You Are Now a BIM/VDC Coordinator: A Talk About the Journey and What Happens Next

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Learning Objectives

- Understand some of the common duties and responsibilities of a BIM/VDC Coordinator
- Recognize the importance of consistent coordination methods throughout the lifecycle of a BIM/VDC project
- Discover best practices for multi-discipline/multi-organization BIM/VDC coordination
- Determine the most-effective methods for interacting with project partners who are utilizing different software packages

Description

The concept of a BIM (Building Information Modeling) manager/coordinator and VDC (Virtual Design and Construction (VDC) manager/coordinator is still fairly new, and most of those with the responsibilities of BIM/VDC coordination came upon their duties, responsibilities, and titles in a roundabout fashion.

In this session we will take a look at the paths that many BIM Coordinators/Managers, VDC Coordinators/Managers and BIM project team members responsible for project coordination took to get where they are. This session will also cover common duties and best practices regarding the specific items for which most BIM/VDC coordinators are responsible.

This session is intended for BIM managers, VDC managers, BIM coordinators, BIM job captains, and others who are responsible for coordination on BIM/VDC projects.

Speaker

With over two decades using and supporting a wide range of CAD software packages and with duties/responsibilities that have included training, managing and organizing teams, Brett brings a real-life understanding of what works and what does not work with today’s CAD and BIM technologies. Actively bringing together diverse teams to work as cohesive teams to improve discipline coordination and to build in the long term value associated with intelligent building models is a challenge that is constantly evolving. Brett stays on the leading edge of this technology by contributing to/participating in multiple online user support groups and industry focus groups. Brett is a multi-year Speaker at Autodesk University, has presented at the Revit Technology Conference and Midwest University. He is also an AutoCAD and Revit Architecture Certified Professional, has earned CANBIM BP3 recognition and is AGC CM-BIM Certified.
Additional Topics of Discussion

In addition to the items that are defined under “Learning Objectives”, during this session we will also discuss:

- Paths that may have led to you becoming a BIM/VDC Coordinator
- Common duties / responsibilities of a BIM/VDC Coordinator on different project types
- Exporting / Delivering data to project partners (internal and external)
  - Defining Export Views and Sets with the end result of consistent data exports
  - Formats (AutoCAD, Navisworks, DWFx, etc…)
  - Settings, etc…
- Utilizing Navisworks to help streamline the coordination review process
- Recommendations for project archive at key milestones
  - Archiving to PDF
  - Archiving to DWG / DWF / DWFx
  - Archiving with eTransmit for Revit
Some of the many names that share the duties of a BIM/VDC Coordinator

There are many different job titles that can have the same or similar duties to that of a BIM/VDC Coordinator. These may be unique positions with very specific duties; but as a whole, they can share many responsibilities.

Some of the titles that may share duties are:

- BIM Manager
- BIM Captain
- BIM Technologist
- BIM Facilitator
- CAD Coordinator
- CAD Administrator
- Coordination Manager
- Collaboration Specialist
- VDC Modeler
- VDC Administrator
- BIM Coordinator
- BIM Administrator
- BIM Specialist
- Building Information Modeler
- CAD Manager
- Project Coordinator
- Collaboration Manager
- Digital Designer
- VDC Specialist
- VDC Coordinator
- Model Manager
- BIM Modeler
- BIM Lead
- VDC Facilitator
- IPD Collaboration Manager
- Design Technologist
- VDC Manager
- IPD Collaborator
- IPD Facilitator
- BIM Engineer

You may have one of these job titles or your organization may have created one specific to them or to you.
Possible paths to becoming a BIM/VDC Coordinator

There are many paths that may have led to you becoming a BIM/VDC Coordinator

You may have started your career as:

- an Architect
- an Engineer
- an IT/Support Person
- a Drafter/Modeler
- a Structural Detailer
- an Electrical Modeler
- a Structural Modeler
- an MEP Modeler
- a CAD Manager
- a BIM Manager
- a position completely unrelated to BIM

Historically, most people don’t enter the AEC field with the intention of being a BIM/VDC Coordinator. In many cases BIM/VDC Coordinators start out in a true production role. Their work habits, knowledge and skillset usually make them the obvious choice when their organization decides that they need to fill or create the position of BIM/VDC Coordinator.

Just as with the positions of CAD Manager and BIM/VDC Manager; quite often the person who becomes a BIM/VDC Coordinator arrives at that position as a result of others recognizing their efforts. They are usually the office / organization’s recognized expert in the software and they have grown into the BIM/VDC Coordinator position (or the position has developed and/or grown around them).

Along the way, you have identified yourself in some way as the right person for this position.
What you may have done to ID yourself as a potential BIM/VDC Coordinator

There are certain things you have probably done that have caused others to take notice and have resulted in you becoming a BIM/VDC Coordinator.

- Through your displayed project prowess, you have proven yourself to be the most BIM Savvy/BIM Aware person in your organization
- You actually understand all of the nuances related to Shared Coordinates
- You can get along with and effectively communicate with anyone from any department, discipline or company
- You were away from your desk or out of the office the day that they were looking for someone to perform BIM/VDC Coordination and/or generate clash reports on a specific project – and your friends/coworkers volunteered you
- You have exhibited the ability to troubleshoot problems with Revit models from any/all disciplines or trades
- You have experience with multiple software packages
  - You are proficient with Revit, AutoCAD, Navisworks, Civil 3D, etc...
- You welcome the challenge of learning new software (i.e. Navisworks)
  - or…you are proficient in Navisworks which made you the logical choice for BIM/VDC Coordinator
- You are able to look at the “big picture” when reviewing project files
  - You understand the workflow of the entire project team
- You can recognize solutions to coordination issues - across disciplines
- You never say “no” when presented with a challenge
- You can be discipline or trade “agnostic”. You recognize that the overall project is what is most important.
  - You never point fingers, you just want to make sure that the project progresses properly
- You are known for always sticking around to resolve project related / model related problems – even when they happen at “quitting time”
  - Everyone knows that you make sure that the job gets done and that it is “done right”
Common duties & responsibilities of a BIM/VDC Coordinator

The role of a BIM/VDC Coordinator will vary from organization to organization (it can even vary from project to project). The duties and responsibilities can also vary from project to project. Multiple factors can influence exactly what your duties might be on any given project.

Within your organization/firm the duties of the BIM/VDC Coordinator may include:

- Involved in the development of the project BIM Execution Plan (BxP) or Project Execution Plan (PxP)
- Setup project models for all disciplines/departments
  - Ensure that the appropriate Coordinate System is in use and that models align
- Navisworks Clash Detection/Model Coordination
- Supporting project teams (Revit or other) while enforcing “modeling best practices”
- Review Revit “warnings” to help keep model problems to a minimum
- Exporting Data for use by other disciplines and/or firms (AutoCAD, Navisworks, etc…)
- Revit Content Creation (general Library or Project specific families)
- End User Support/Troubleshooting
- Internal Revit Training (Formal and/or Over-the-Shoulder)
- Contributing to the creation of in-house BIM Standards (along with the appropriate technical staff)
  - Update in-house BIM Standards as necessary (living document model)
- Revit Model Migration – moving Revit models forward to newest version while verifying their integrity and completeness
  - Done with the agreement of the entire project team
- Investigate and test new Revit add-ons and other BIM/VDC technologies
- Create Revit models based upon Point Cloud Scan Data
- Clean-up Point Cloud data to remove unneeded items (i.e. furniture) prior to linking files
- Create “as-built” Revit models from 2d legacy/owner drawings to be used as reference information or starting points for project teams
- Attend kickoff meetings to ensure that everyone understands your BIM/VDC process
- Creation and/or maintenance of your company’s Revit project templates
- Perform the initial Revit model setup for each project
- Attend meetings with clients and others as your organization’s “BIM/VDC Expert”
- Post relevant “Tips and Tricks” and “Lessons Learned” to your Corporate Intranet
- Overall BIM/VDC/CAD Support (including the support of legacy CAD packages)
- Create Agendas for regular Coordination Meetings
BIM /VDC Coordination on an “internal only” project

On the AE side, if you are a multi-discipline firm, you may have projects on which all Revit disciplines reside within your organization. On this type of single company BIM/VDC Project (multi-discipline) the responsibilities of the BIM/VDC Coordinator could consist of:

- Exporting to Navisworks format
  - Verify that the data in the exported Navisworks files is complete and accurate
- Performing Navisworks Clash Detection/Model Coordination
  - Assemble Navisworks .NWC files that are generated by each specific discipline consultant\trade into a Collaboration or Federated Model.
  - Run Clash Detective on the predetermined portions of the assembled files (ex: Piping vs. Stru Steel, HVAC vs. Stru Steel, etc…)
  - Logically name and group clashes for easier identification
  - Generate Clash Reports for each discipline\consultant\trade and distribute to the appropriate project team members
  - If necessary, work with each discipline\consultant\trade to help clarify and resolve any identified clashes
    - Note: The Switchback command works better if the NWC files that are in use in the Navisworks Collaboration file have been generated by exporting from within Revit – as opposed to using the Append function to link in the data from Revit. Switchback wants to open the Central Revit file because that is where the export occurred.
- Exporting DWG format background files for project team members who might not be utilizing Revit (2D and 3D)
- Leading internal Coordination Meetings that are attended by all project team members
  - Utilize Navisworks to review the Clash Reports with the attendees to identify all relevant clashes
- Publishing and posting the "clashed" Navisworks model (Collaboration or Federated depending upon project stage) for review by other team members
BIM/VDC Coordination on a “multi-party/multi-firm” project

On multi-organization BIM/VDC projects, Collaboration/Coordination Duties will differ from project to project. What your responsibilities are depends upon who else is involved with the project and who is responsible for which specific aspects of the coordination effort. This is typically sorted out early (Project BIM Kick-off Meeting) and can be captured in the BxP/PxP or the project Coordination Kick-off Document.

Who is doing the overall project BIM/VDC Coordination?

Your organization is performing the project BIM/VDC Coordination:

If your firm is performing the overall coordination effort for a multi-firm/multi-organization project, the responsibilities of the BIM/VDC Coordinator might include…

• …downloading, managing and verifying coordination data that is provided by other project partners
• …performing Navisworks coordination and Clash Detection based upon data supplied by others (Navisworks Manage)
  o …generating Clash Reports to share with the project team
  o …logically naming and grouping clashes for easier identification
• …leading Coordination Meetings that are attended by all project team members (internal and external)
  o …during the meeting you would utilize Navisworks to review the Clash Reports with the Coordination Meeting attendees to identify all relevant clashes
• …publishing and posting the “clashed” Navisworks model for review by other team members

In this scenario, you may also be responsible for:

• …exporting your organization’s Revit data/views to Navisworks format
• …verifying that the data in the exported Navisworks files is complete and accurate
• …posting your organization’s exported files via the agreed upon method so that they are available for the scheduled Coordination Meetings
• …reviewing the Clash Reports with the appropriate member(s) of your internal project team to help them identify/find and eliminate the clashes with their model
• …exporting data or ensuring that the necessary Object Enablers are installed/available, so that data from any other software packages being used (AutoCAD, Fabrication)
CADmep, Fabrication ESTmep, and Fabrication CAMduct, etc…) is available for use in the Coordination Review meetings

- …verifying that all exported data is complete and accurate

Another organization/team member is performing the project BIM/VDC Coordination:

If another organization, the CM/GC or a separate “BIM/VDC Coordination Specialist” is performing the overall project coordination effort your responsibilities might include…

- …exporting Revit data/views files to Navisworks format based upon the agreed Coordination schedule
- …verifying that the data in the exported Navisworks files is complete and accurate
- …posting the exported files via the agreed upon method so that they are available for the scheduled Coordination Meetings
- …reviewing the Clash Reports with the appropriate member(s) of your internal project team to help them identify/find and eliminate the clashes with their model
- …exporting data from any other software packages being used (AutoCAD, CADDuct/MAP, etc…) for use in the Coordination Review meetings
- …exporting files to any other agreed upon format(s) (AutoCAD 3D, AutoCAD 2D, IFC, etc…) based upon the agreed Coordination schedule
- …verifying that all exported data is complete and accurate
Generic project related BIM/VDC Coordination duties

**Exporting Data from Revit – Creating Export Views**

Consistency is important when exporting data from Revit. This is true whether you are sharing this data with others or if you are performing all coordination “in-house”. For more accurate and track-able coordination efforts, the same data must be presented in the same way each time that it is shared.

It is extremely important that the same export views are used for every coordination meeting – regardless of the chosen export formats (DWG, NWC, etc…).

When in Revit:

- Create any/all necessary views that will be needed for coordination purposes (2D & 3D). The number and type of views will vary depending upon what type of exports the rest of the project team requires.
  - If you are planning on Appending your Revit files into Navisworks, make sure to create a 3D view named Navisworks.
    - When using Append, Navisworks looks for a view named Navisworks when creating the NWC file.
  - These views should be named per your company’s/organization’s naming convention/standard so that others can easily identify them. They may also be named per the requirements of a specific project.
  - On a multistory building, it may be necessary to export each floor individually for organizations that are not using Revit or Navisworks. If this is the case, make sure to create Export Views for each Level/Story.

- Categorize the necessary export views within your Revit model(s). This will make the views easier to find and identify.

- Modify visibility as necessary (via the Visibility Graphics dialog or an appropriate View Template) so that each of the views accurately reflects the intended/relevant information.
  - Exports from Revit are WYSIWYG (What You See Is What You Get) meaning that whatever is visible in the view on the screen will be included in the export
• Hint: Turn off all Revit Links and “Imported Categories” (AutoCAD links) in the defined export views in your Revit model. If these items are needed for coordination, each of them should be exported from the original data – preferably by the organization/person that is responsible for that portion of the project information.

• If the model is very “busy” and you are exporting for Navisworks Clash Detection or using Append to load into Navisworks, you may benefit from hiding specific categories in your export views that may not be important for that level of “clashing” (Ex: furniture).

• In each of the 2D export views, adjust the View Range as necessary

• If you are performing exports of 3D views for individual floors, you may want to align them to their related 2D export views
  • 3D views can be “Oriented to” a 2D plan. This way the visible area of the 3D view (Section Box) matches the Cut Plane in its related 2D view. Orient to a View can be accessed by Right Clicking on the View Cube.
Exporting Data from Revit – Creating Export Sets

If you will be exporting AutoCAD files (or any other supported format) for use by yourself or others on the project team, you should create “Export Sets” within the Revit model. The use of export sets ensures that you can easily export the same group of files each time. Consistent Export information is crucial to the project coordination effort.

Note: for the initial setup, you may find that the Print interface in Revit allows an easier way to create your sheet sets (compared to the Export dialog).

When in Revit:

To create an Export/Print Set

- Invoke the Print Command to bring up the Print dialog box
- Choose the radio button (selection circle) for “Selected views/sheets” under the Print Range section of the Print dialog.
- Pick on the Select… button to bring up the View/Sheet Set dialog

Select the views that you want to export and check the appropriate boxes. When done choose Save As to save the set.

Note: to ensure that you do not have any unintended views in your set, pick on the Check None button prior to selecting the views to export or picking any other buttons.
Print Sheet/View Selection Dialog vs. Export Selection Dialog

You can “multi-select” in the View/Sheet menu that is available through the Print command.

You can only “single-select” views and/or sheets in the menu that is available via the Export command.
**Exporting Data from Revit – Creating Navisworks Exports**

Note: Navisworks can read/import native Revit files via Append.

Even though Navisworks can read native Revit files (actually converting them to NWC format), exporting directly from within the Revit model to NWD format may you a little more flexibility and control over what you are exporting.

In addition, the Switchback command works better if the NWC / NWD files that are in use in the Navisworks Collaboration file have been generated by exporting from within Revit (or by using the Navisworks Batch Utility) – as opposed to using the Append function to link in the data from Revit. Switchback wants to open the Central Revit file because that is where the export occurred.

If a specific 3D view named **Navisworks** has not been created within the Revit file, the Navisworks RVT Reader converts the entire model by default.

The following process (manually performing the exports / conversions) can be partially automated and scheduled by using the Navisworks Batch Utility to schedule your file exports / conversions. Note: if the Central models are being used for exports / conversions using the Batch Utility, the Switchback command will have the same issues as were identified above.

When in Revit:

- Open the first view that you wish to export to Navisworks format
  - When using the Navisworks Exporter add in for Revit, you can change certain export options. These options are available by picking on the Navisworks Settings button from the “Export scene as...” dialog box. Picking this button loads the “Navisworks Options Editor – Revit” dialog.

- Pick on Navisworks Settings to access the “Options Editor” dialog box.
• Determine what settings to use when creating your Navisworks exports (Coordinate System, etc…)
  Note: The Coordinates setting will be driven by the Coordinate method that was used when linking the Revit models together (i.e. Shared vs Project Internal).
  - If you will be using the .RVT Reader functionality (Append in Navisworks) or if you are exporting your entire model (as opposed to level-by-level), you should make certain that the “Divide file into Levels box” is checked.

The next time that you use the Navisworks export add-in, the “Options Editor” will retain the settings that were used last. You will want to review these settings if you are exporting for multiple projects that may be using different export settings (especially Coordinates).

• Keep track of these options (at minimum the Coordinates setting) for each of the projects for which you will be creating Navisworks exports.
• After making certain that the settings in the “Options Editor” dialog box are correct, press OK to save and exit the Options Editor.
• In the “Export scene as…” dialog, browse to the appropriate destination for the exported files and assign a name for the file according to the defined naming convention and press Save.
The Navisworks Exporter will show a status dialog to let you know that your file is processing.

The end result is a “What You See Is What You Get” (WYSIWYG) export of the active Revit view. WYSIWYG is relative to the items that are visible within the view – not necessarily the overall display properties (materials, appearance, etc…).

Repeat these steps as necessary until all necessary 3D coordination views have been exported to Navisworks format.

**Exporting Data from Revit – Exporting to CAD/DWG format**

It’s inevitable; you will need to create AutoCAD exports from your Revit files. No matter how much you want to be 100% Revit – it will happen.

When you need to supply others (or your own organization) with DWG exports, there are a few export settings that may need to be reviewed.
When in Revit:
- To access these settings, pick on the ellipsis symbol (…) next to the “Select Export Setup” pull-down in the DWG Export dialog box. The DWG Export dialog box is visible when picking on Export >> CAD Formats from the Application pull-down (the purple R in the upper left corner of your Revit session).

Once the Modify DWG/DXF Export Setup dialog is open:
- If necessary, modify, create, and save custom export settings (or load existing custom settings) related to Layers, Layer Options, Lines, Coordinate System, AutoCAD version, etc… You can also use the supplied standard configurations (AIA layers, etc…).

Note: Whichever settings you choose to use should be saved and then reused each time that you export to DWG format for this project.

As previously stated, consistency is very important when exporting from your Revit model(s) – regardless of the format to which you are exporting.

**A final note on exporting data when working on a multi-firm/multi-discipline project.**

In most cases you will not be responsible for exporting any other organization’s data for use by others (it all depends upon the project agreements). Typically you will only export data (views to DWG, NWC, etc…) that was created within your own files (not the links). This way each organization is responsible for the content, completeness and accuracy of their own exports. Think of how much you’d object and the possible repercussions if another project team member took it upon themselves to supply your export data to others – and got it wrong.
Consistent Coordination

Creating an environment for successful coordination

Communication is key

A Project kick off meeting with all partners (all that are known at that time) is the ideal time to set the groundwork for a collaboration environment that will work for each specific project. This also allows the different project participants a chance to meet the rest of the team and to understand the responsibilities of each organization.

Remember to document the process (to be discussed in more detail in the next section). This can be done by using a project specific BIM Kick-Off document. This document should be shared with the project team.

Make sure that you keep and publish/share an up-to-date list of project contacts for each organization so that the project team knows who to contact. This should be a living document and must be updated as team members are added to and removed from the project team.

Consistency of data is a crucial component of each project. This can include file names, formats and defined areas (among other requirements). File versions and formats must be consistent throughout the project. This includes Service Packs, Web Updates, etc...

Save settings and views within Revit so that exported data (DWG, NWC, etc…) is consistent throughout the lifecycle of the project. In addition, everyone on the project team must stick to the predetermined Data Exchange schedule and method so that the rest of the team has the data that is needed in a timely fashion.

Data origins and orientations should not change unless absolutely necessary. If the need arises to do this; it must be discussed with the rest of the project team prior to making any changes.

Navisworks Coordination Model

The same Collaboration/Coordination Model should be used throughout the project. There is absolutely no reason the recreate this file from scratch before each meeting. The same model should be used throughout the coordination process so that project history is not lost (Clash Records, Viewpoints, etc…).

When each coordination meeting is done, changes and markups should be saved and the file should be Published (utilizing date stamp versioning in the file name) to NWD format. This file can be used for archiving/record purposes or it can be shared with the rest of the project team.

No Surprises

There should never be a surprise upgrade or software change by anyone on the project team. There can be compatibility issues when any project team member moves to a more recent version of a software package – including the installation of updates/service packs.

For this reason, upgrades to new versions of any software must be discussed as a team! No exceptions.
Developing Best Practices for multi-discipline / multi-firm BIM/VDC Coordination

(AKA – creating a BIM/VDC Kick Off Document / Coordination Checklist)

The entire project team should meet early in the project cycle to establish project goals and to address collaboration/coordination questions.

Having a BIM/VDC Coordination document can go a long way towards making sure that everyone on the project team is on the same page regarding collaboration expectations. The BIM/VDC Coordination document can help to outline specific information about the project files.

The images above show a portion of a BIM/VDC Kick Off Record/Checklist that can be completed on each project (internal only and/or multi-organization).

This file would be filled out and shared with all project team members during or immediately after the project BIM/VDC kick off meeting. Its use helps to establish data related expectations and responsibilities.

This document could be treated as an addendum to the BxP/PxP or could be a standalone document.
Some of the questions that can be addressed in the BIM/VDC Coordination document could be:

**Project Contacts**
- Up-to-date list of primary BIM and Management contacts on the project

**Software Questions**
- Which disciplines/project partners will be using Revit?
- What Version of Revit will be used (including Service Packs / Updates)?
  - Is a specific version noted as the project deliverable?
- What other software packages will be used on the project?
- What software will be utilized for Clash Detection/Interference Checking (Navisworks)?

**Working with Navisworks**
- What version of Navisworks will be utilized?
- Does the project require a single export file or separate floor-by-floor exports?
- How often do the Navisworks files need to be exported (export schedule)?
  - When do they need to be posted for use in the Coordination Meetings? (ex: Tuesday coordination meeting - post by noon Monday)
- Will the Navisworks exports utilize Internal or Shared Coordinates?
- How often will the models be “Clashed”?
- Which discipline models (or portions of discipline models) will be clashed against each other?

- Who is performing the “Clashing” (Company and Individual)?
  - What type of Clash Report will be generated?
  - How will the Clash Report information be shared?
  - How will the Navisworks “clash” file (NWD) be shared?
    - How soon after each Coordination Meeting will the “clash” file (NWD) be shared?
File transfer method - How to share project data
- How will data be shared/distributed?
  - BIM 360, FTP, Network Share utilizing WAN accelerators, VPN Access, PIM System (ex: Newforma, Buzzsaw), email, etc…

Overall Project Coordination questions
- How often will coordination meetings take place?
  - Who is hosting the coordination meetings?
- Determine who “owns” the coordinate system and where the origins are
  - Where is the Project Origin?
  - Where is the Survey Point information coming from?
- Is there a mandatory/preferred naming convention for exports?

Navisworks Clash Detective & Navisworks Switchback

Quite often a BIM/VDC Coordinator is called upon to “clash” the individual models in search of interferences. Navisworks Manage is quite often the tool of choice for this task.

Within Navisworks Manage

Append each of the exported files and/or Appended Revit and/or AutoCAD files into one overall Navisworks file. This can be done by combining level-by-level exports (into Level-by-Level Navisworks files) or it can be done by combining full model exports.

In the Clash Detective dialog, create clash tests to isolate specific models to “clash” against each other or specific selection sets to “clash” against each other (using the “Add Test” button)

Modify any other settings (as necessary) and press Run Test.
After the Clash Test is complete, pick on the Results tab to view the “clashes” that were found. You can review each of the “clashes” from this dialog and you can mark up and annotate as needed. You can also export Clash Reports to multiple formats for sharing with other team members.

**Navisworks Switchback**

If users have Navisworks Manage installed in addition to Revit, they can take advantage of the “Switchback” feature in Navisworks/Revit to more easily locate and correct the clashes within the Revit model. Running the “Switchback” command in Navisworks locates the “clash” in an open Revit model. This tool can be used when reviewing “clashes” with the Revit team.

Note: The functionality of “Switchback” is not available if the Navisworks Exporter is the only Navisworks install on the computer. It is only available if the full version of Navisworks Manage is installed.

Switchback works better if the NWC files that are in use in the Navisworks Collaboration file have been generated by exporting from within Revit – as opposed to using the Append function to link in the data from Revit. If you choose to Append the Central Model into Navisworks, by default the Switchback command will open the Central Model (never a good workflow).
To utilize the “Switchback” functionality you must first enable it within Revit. The “switch” to enable Navisworks Switchback can be found under the External Tools portion of the Add-Ins tab. Pick on “Navisworks Switchback” to enable.

When you are reviewing a “clash” within Navisworks by default the “clashing” items are highlighted (but not technically “selected”). Select the “clashing” item from the appropriate discipline file and choose “Switchback” from the Item Tools panel or right click on the selected item and choose “Switchback”.

You can also choose “Switchback” from the Clash Detective “Results” tab. Pick on the Switchback button under the correct data set (exported from a specific Revit discipline model) to locate that item in the Revit model.

Note: Revit must be open and Navisworks Switchback enabled for the Switchback command to work. If Revit is not open or if Switchback has not yet been enabled in that session, you will be presented with an error dialog.
If the Revit file is already open, Switchback will locate and select the “clashing” item within the open Revit model. Having the specific Revit file pre-opened can be the fastest way to utilize Switchback. In addition, having the Revit file pre-opened ensures that Navisworks Switchback does not accidently load the Revit Central Model.

If the Revit file is not yet open, “Switchback” will load the appropriate file within the open session of Revit. Note: this could be an issue if there are multiple versions of Revit installed on the computer and you open the “wrong” year version of Revit. It can also be problematic if you utilize the Append function to link in the Revit data. Since you Appended the Central Model into Navisworks, by default the Switchback command will open the Central Model (never a good workflow).

Note: If another user created the Navisworks export file(s) that were used to generate the Clash Reports from their personal Revit session, you will be presented with a dialog box warning you that Switchback cannot locate the Revit model at its original path (this is because their local file is tied to their username).

Simply browse to and choose your copy of local file (from wherever it is located on your computer) to establish the link between Navisworks and your local file. This works even if your local file is already open/loaded in Revit (recommended). Pressing Ignore, Ignore All and Cancel will all result in the Switchback command not completing.

Navisworks tracks the Revit exported items by their “Element ID” (Element ID’s never change in Revit) so it will still recognize the correct elements in your version of the local file.
**Note of Caution:** If a local file with the proper name (for the other user) exists in the same location on the computer that you are using, Switchback will actually attempt to open that copy of the local file. This can be problematic for a few reasons:

- If you already have the model open, it will open a second copy – sometimes without any warnings.
- Your “real” session of Revit will be bumped from the Worksharing Monitor (the tab is still there but it does not show any users) and it may not be apparent to you that you have two active sessions.
- The Local file that is opened could be extremely out of date and may not reconcile/synchronize properly with the Central Model.
- The Local file that has been opened is related to the “other” user and Revit does not like that scenario.

If your "Switchbacked" items are not readily apparent and obviously selected in Revit (not fully selected and greyed out in the Properties dialog) you may need to change the “Resolution” setting in the Navisworks Options Editor from Last Object to First Object.
I have found that in some instances, changing the Resolution setting to First Object does not actually result in the item being selected in Revit after the “Switchback” (it does appear highlighted and is counted in the Filter but it is not selected). The “Switchbacked” item that is not fully selected will still be counted by the Filter.

If you happen to see this behavior, you can choose on the Filter icon in Revit (which should be showing an item being selected even though it technically is not) and pick Check None then pick Check All then pick OK (from the Filter dialog) – this process will result in your object being selected in Revit.
Team Members using “Other” Software Packages
(aka Working with other Export formats)

On almost all projects, you will find that somewhere down the line, a project team member (or multiple team members) will be using software that does not align with what is being used by the rest of the team. When this occurs, ground rules will need to be discussed to ensure that all team members who need this data have access to it. This is typically done via exports and/or imports.

The discussion regarding ground rules should include documenting (this can be captured on the BIM/VDC Kick Off Document / Coordination Checklist):

- What export formats will be utilized/created (besides Navisworks)? DWG, IFC, etc…
  - What version of these software packages will be used?
  - Who needs these different formats?
- What is the Coordinate System basis of the export files?
  - Shared Coordinates or Project Internal?
  - Record the location of a known element/monument/survey spike and share with the project team (via the BIM/VDC Kick Off Document / Coordination Checklist)
- What needs to be shown in the exports for each discipline?
  - Team Members who are using the “other” software packages should share this data prior to a hard deadline
    - Others can verify the content and integrity of the files.
    - Must verify that exported/linked data aligns properly.
    - Exports must be consistent throughout the project (naming, content, etc..)
- How often will the exported files be shared with the rest of the team (export schedule)?
  - Team members must post per the schedule so that others who are relying upon their data have it when they need it.
- Will any of the supplied software require proprietary software vendor supplied Object Enablers?
  - If so, is special licensing required or are they free?

Making sure that each project team member understands that their data must be consistent, readable by the rest of the team and shared on time per the agreed upon schedule, will go a long way towards ensuring that the use of multiple software packages does not have a negative impact on the project itself.
Archiving Revit/BIM/VDC projects at key milestones

There are multiple scenarios that can result in the need to archive Revit project data. Among these scenarios are:

- The owner has decided to go a different direction with the design and you need to retain a Record Copy of the project “before change”
- The project scope has changed
- Your project is moving from one phase to the next (SD to DD to CD)
- You are accepting a Revit Design Option and you want to retain the information that existed in the other Option(s) for future reference
- You want to create a “point in time” snapshot – just in case

Potential Archiving Methods

Some of the methods you can use to archive a Revit project:

- PDF – Print to PDF
- DWF – Export to DWF
- DWG – Export to DWG
- Copy all related files (Revit, AutoCAD, etc…) to a specified “archive location” (remapping of linked Revit files will be necessary )
- Create a fully inclusive copy of your Revit file with all links (Revit, AutoCAD, etc…) using eTransmit for Revit. Depending upon which version of Revit you are using, eTransmit may be part of the base install (2018 – 2019) or the installation of an add-in may be required (2017 and below).

Archiving from Revit via PDF/DWF/DWG – Creating Print Sets

When creating “point in time/archival/milestone” print or Export sets from Revit you should create “Print/Export Sets” within the Revit model. These “Print/Export Sets” help keep track of what items are/were printed as part of each milestone.

The steps described in the section of this document named “Exporting Data from Revit – Creating Export Sets” (regarding exporting data for sharing with the rest of the project team) can be applied to the creation of “Print/Export Sets”.

Below is a quick recap/review of creating a View/Sheet set:

- Invoke the Print Command to bring up the Print dialog box
Choose the radio button (selection circle) for "Selected views/sheets" under the Print Range section of the Print dialog.

Pick on the Select… button to bring up the View/Sheet Set dialog

Select the views that you want to export and check the appropriate boxes. When done choose Save As to save the set.

For ease of selecting/isolating sheets from Views (a much more manageable listing), Revit allows you to filter the available items within View/Sheet Set dialog. Uncheck Views under “Show” to remove the views items from the list of available selections.

Note: to ensure that you do not have any unintended Sheets or Views included in your set; pick on the Check None button prior to unchecking the Views box and subsequently selecting the Sheets to add to the Export Set.

Archiving from Revit via PDF/DWG – Printing or Exporting Sets

If you want to save an “archival” copy of your project in neutral formats, you can choose to print to PDF or export to DWG or DWFx format.

This type of archive will result in a “virtual drawing set” of the information that exists in the Revit model. This method will give you a “static” copy of the project at the chosen date. It can be considered a point in time snapshot of the project at the date of printing/export and results in easy formats to share with others.

When in Revit:
Printing (PDF)

- After invoking the Print command - under “Print Range” choose the radio button for “Selected views/sheets” then pick Select… to access the View/Sheet Set dialog box.
- Choose the View/Sheet Set that you have created for this “archive” and press OK

- Make any other necessary changes to the print setup with in the Print dialog box (Settings, Printer/PDF Device, etc…) to access the View/Sheet Set dialog box. If desired, save your changes.
- Press OK to “Print” your set.
- Save the newly created PDF files to an assigned “archive” folder.

Exporting (DWG / DWF /DWFx)

- Choose the appropriate Export format (CAD Formats >> DWG or DWF/DWFx) from the Export command (found under the Application pull-down).
- Note: If creating DWF files you can also use the Publish command.
- Pick the correct Export Set from the options available under “Export:”
  - If you have a defined custom Export Setup, choose it from the “Select Export Setup” pull-down

- After making any necessary changes, pick on Next to access the “Save to Target Folder” dialog.

- Browse to the correct “archive” folder location and pick the appropriate AutoCAD format (version year) or DWF type
Choose the correct naming option (Automatic-Short usually works well for sheet files)

**DWG Only** - If exporting to DWG format, you have an additional check box available on the “Save to Target” dialog.

  - Uncheck the box for “Export views on sheets….”. This will result in a “bound” AutoCAD file with no external references.

*Note:* Even with this unchecked, linked images will be retained as external references in the exported AutoCAD files.

- Pick on OK to start the export

**Archiving from Revit by copying all related files to a folder**

This is a simple sounding process that could actually end up being the most time consuming.

To perform this method, you would need to open each of the Revit files to get a list of Linked files (Revit, AutoCAD, Point Clouds, etc…) as well as their paths so that you are able to browse to the correct locations to copy these files to your chosen archive folder. This could also be done with only the Revit files themselves but you would still need to get the paths and names of each of the linked files by opening each of the Revit project files.

After copying the Revit files to the archive location, it would be considered good practice to open each of the files with Detach from Central, then save as “new” Centrals to break their connection to the still under development Revit Central models.

While in each of the Revit files, you would also need to repath each of the linked files (Revit, AutoCAD, Point Clouds, etc..) that was copied to this folder.

If you need to include the Revit models and other links in your archive, my recommendation would be to utilize the Revit eTransmit command (see next section).
Archiving with eTransmit for Revit

**eTransmit – Autodesk Verbiage**

A Snippet from Revit Help (edited for space):

With the eTransmit for Autodesk Revit add-in, you can copy a Revit model and dependent files to a single folder for Internet transmission. You can transmit any model that has been upgraded to Revit Release 2012 or later and saved. You can select to:

- Include related dependent files such as linked models and DWF markups.
- Include supporting files such as documents or spreadsheets.
- Upgrade the Revit (.rvt) model and linked models to the current release.
- Disable Worksets.
- Remove unused families, materials, and other objects from the Revit models to reduce file size.
- Delete sheets, and specific view types so that the models do not contain unnecessary data.
- Include only the views that are placed on sheets.

A common problem when sending Revit models to someone is neglecting to include dependent files. In some cases, not including these files can make the model unusable by the recipient. With eTransmit for Autodesk Revit, dependent files can be included automatically in the transmittal folder, reducing the possibility of error. All fully specified (absolute) paths of dependent files are converted to relative paths or "no path" to ensure that the dependent files can be located by the model.

Common uses for eTransmit for Autodesk Revit:

- **Internal archiving**
- Sending deliverables to clients
- Model exchange between consultants/partners
- Model cleanup
- Sharing models between disciplines
- Upgrading models

**Using eTransmit for Revit**

When in Revit:

Newer versions of Revit have eTransmit installed as a default. Older versions required a separate download and install. Regardless of which options applies (preinstalled or installed separately), "Transmit a model" will be available from the Add-Ins tab within Revit.
When you choose the “Transmit a model” button, you will be presented with the eTransmit dialog box. This dialog box allows you to:

- Browse to and choose the Revit model that you wish to “archive”.
- Choose the “Save to” location
- Define which types of linked files to include in the “archive”
- Whether or not to Purge the “eTransmitted” file
- Upgrade an older Revit project to the “active” version of Revit

After making the appropriate selections and pressing the “Transmit model” button, you will see a pair of status dialogs. These dialogs are a visual indication that your eTransmit is “working/processing”.

![Dialog box shown from eTransmit for Revit - 2018 Version.](image)

![First dialog](image)

![Second Dialog](image)
If you are “eTransmitting” a file from an earlier version of Revit, and have chosen to upgrade, you will see two notifications that the Revit file(s) are being upgraded. They will show the upgrade progress status of each linked Revit model as it is upgraded to the “active version”.

When the processing is complete, the “eTransmitted” data will be saved to a date/time stamped folder in the location specified under “Save transmitted model to” from the eTransmit dialog box – this is your Record/Archive Copy of the project.

Possible Error Dialog when using eTransmit for Revit

You may be presented with an error message when using the eTransmit for Revit utility stating that “Errors were encountered…”. This message typically appears if Revit is unable to find some (or all) of the files that have been linked into the chosen Revit model. To see what problems were found, you can review the file named “_TransmittalReport.txt” that is available after choosing “Open folder” from the error message dialog.

If the only items mentioned in the “TransmittalReport” are AutoCAD format; you may choose to ignore this message (depending upon anticipated future usage of the archived Revit model). Revit retains and displays the information from linked AutoCAD files in their last loaded state – even it they can no longer be found.
Conclusion

Within this document, I’ve tried to capture some real world examples of what types of responsibilities those who are new to the roles of BIM and VDC Coordinator might see as they progress on their journey. You may already be aware of some of these items but hopefully I’ve managed to identify a couple of things that you may not have been aware of so that there are no unwelcome surprises.

Not all items are applicable to all BIM and VDC Coordinators and their organizations, but hopefully you saw yourself in here somewhere and/or found something within this session that you can relate to.

You may have noticed that there are some sections of “Picks and Clicks” (step-by-step descriptions) within this document. These items are mentioned within the presentation itself (page numbers have been identified) but due to time constraints, these items had to be skimmed over. But, I have used the handout (this document) to give the full step by step, including potential problems that you may encounter.

Thank you for being part of this session.

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