

Course challenge exercise (metric version)**Complete and coordinate the MEP systems for an office building**

Assuming the role of an MEP BIM Consultant, you are tasked with executing a defined multi-discipline project workflow on a three-story office building with a roof (Level 0, Level 1, Level 2, and Roof). You will set up the project environment, link and rename cross-discipline models to match the BIM execution plan, construct fully connected HVAC, electrical, and plumbing infrastructure, and establish a cloud-based coordination space. Adhere strictly to the project's BIM Execution Plan (BEP) for model naming conventions. All families and system families have been provided in the MEP Model for your use in the download .zip file.

Complete the required activities:**Step 1: Model Initialization and Link Management**

- **Rename the Model:** Open the Challenge Exercise Folder containing the Revit Models (***BIMMEP_Project_challenge_metric_files.zip***). Rename the models based on the the naming standards mandated by the project BIM Execution Plan (BEP) located in the same folder.
- **Open the renamed MEP Model** and link the Architectural and Structural models using a "Relative" link path.

Step 2: Multi-Discipline View Creation & Standardization

- **Generate Floorplans:** Create floorplan views for Level 0, Level 1, Level 2, and Roof for all three engineering disciplines: Mechanical, Electrical, and Plumbing (12 views total).
- **Generate Ceiling Plan Views:** Create ceiling plan views for Level 0, Level 1, and Level 2 for the Mechanical, and Electrical disciplines (6 views total).
- **Apply View Templates:** Assign the corresponding discipline-specific View Templates to every new floorplan and ceiling plan to control category visibility, detail levels, and discipline graphics automatically.

Step 3: Mechanical (HVAC) System Layout

- **Locate the Workspace:** Navigate to the Level 0 floorplan and locate the room bounded by Grid Lines 1 and 2 and A and B.
- **Place Equipment:** Position a VAV unit (Mechanical Equipment) in this room at the designated plenum height. Use a section view to verify the placement of the VAV unit.
- **Route Main Supply Duct:** Draw a rectangular supply air duct originating directly from the VAV unit's "Out" connector. Route this main line into a T-shape layout.
- **Branch Piping:** Tap a 200 mm round branch ducts directly off the sides of the rectangular main duct run.
- **Terminal Connections:** Place 4 supply diffuser air terminals in the ceiling grid. Route flex duct from the round branch taps to connect to each of the 4 air terminals, ensuring a fully logical supply air system network.

Step 4: Electrical Distribution & Circuiting

- **Device Placement:** In the same Level 0 room (Grids 1-2 / A-B), place 4 standard duplex receptacles along the perimeter walls and place 4 600 x 600 - 120 lighting fixtures in the ceiling layout, making sure not to conflict with the air terminals.
- **Panel Setup:** Locate the small room adjacent to the building elevators on Level 0 and place a 600A Electrical Panel recessed in the wall.
- **Circuit Creation:** Select the 4 duplex receptacles and create a power circuit, assigning them to the new electrical panel. Select the 4 lights, create a lighting circuit, and assign them to the same panel.
- **Model Wiring:** Add wiring to both the receptacle circuit and the lighting circuit within the view.

Step 5: Plumbing Restroom Infrastructure & Vent Routing

- **Fixture Placement:** Add the designated water closet (toilet) families to the restroom core layout on Level 0.
- **Sanitary Gravity Run:** Connect 100 mm PVC piping to each water closet. Route the physical piping so it leaves the building plan South, sloped down at 1% beneath the ground floor slab (Level 0).

- Vent System Modeling: Create and connect a Vent Piping system to the sanitary run. Route the vent line vertically up through the building levels, penetrating the roof, and terminate the pipe stack exactly 300 mm above the Roof line.

Step 6: Documentation and Sheet Composition

- Create Project Sheets: Set up 3 brand new documentation sheets in your Project Browser—one designated for each trade (Mechanical, Electrical, and Plumbing).
- Generate Enlarged Views: Create a Level 0 enlarged floorplan view isolating the area between Grid Lines 1 and 2 and A and C.
- Set Scale:
- If working in the Metric model dataset, set the view scale to 1:50 mm.
- Compose Sheets: Add the respective enlarged views to your Mechanical, Electrical, and Plumbing sheets. Apply a view crop region and crop the views tightly so they sit clean and professional within the titleblock boundaries.

Step 7: Cloud Coordination Setup (Forma for Construction)

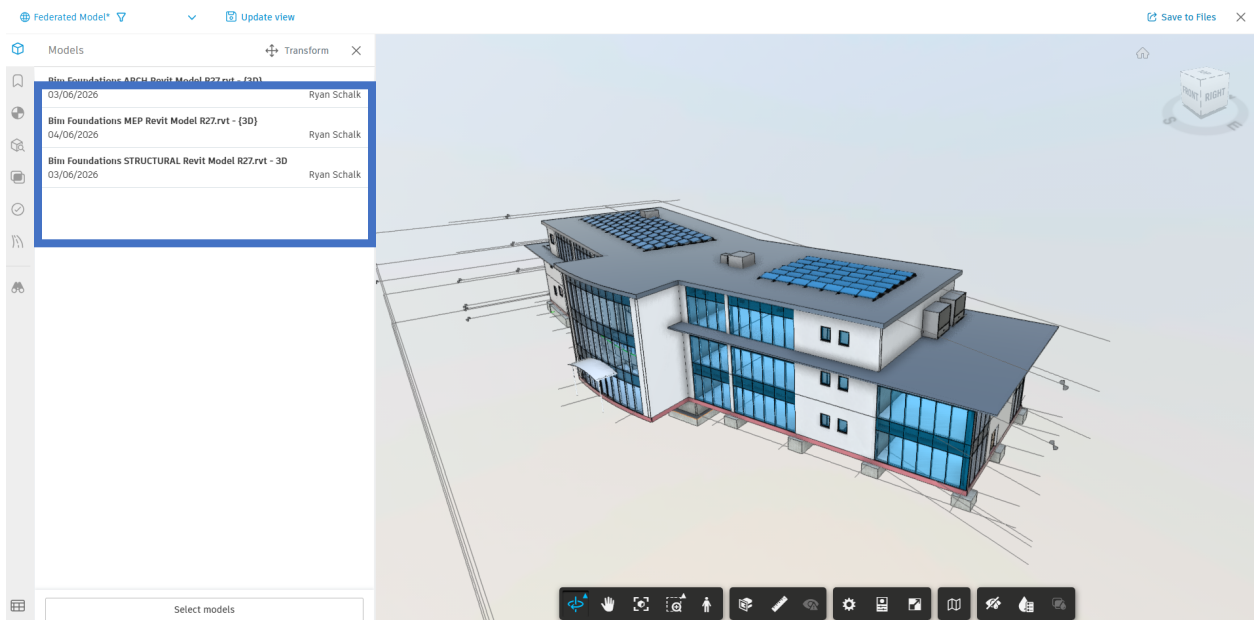
- Initialize Cloud Project: Log into the cloud hub environment and create a brand new project container named according to your course section standards.
- Upload Models: Upload your active MEP Model, along with the Architectural Model and Structural Model, into the common data environment. Ensure all uploaded cloud filenames strictly reflect their respective BEP naming rules.
- Establish Coordination Space: Create a shared coordination space within the project environment to automatically aggregate the models.
- Generate Federated View: Open the model viewer tools and compile the files together into a single, comprehensive federated model view, ready for multi-trade clash review.

Success Criteria:

- **Model consistency:** The MEP model will be inspected for completeness and accuracy.
- **Federated View:** Confirm the Federated view was created.

What to Submit:

- **3 Revit model files (.RVT) in a Folder** – The MEP, Architectural and Structural project models, with model names based on the BIM Execution Plan (BEP). Locate all models in the same folder. Rename the folder “FirstName_LastName_Challenge”.
- **Federated View** – Provide a screenshot of the Federated view showing three models with the correct names based on the BIM Execution Plan (BEP). Place the image in the folder with the Models. Note: The model names will need to be updated according to the BEP in this example shown:



Grading Rubric

Use the MEP Revit model and federated view screenshot to grade the accuracy where instructed.

	Advanced 100%	Proficient 50%	Basic 25%	Emerging 0%
Views Created (20 points)	All 18 discipline views exist across 3 floors + roof. Proper view templates are assigned to dictate mechanical, electrical, and plumbing graphics.	10–11 views exist, or view template assignments are missing on a few layouts.	Minimum of 6 organized views exist; missing entire levels or trades.	Views unconfigured or default browser hierarchy unchanged.
Mechanical Connectivity (15 points)	VAV unit connected via rectangular duct "Out" connector into a T-shape. Taps, round branches, and flex ducts map perfectly to 4 diffusers.	VAV connected, but flex duct connections or round duct taps are missing/unlinked.	Duct elements placed in room but completely unlinked to the VAV equipment anchor.	Mechanical equipment and air terminals missing.
Electrical Distribution (15 points)	4 receptacles and 4 lights are placed, circuited to the panel by the elevators, and display model wiring paths.	Fixtures and devices are circuited to the correct panel, but physical wire paths are missing in the view.	Panel and fixtures are placed, but elements remain uncircuited to a distribution root.	Electrical infrastructure omitted.
Plumbing Sanitary and Vent System (15 points)	Sanitary drainage exits plan South below Level 0. Vent piping is modeled off sanitary run and exits exactly 300 mm above the Roof level.	Sanitary and vent paths exist, but vent pipe terminates at an incorrect offset or misses roof penetration.	Restroom water closets placed, but pipe runs are unrouted or missing gravity slope rules.	Plumbing sanitary and vent systems not modeled.
Sheet Creation (20 points)	3 trade sheets created. Enlarged views (Grids 1-2 / A-C) placed at exact 1:50 scale and tightly cropped to the sheet.	Sheets exist, but view scale is incorrect or crop regions are unmanaged, causing overlapping graphics.	Only 1 or 2 sheets created, or views are placed without being isolated via an enlarged crop.	Sheets and sheet documentation was not attempted.
Cloud Common Data Environment (15 points)	Cloud project established. All 3 models (MEP, ARCH, STRU) uploaded,	Models uploaded to cloud platform, but files were not renamed to BEP	Only the MEP model uploaded; cross-discipline links and	No cloud platform project initialization.

	renamed per BEP, and compiled into a federated view.	standards, or coordination space is unlinked.	federated coordination views missing.	
--	--	---	---	--