

Overall:

- In essence, T&P Route file is a part based on 3D Sketch technology. To ensure the piping can update correctly, the key point is ensuring the 3D Sketch can update correctly.
- After finishing the route creation, you may check whether the route updates correctly before populating.
- Conduit file might be re-generated in some cases, which will introduce new files in the disk, so you may want to populate route at the later design stage. It also saves time for updating the T&P assembly during the design.
- To clearly identify the components contained in a particular route, especially in complex runs where multiple branches or drops exist, right-click the route part in the browser, and then select Show Components from the context menu. The system highlights all components in that route.
- To avoid unexpected movement of piping, align Origin between T&P runs sub-assembly and top assembly, and align Origin between Run sub-assembly and T&P runs sub-assembly
- Comparison of two methods of piping creation - Route first vs. Fitting first
 - Position all fittings, then create route to connect fittings - It's the most direct way, but more constraints are required when positioning fittings.
 - Position the key fittings, then create route, and then insert other fittings - Inserting fitting is quicker than adding constraints, but we need identify the key fittings first.

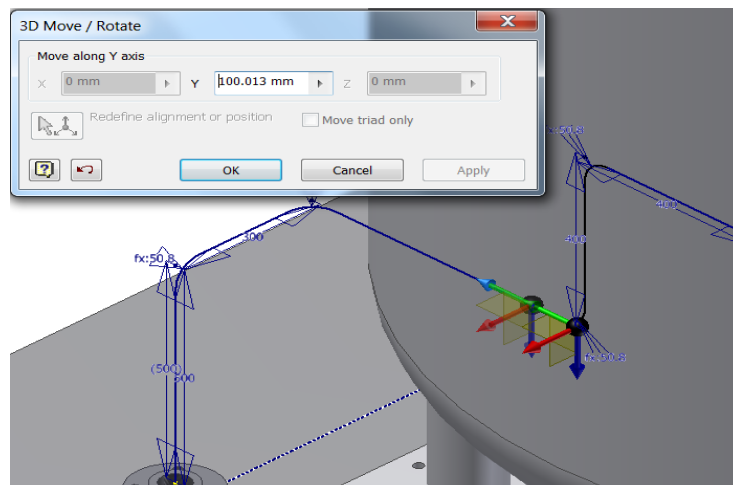
T&P Style:

- Create the right pipe and fittings and publish them into Content Center
- Add pipe standards which will be used in the company into T&P template
- Delete pipe standards which you are not going to use

Route:

- Make the Route sketch fully constrained.
- Control route - Constraints vs. Driving dimension
 - Keep consistent with the design intent, when you need piping to follow another component (or face, etc.), using constraints; when you need route a certain length of piping, using driving dimension.
 - The driving dimension cannot update along with geometry change. So don't add driving dimension if you want the length of route segment updated at a later time. Using constraints instead of driving dimension to make the route fully constrained
 - Delete unnecessary driving dimension, and add appropriate constraint. It will enable the piping updating as expected.

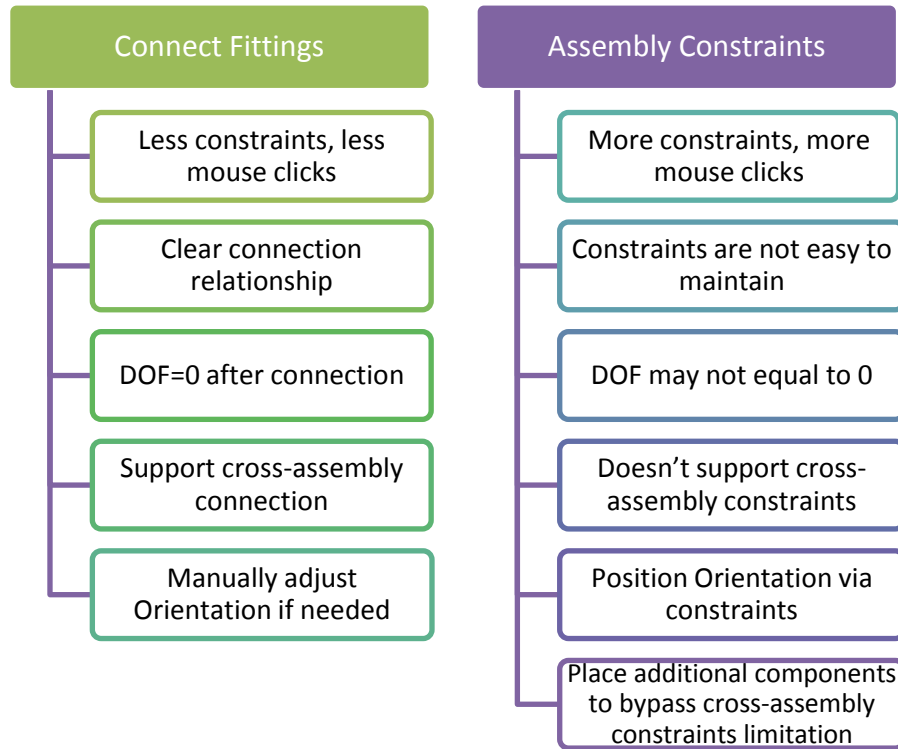
- Use parallel constraints instead of perpendicular if applicable, such as parallel to origin work axis
- If there is no need to add driving dimension, don't use Auto-Dimension (shown in the context menu within route command). We can add dimension where there is a need.
- Route the segments first, and then add constraints and driving dimension. Just like you build sketch lines.
- AutoRoute will reset to the default solution in most cases, so when the route is complex, we can convert AutoRoute to sketch for better control of piping direction.
- Sometimes, you may need to flip the route direction during design change. You can try the following steps to get it done:
 - Make the Route Point not fully constrained via deleting the related dimension
 - 3D Move/Rotate the Route point to the opposite direction, and then add the dimension again



Fittings:

- “Connect Fittings” are used to maintain the fixed relationship between components.
- Free Fitting will be grounded after connected by “Connect Fittings”
- You can connect fittings or normal Inventor components to other components.
- Using “Edit Fitting Orientation” to change the fitting orientation - X, Y, Z Angle offset
- It's not recommended to use “Connect Fittings” if the fitting orientation may need change frequently.
- Edit Fitting Orientation:
 - Support snap to other geometries, but there is no association
 - The current orientation is shown as Angle offset in in Occurrence tab of iProperties dialog
- Take notice of the model quality of customized fittings
- Position Fitting - Connect Fittings vs. Assembly Constraints

- Free fitting will be grounded after positioned by “Connect Fittings”, so if the position and/or orientation of a fitting are must controlled by more than one component, you may need to use assembly constraints or use a dummy fitting as a bridge (for cross-assembly reference) to control it



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Performance:

- Working with large tube and pipe assemblies is expensive in computer memory. If it is not important to monitor tube and pipe updates simultaneously, it is recommended that you defer automatic updates to speed up the edits.
- When a change is made to routes, runs, and positional representations, the tube and pipe assembly automatically updates all components as 3D objects. To save time for updating the tube and pipe assembly, you can choose to display individual routes and runs as centerlines