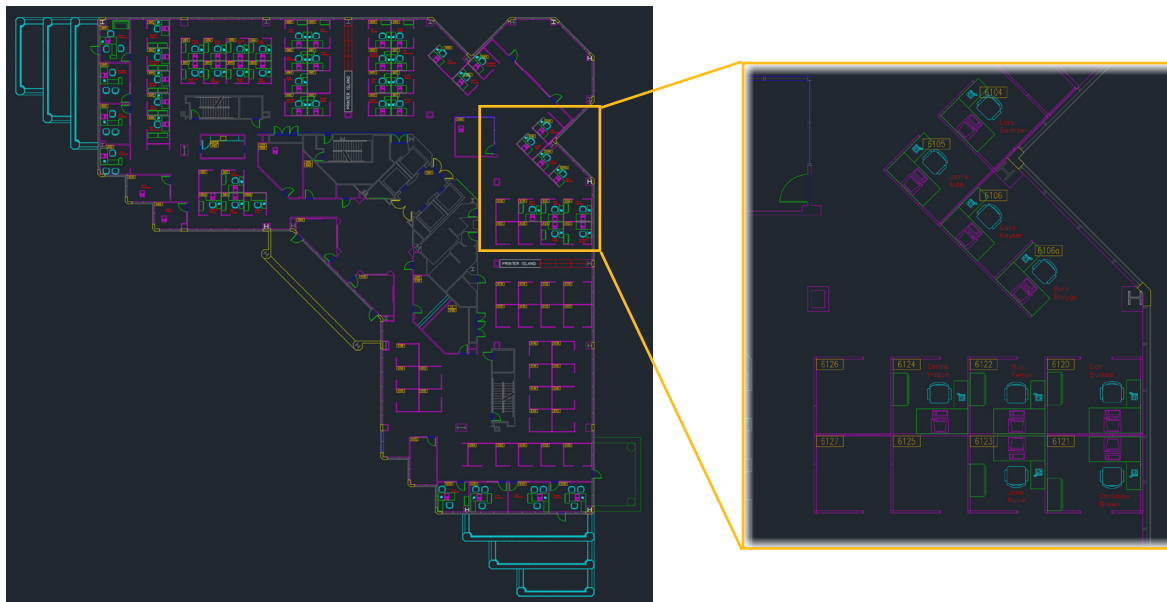


Fig.1 – A typical 2D floor plan

NOTE (\*): It was assumed during the study that any symbols and title blocks needed in AutoCAD for the design process were local to the document. Search time is subjective, and this method allows for the quick placement of required blocks in the shortest possible time.

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## Design task 1

# Hatching along a path

Hatching in AutoCAD is fundamental to highlighting and accenting objects and areas on a drawing. AutoCAD 2025 provides more flexibility when hatching, including the ability to hatch along a path. In AutoCAD 2021, this task would normally require an area offset from the defined path to provide hatch boundaries, but this is no longer required in AutoCAD 2025.

AutoCAD 2025 now has several drawing modes when hatching, including the ability to hatch areas without pre-defined boundaries. This also includes a new Path option that allows you to follow a path, define a hatch width offset from the path, and adjust alignment settings to be Center, Inside, and Outside a path.

Since hatching without pre-defined boundaries is not possible in AutoCAD 2021, placing a hatch pattern along a path would require additional geometry would be required to define them. This would include the use of the Offset command to determine the width of the hatch area along with additional lines and/or polylines to enclose the boundaries. Once the hatch object is created using the defined boundaries, the additional objects that were created would then need to be removed or moved to a separate layer that could be turned off or frozen.

## Task

This task compares the time taken to create a hatch along a freeform path using the enhanced functionality in AutoCAD 2025 to the method that would be used in AutoCAD 2021. The path forms an emergency egress path in a 2D floor plan.

The task looks at how the enhanced Hatch functionality in AutoCAD 2025 can save valuable drafting time by creating a hatch pattern along a path instead of the more time-consuming method of creating a hatch pattern along a path using additional objects to form a hatch boundary in AutoCAD 2021.

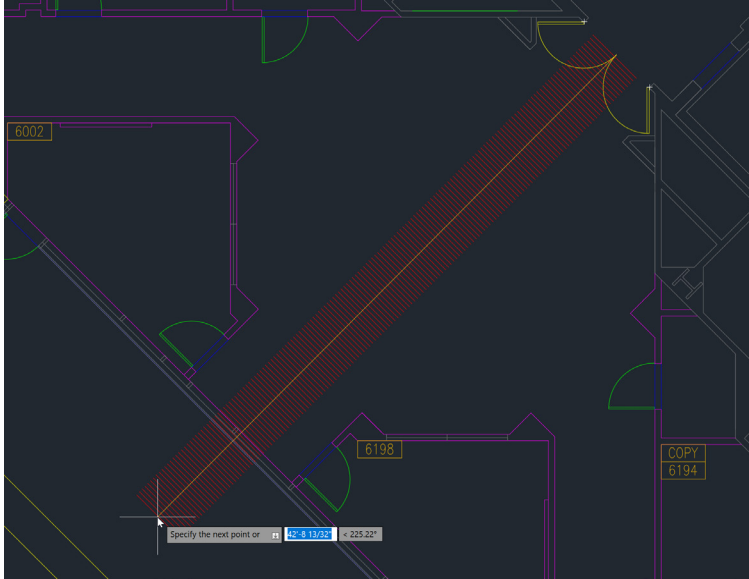


Fig.2 – Hatching being added in AutoCAD 2025, using the Path setting to draw a freeform hatched path

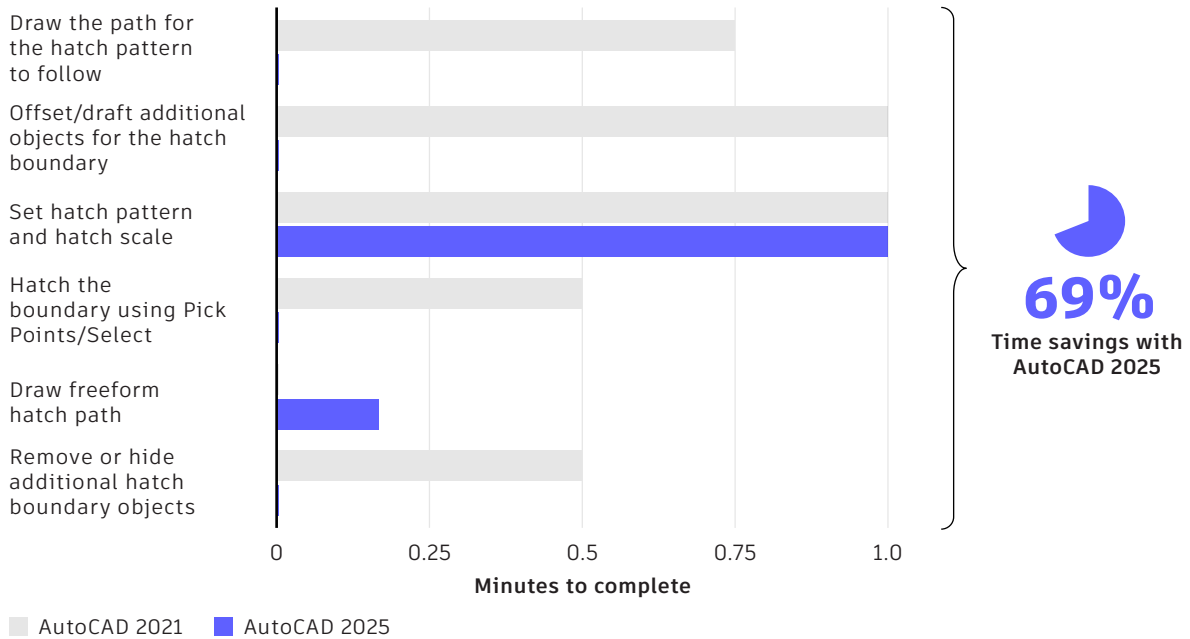
### **Steps (AutoCAD 2025):**

1. Draw the path for the hatch pattern to follow.
2. Set the hatch pattern and hatch scale.
3. Hatch along the path using a path with a set width.

### **Steps (AutoCAD 2021):**

1. Draw the path for the hatch pattern to follow.
2. Offset the path and draft additional polylines/lines to accommodate the hatch pattern width.
3. Set the hatch pattern and hatch scale.
4. Hatch the boundary using Pick Points/Select.
5. Remove the additional hatch boundary objects or place them on a layer that can be frozen or switched off.

## Hatching along a path



## Results

Hatching has been a standard function in AutoCAD for many years. In AutoCAD 2025, the new Path functionality in the Hatch command removes the need to draft additional objects to define enclosed boundaries to get a hatch pattern to follow a path. This also removes any necessary remedial action, such as turning off or freezing layers to hide these objects from the final output—saving valuable drafting time and providing flexibility to use Hatch to create highlights that improve readability in your drawings.

AutoCAD 2025 also includes new functionality where hatching can be completed without pre-defined boundaries, using shapes such as rectangles or circles. This is selected in the HATCH command submenus, and you draw the hatch shape in the same way you would an object: a center point for a circle and opposing diagonal corners for a rectangle.

## Design task 2

# Placing and replacing block instances

In AutoCAD 2021, blocks are placed in the traditional way, using the Insert dialog box. First introduced in AutoCAD 2024, AutoCAD 2025 allows block placement via the Blocks palette and the use of Smart Blocks: Placement and Smart Blocks: Replacement. These features allow for the automatic placement of blocks using previous placements, and with the help of Autodesk AI you can quickly find and replace selected blocks with similar suggested blocks—saving on manual drafting time needed to place and replace blocks in AutoCAD 2021.

## Task

A new block needs to be placed in a drawing. The task will compare a common block placement method using AutoCAD 2025 and AutoCAD 2021. This will require locating the block to be used along with the drafting techniques required to place the block. The block will then be replaced with an alternative block, using both AutoCAD 2025 and AutoCAD 2021. This will involve locating the replacement block and the subsequent method used to replace the existing block.

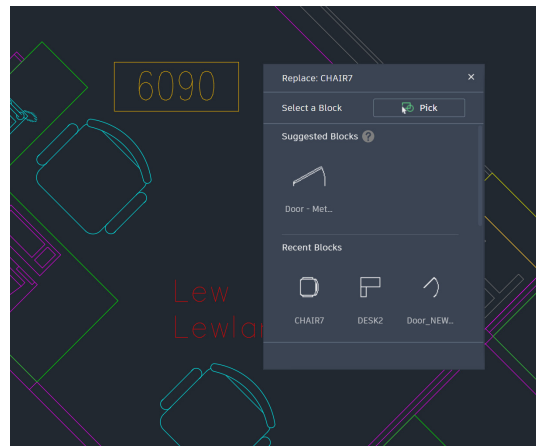
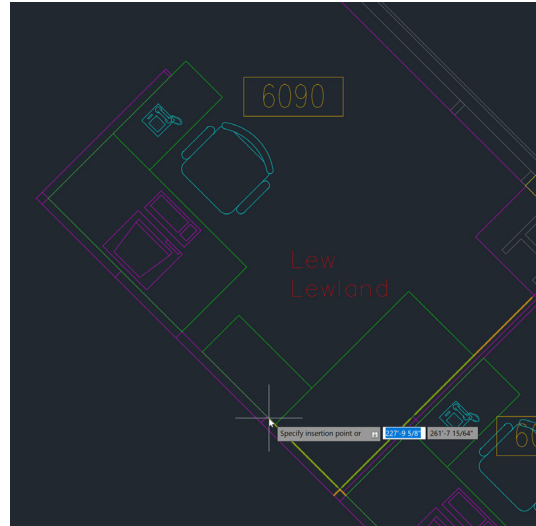


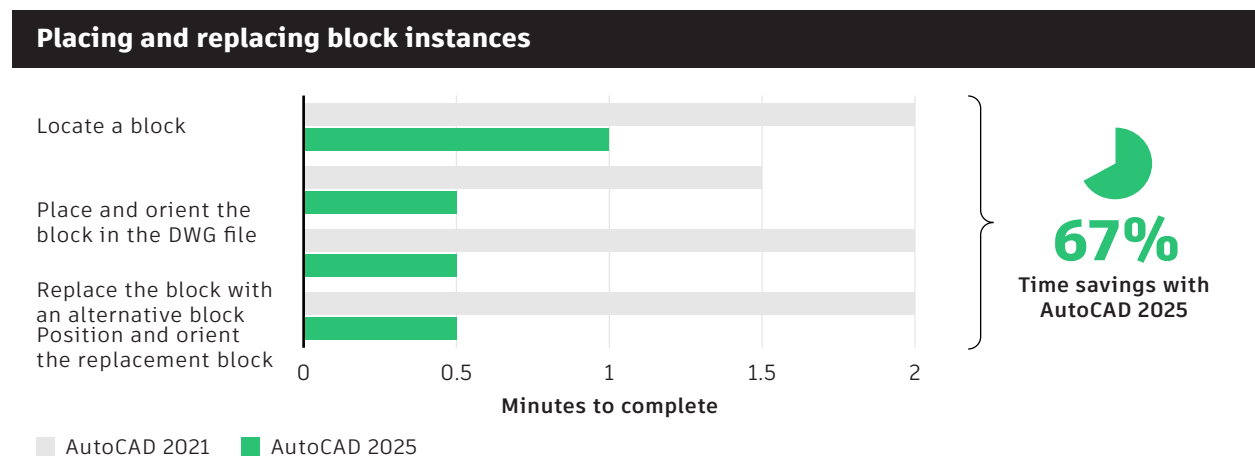
Fig.3 – Smart Blocks: Placement (top) and Smart Blocks: Replacement (bottom)

## Steps (AutoCAD 2025):

1. Locate an AutoCAD block
2. Place the block in the drawing using Smart Blocks: Placement
3. Replace the block with an alternative block using Smart Blocks: Replacement
4. Ensure correct block positioning using Auto-Placement

## Steps (AutoCAD 2021):

1. Locate an AutoCAD block on the Blocks palette
2. Place the block in the DWG file using object snaps for location and orientation
3. Replace the block with an alternative block
4. Locate and orient the replacement block using object snaps and the MOVE and/or ROTATE commands



## Results

The Smart Blocks: Placement feature in AutoCAD 2025 is a great way to save time when placing blocks in your DWG files. It suggests locations and orientations based on previous block placements from the Blocks palette, providing substantial time savings over traditional block placement methods in AutoCAD 2021. The Smart Blocks: Replacement feature (BREPLACE command) in AutoCAD 2025 leverages the power of Autodesk AI to provide a simple block replacement interface, suggesting already-used blocks. Once the replacement block is selected, the Smart Blocks: Placement feature can be utilized for quick block placement and orientation.

## Design task 3

# Counting block instances in a DWG file

Facilities management documents often start with a set of office floor plans used to assess the maximum capacity of each floor in the building. The number of desks, chairs, computers, and other office-related items would be reflected in the plans—and need to be manually counted.

A typical scenario would be an office move requiring an office furniture inventory. This would include all workstations, computers, chairs, office plants, etc. In this task, all those objects are represented by AutoCAD blocks, which need to be counted for an accurate count of all office furniture.

## Task

This task compares the time taken to count a group of blocks using the DATAEXTRACTION command in AutoCAD 2021 and put the relevant block count into an AutoCAD table, to the time taken to use the COUNT command in AutoCAD 2025 and generate a table of the associated block count.

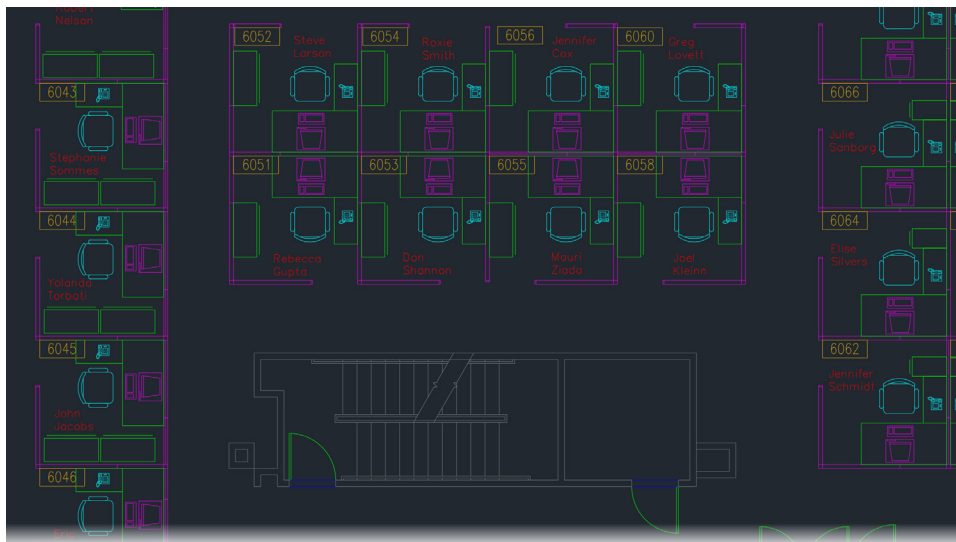
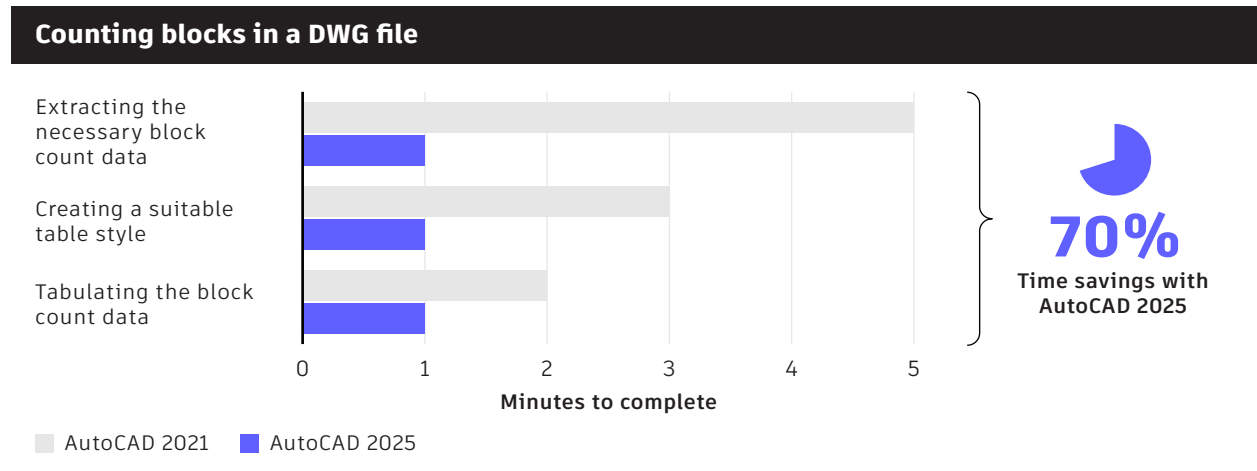


Fig.4 – A typical 2D office floor plan where a block count might be required

## Steps (AutoCAD 2025 & AutoCAD 2021):

1. Extract the necessary block count data
2. Add an AutoCAD table to tabulate the block count data



## Results

Before the counting process started with AutoCAD 2021, you had to be armed with a set of highlighter pens and hardcopy drawings or be incredibly familiar with the DATAEXTRACTION command. You had to perform manual hardcopy counts where each instance of a particular block was marked with a separate highlighter color or run a full data extraction. Both processes could be a massive drain on time when working on a project.

The COUNT command in AutoCAD 2025 is a great time-saver, allowing more productivity when counting blocks in your designs. You can still use the DATAEXTRACTION command in AutoCAD 2025, however it requires more input in numerous dialog boxes to ensure you get the relevant block count data into an AutoCAD table.

The COUNT command is much more specific and will count all the blocks in your DWG file. In AutoCAD 2025, you can specify an area of a drawing to count blocks, display any exploded blocks, and count nested blocks within a block.

## Design task 4

# Searching and converting objects into block instances

Being able to locate objects to convert and organize into blocks is an essential drafting practice to maintain efficient drawings. Over the lifetime of a drawing, design changes, revisions, new collaborators, and more can result in the creation of new unblocked objects that may need to be converted to block instances. And in some cases, blocks may become exploded after receiving updates made by external collaborators using incompatible drawing tools—or were drafted without the use of blocks.

AutoCAD 2025 introduces the Smart Blocks: Search and Convert tool which allows you to quickly search your drawing for geometry to convert into new or existing block instances, drastically minimizing time spent manually searching for and replacing exploded blocks into new or previously defined block instances.

AutoCAD 2021 requires you to instead manually search for and select exploded geometry to convert into blocks, or alternatively remove exploded geometry to then manually place pre-defined block instances.

## Task

This task compares the time needed to find and convert multiple instances of exploded geometry for one style of single swing door in a drawing into instances of a new block definition using Smart Blocks: Search and Convert in AutoCAD 2025, as compared to the manual selection and conversion of the exploded geometry in AutoCAD 2021.

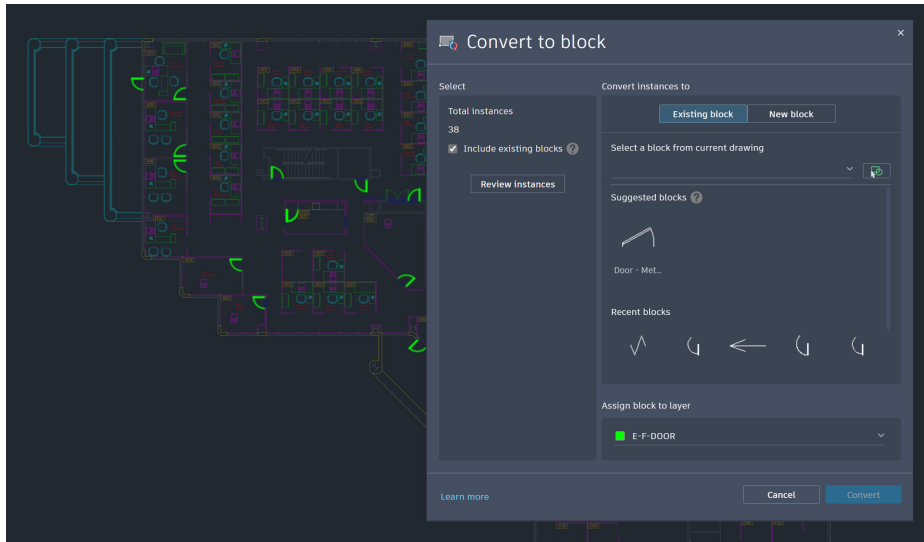


Fig.5 – Converting unblocked objects into instances of either a new or existing block using AutoCAD 2025’s Smart Blocks: Search and Convert

### Steps (AutoCAD 2025):

1. Run the Smart Blocks: Search and Convert (BCONVERT) command
2. Visually search for and select a single exploded block instance in the drawing
3. Use the Convert to block dialog to review matching selections found in the drawing
4. Define and convert the selected objects into a new block definition

### Steps (AutoCAD 2021):

1. Review drawing visually for instances of exploded block geometry
2. Select a single exploded block geometry instance and run the BLOCK command
3. Define and convert the selected geometry into a new block using the BLOCK command
4. Repeat steps 1 and 2 for each instance of an exploded geometry, deleting the selected geometry, and inserting the new block defined created in step 3 in the same location

## Searching and converting objects into block instances

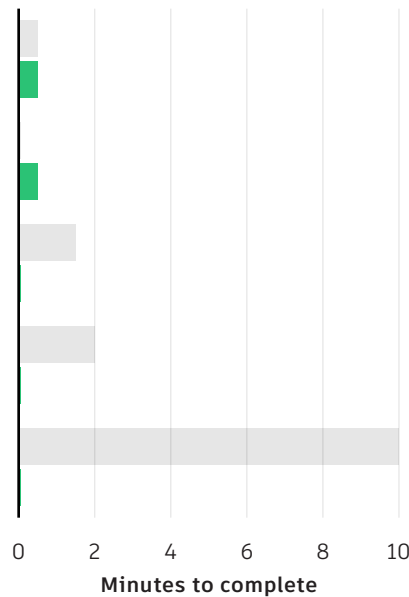
Select geometry for a single exploded block instance


Run the BCONVERT command, review matching geometry found in the drawing, create a new block definition, and convert objects into new instances of a block

Use Create Block (BLOCK) command to create a new block definition

Review drawing visually for another instance of exploded geometry, select the instance, delete the instance, and insert the new block previously defined in the same location

Repeat the workflow until all exploded block geometry is converted into instances of a block



  
**93%**  
Time savings with  
AutoCAD 2025

■ AutoCAD 2021 ■ AutoCAD 2025

## Results

In AutoCAD 2025, there are obvious time savings when utilizing the BCONVERT command, especially when locating unblocked geometry to convert into new blocks. In AutoCAD 2021, this workflow is manual, and each new block must be inserted into the drawing, requiring a significantly more time-consuming workflow. Using AutoCAD 2025's Smart Blocks technology, block creation is a much more efficient process. Furthermore, with the help of Autodesk AI, Smart Blocks Search and Convert suggests converting objects into similar blocks that already exist in your block library, encouraging block re-use and further time savings.

## Design task 5

# Incorporating markups in a DWG file

AutoCAD has long been able to raster images and PDFs using commands such as PDFIMPORT and ATTACH. However, this required time to assess and scale the raster images and copy the text annotation across. It was often easier to manually type out annotations directly into AutoCAD, copying them from the raster image instead of using raster text to vector text applications.

In AutoCAD 2025, the Markup Import and Markup Assist features utilize Autodesk AI to take text annotation from a raster image and bring it directly into the DWG file as AutoCAD text.

In AutoCAD 2021, a raster image was attached or imported, and valuable project time was wasted making sure the appropriate annotation was in the DWG file and presented accurately. Certain Express Tools could be used, but these also took up valuable time.

## Task

This task compares the different import workflows used in AutoCAD's 2025 and 2021 versions, where markups are required in a DWG file.

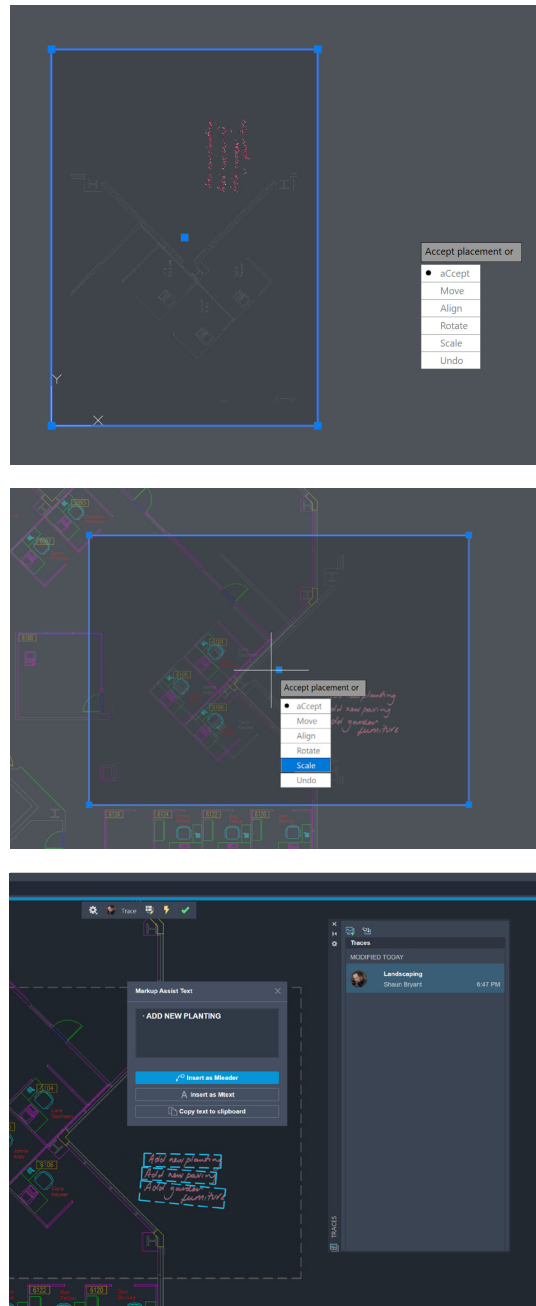


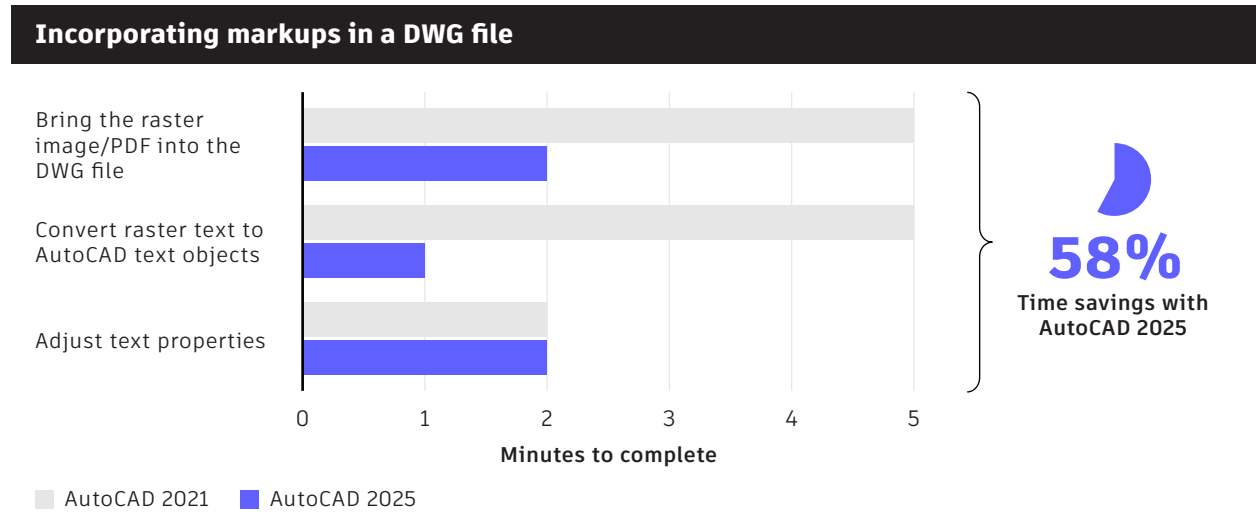
Fig.6 – Working with Markup Import and Markup Assist in AutoCAD 2025

### Steps (AutoCAD 2025):

1. Use Markup Import to import a markup file, such as a PDF
2. Use the Markup Import tools to place and scale the markup
3. Use Markup Assist to convert raster text to AutoCAD text objects

### Steps (AutoCAD 2021):

1. Bring raster image/PDF into the current DWG file
2. Create AutoCAD text objects based on notes in the raster image/PDF, manually copying what is there already
3. Adjust text properties, such as layer and text style



## Results

In AutoCAD 2025, the Markup Import and Markup Assist features allow for a quick and easy method to import a raster image markup, such as a scanned PDF, and rotate and scale the imported markup to suit the host DWG file. Markup Assist lets you quickly convert raster text annotation to AutoCAD text annotation using Autodesk AI. This provides a visual, effective workflow that lists the markups in the Traces palette, utilizing the Trace feature in newer versions of AutoCAD. AutoCAD 2025 includes additional enhancements to Markup Import and Markup assist including syncing Markups from Autodesk Docs along with the ability to apply Markup Assist to external references (XREFs)—saving even more valuable time.

In AutoCAD 2021 and previous versions, you would need to replicate what is in the raster image/PDF, which would create repetitive work and reduce productivity. Errors could also be transferred to the DWG file.



## Design task 6

# Collaborating on design changes in a DWG file

Changes in a DWG file need to be shared clearly and effectively to ensure that design intent is understood and implemented accurately. AutoCAD has always provided accurate drafting tools, but the need to make changes to a design often causes a roadblock to productivity.

AutoCAD 2025 gives you access to AutoCAD Web & Mobile folders after installing a small AutoCAD plugin. This encourages using AutoCAD on the web and mobile to share and collaborate on DWG files via the cloud. You can also use Autodesk Docs, Autodesk Drive, or other cloud storage providers, such as Box, Dropbox, Google Drive, Microsoft OneDrive, and your local files. All the markup information is added using the Trace functionality in AutoCAD 2025, which is also available through AutoCAD on the web and mobile.

In AutoCAD 2021, the optimal way to collaborate was using the DWF file format. A drawing would be exported as a DWF file (like a PDF file), and the recipient could use Autodesk Design Review with no need for an installation of AutoCAD to view, check, and redline markup the DWF file. This was seen as effective back when AutoCAD 2021 was released. However, it required the recipient to have a license of Autodesk Design Review and relied on them receiving and sending back the appropriate DWF file.

## Task

This task compares the time taken using a DWG file from AutoCAD 2025 as compared to the output and review of a DWF file from AutoCAD 2021.

The task looks at the Trace functionality in AutoCAD 2025 in conjunction with the AutoCAD on the web as compared to the marking up an exported DWF file in Autodesk Design Review, which is then sent back to the AutoCAD originator and viewed in the Markup Set Manager in AutoCAD 2021.

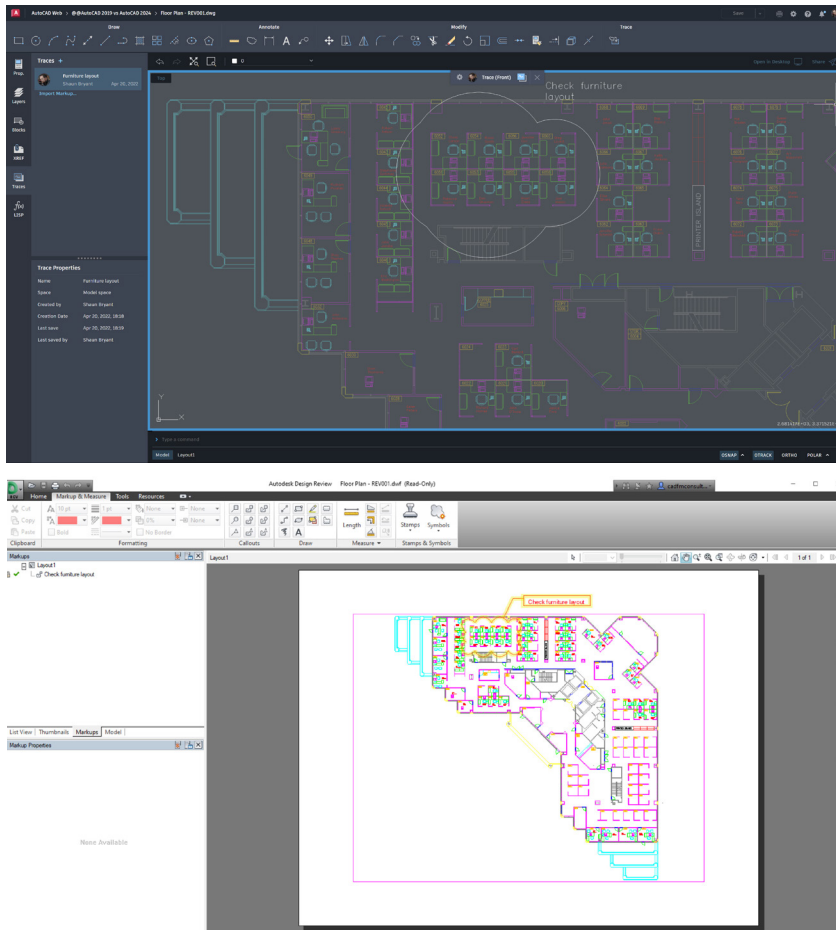


Fig.7 – An imported markup trace layer using a DWG file in AutoCAD Web (top) vs using Autodesk Design Review to review a DWF file output from AutoCAD 2021 (bottom)

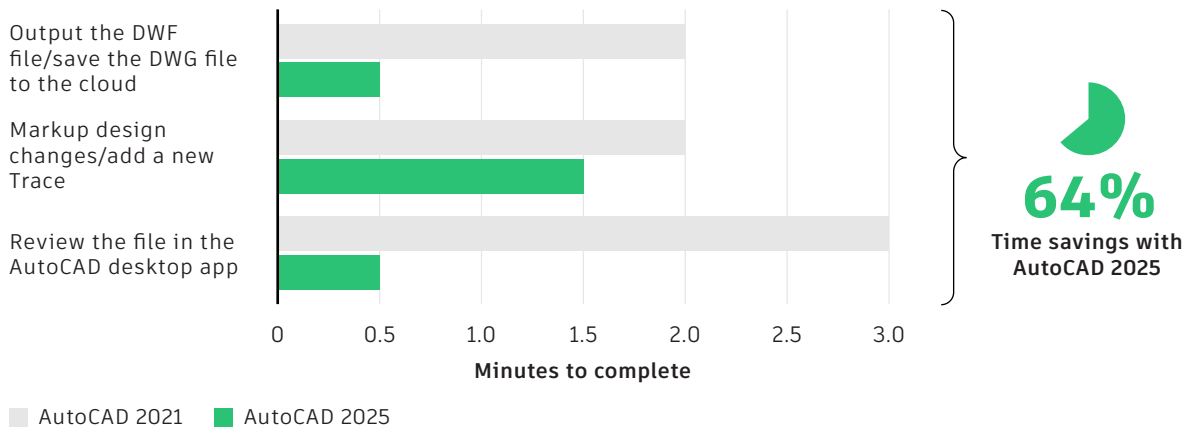
### Steps (AutoCAD 2025):

1. Save the DWG file to a cloud-based location (such as Autodesk Docs or AutoCAD Web & Mobile folders)
2. Add a new Trace to the saved DWG file using AutoCAD on the web
3. Review the Trace in the same DWG file using the AutoCAD desktop app and save the new file revision

### Steps (AutoCAD 2021):

1. Output the DWG file to a DWF file
2. Open the DWF file in Autodesk Design Review to markup and communicate design changes
3. Review the marked-up file in the Markup Set Manager and save the new file revision

## Collaborating design changes in a DWG file



## Results

Utilizing Autodesk Docs, AutoCAD Web & Mobile folders, or a preferred cloud storage provider combined with AutoCAD on the web and mobile through your AutoCAD 2025 subscription is a great time-saver. It allows for more productivity when collaborating and sharing your designs. It also means that you and your team can work concurrently on the same DWG file, updating changes on the fly.

Using the DWF output method in AutoCAD 2021 is a lengthier process that introduces another file format (DWF) that needs to be tracked and maintained in addition to a DWG. That file must be opened in another application, Autodesk Design Review, leaving the workflow open to error if the wrong DWF file is used.

Access to AutoCAD on the web and mobile is part of your AutoCAD 2025 subscription. This access, along with your desktop app, provides a much leaner workflow that saves a lot of time in a project's collaboration stages.

# Study results

Based on these six selected tasks, AutoCAD 2025 provides a higher level of productivity than AutoCAD 2021. Because AutoCAD 2025 is built with new features that work with Autodesk AI to enhance the design workflow, you could realize immediate and substantial productivity benefits like those discussed in this paper by updating AutoCAD .

With AutoCAD 2025, saving up to 72% of your working time is possible compared to AutoCAD 2021.\*\*

Project tasks	AutoCAD 2025	AutoCAD 2021	Time Savings
1. Hatching along a path	1:10	3:45	69%
2. Placing and replacing block instances	2:30	7:30	67%
3. COunting block instances in a DWG file	3:00	10:00	70%
4. Searching for and converting objects into block instances	1:00	14:00	93%
5. Incorporating markups in a DWG file	5:00	12:00	58%
6. Collaborating on design changes in a DWG file	2:30	7:00	64%
<b>Total Time</b>	<b>15:10</b>	<b>54:15</b>	
<b>Overall time saving with AutoCAD 2025</b>			<b>72%</b>

(Figures shown in minutes and seconds unless otherwise noted)

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# Conclusion

In this AutoCAD 2025 versus AutoCAD 2021 productivity study, the six design tasks analyzed represent just a few examples of how AutoCAD 2025 can provide tools and workflows to make you more productive.

In addition to the tasks completed for this study, an overview of additional productivity features introduced in AutoCAD 2025 are outlined in the following sections. This includes performance enhancements where AutoCAD 2025 can open DWG files 2 times faster than AutoCAD 2024, and Smart Blocks: Object Detection Tech Preview (DETECT), where AutoCAD can automatically recognize, group, and suggest objects to convert into instances of a new or existing blocks. Also, the DWG History function has now been merged into Activity Insights in AutoCAD 2025, making for a cleaner, easier-to-use interface.

As these features represent improvements which could not be measured within this study's parameters along with net new capabilities with no comparable process in AutoCAD 2021, they have been excluded from the main study results.

## Additional workflow enhancements in AutoCAD 2025

### File open performance

Opening a larger, more complex DWG file can be a time-consuming task, especially if that DWG file contains large 2D floor plans with high numbers of layers and entities, such as complex blocks. Over the years, the time taken for such a file to open has reduced dramatically, primarily due to technological advances, where hardware such as CPUs and graphics cards provide much faster access speeds. However, that initial file opening time can still be irritating when you need to get into a DWG file quickly.

On average, DWG files will open 2x faster in AutoCAD 2025 vs AutoCAD 2024. In this case, the 2D DWG file used for the study was opened in AutoCAD 2025 and AutoCAD 2021—and therefore was not included as a part of this study. When used over time, faster file opening creates a better user experience in AutoCAD 2025 when working with larger DWG files.

## Smart Blocks: Object Detection Tech Preview

AutoCAD 2025 offers Smart Blocks: Object Detection (DETECT) is a functionality currently under development as a Tech Preview in AutoCAD 2025. Object Detection uses Autodesk AI to recognize unblocked geometry in your drawing as objects, showing you these detected objects so that you can quickly and easily convert them into new or existing blocks. This tool saves you time when cleaning up drawings that have been drafted without the blocks, created with non-AutoCAD-based applications, or imported from other file formats like PDF.

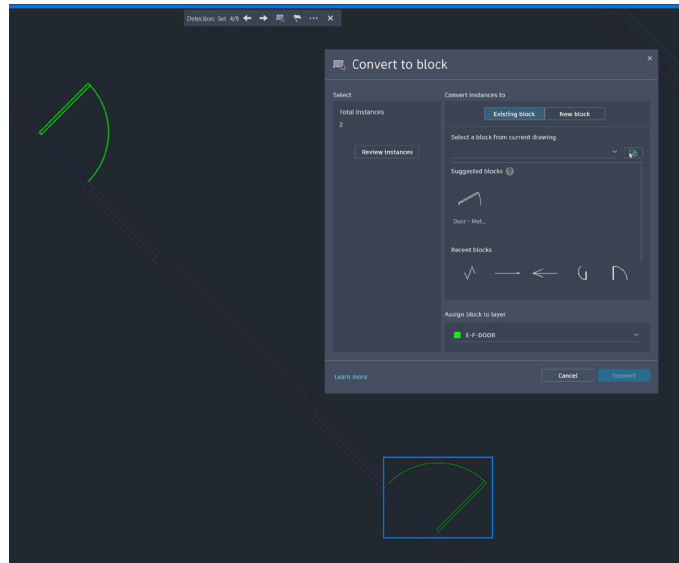


Fig.8 – Converting a set of doors recognized by Object Detection into an existing similar block suggested by Autodesk AI

Object Detection recognizes, groups, and suggests objects to convert into new or existing blocks. The grouping of Detection results into “sets” makes it easier to locate similar geometry to be converted into instances of the same block, while the Autodesk AI powered similar block suggestions save you the time of looking for the right block to convert the detected objects into and encourages re-use of existing content.

At the time of writing, this feature is a technology preview that is still under development and will continue to evolve and improve with time. At present, Object Detection works in a plan view and is best at detecting architectural elements.

## Activity Insights

AutoCAD 2024 introduced Activity Insights, which has been further enhanced in AutoCAD 2025. The palette offers access to design data, providing detailed multi-user event logs with activity tracking for over 35 activity types. This now includes version history—which used to be Drawing History (DWGHISTORY)—combined with the option to visually compare versions of similar files.

Activity Insights tracks and logs commands and actions that you and your collaborators have performed within a DWG, such as when an XREF was

added, or when the current DWG was externally referenced (XREF) elsewhere. It also tracks when a DWG was plotted or transmitted along with external actions, such as when a drawing is renamed or copied in Windows Explorer.

Versioning is available for drawings managed on supported cloud storage providers such as Autodesk Docs, Google Drive, OneDrive, Box, and Dropbox, removing the need for any additional setup or configuration to view Activity Insights. Users can filter and search for drawing activities by variables including date, user, or activity type—making it quick and easy to pinpoint activities of interest.

By providing useful information about your workflows and practices in an easy-to-use palette that works out-of-the-box with the file storage solution of your choice, managers and drafters can identify learning and development opportunities for staff along with new workflows to enhance overall efficiency.

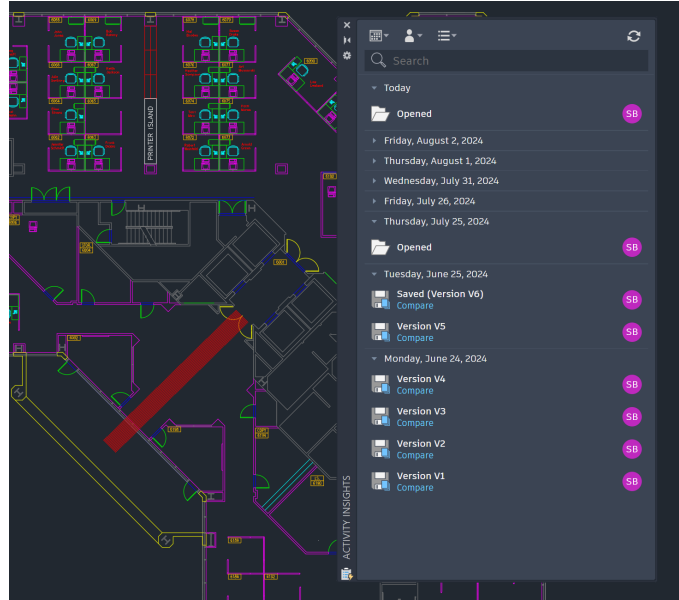


Fig.9 – The Activity Insights palette displaying the current drawing history



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