

WHAT'S YOUR VDC SERVICE PROVIDER REALLY DELIVERING?



If you're reading this book, you're probably responsible for either overseeing or carrying out project management tasks at a small- to mid-sized construction firm.

Or, if you're the owner of the company, you've recognized where project management is heading in your field. You're already aware of the all-encompassing impact of building information management (BIM) and virtual design and construction (VDC), and you're either already working on integrating these disciplines into your projects, or you're right at the cusp of doing so.

If that doesn't really describe your situation, you may want to check out these articles first:

- ▶ [**VDC and its Applications in BIM: A Quick Look at Fundamentals**](#)
- ▶ [**What's the Difference Between 3D CAD, BIM, and VDC?**](#)
- ▶ [**Using a BIM Service to Improve Your Bottom Line**](#)

WHY YOU'RE LOOKING AT OUTSOURCED VDC SERVICES

You're likely in one of two positions at the moment:

- 1** You have no current VDC capabilities in-house, and you need outside help to start offering the BIM-related services your clients are demanding more and more.
- 2** You have a small or relatively new VDC/BIM unit in-house, but they're not currently able to handle the full workload your customers need.

For many construction pros in your position, the investment required to build out an adequately sized and experienced VDC/BIM unit in-house is currently out-of-reach. So, it makes good sense to outsource the work by hiring a VDC service provider, either on an ongoing, or as-needed basis. It's a proven strategy many construction firms are using now to stay current with client expectations and reap the benefits of BIM processes.

But, this strategy comes with a serious responsibility as well: as a smart business person, you know that the results for your firm are only going to be as good as the quality and reliability of the VDC provider you choose.

So, since this is still somewhat new to you, you're rightfully concerned:

- **How do I know what my VDC service provider is (and should be) delivering?**
- **How do I make sure we're getting the most out of these services?**

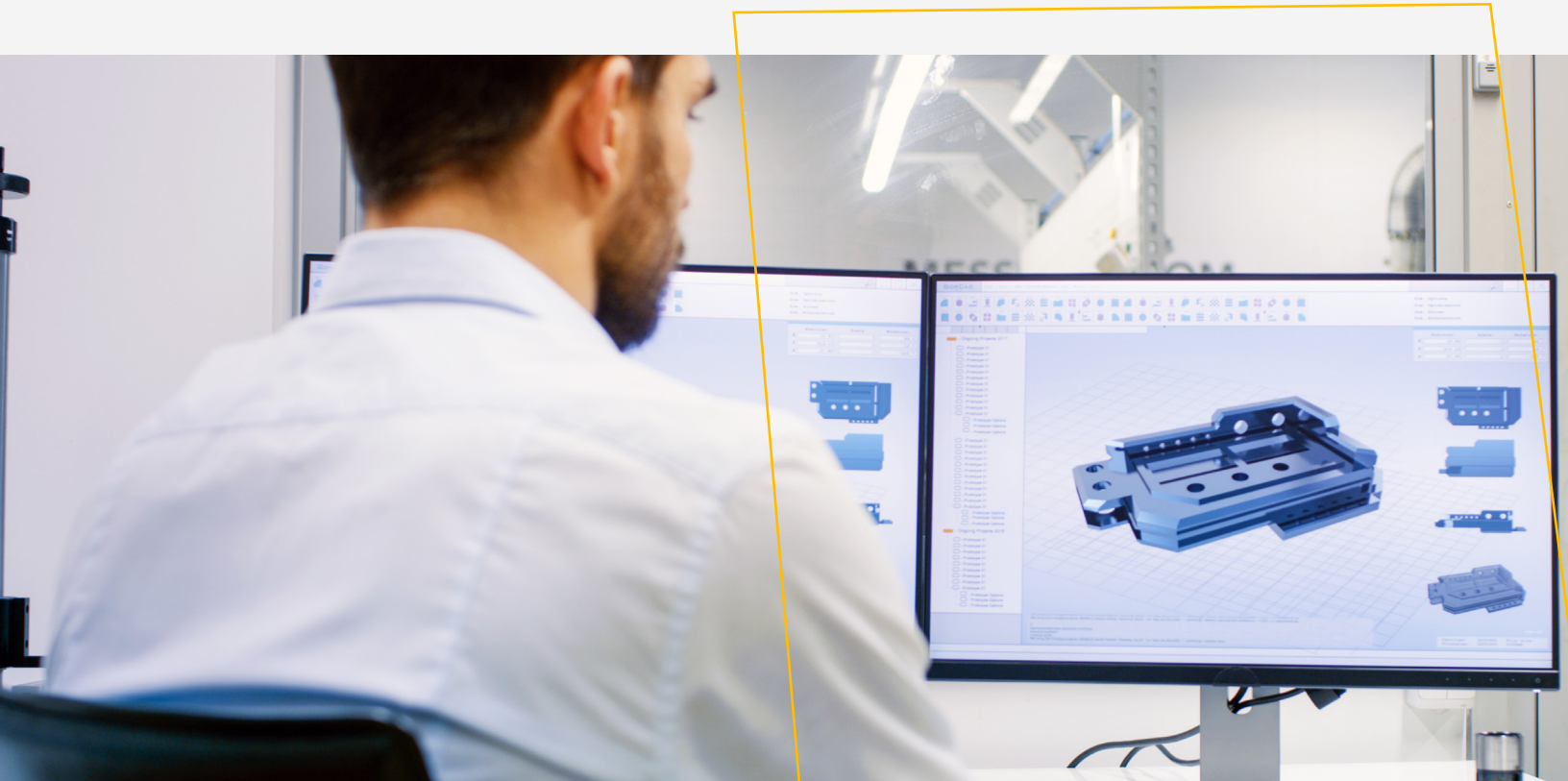
We're going to answer those questions for you over the next few pages by diving deep into the kinds of deliverables a VDC services provider should be offering, and how you can work together with your provider to optimize the experience for everyone involved.

WHAT DELIVERABLES SHOULD YOU EXPECT FROM YOUR VDC PROVIDER?

For the sake of this discussion, we're going to assume your company has no in-house VDC capabilities. That way, we can cover all the potential deliverables equally. If you do have an in-house team, a five-minute conversation about this section will likely yield which areas they're comfortable with and which they could use support with.

The main deliverables every quality VDC services provider should be making available fall into four main buckets:

- ▶ **3D Model Evaluation**
- ▶ **3D Model Coordination**
- ▶ **3D Modeling**
- ▶ **Fabrication and Documentation**





3D MODEL EVALUATION

Whether the 3D model you're working with was supplied by someone inside or outside of your company, an experienced VDC services provider will be able to evaluate the model and offer valuable expert advice on its accuracy and usefulness.

3D/2D Model Comparison

This generally involves a critique of the 3D model based largely on the original 2D drawings. The VDC expert wants to determine how closely the 3D model adheres to the architect and/or designer's original vision and specs for the plan.

In some cases, changes or improvements may be recommended in order to avoid miscommunication or errors later in the construction process, or to increase the level of detail (LOD) at which the model is rendered.



VDC SERVICE DELIVERABLES

- **3D Model Evaluation Report**

- How the model was evaluated
- The results of the evaluation (incl. score card)

- **List of recommended improvements**

- Why the model is deficient
- How to bring it up to a usable level

VDC/BIM score card

A common method of reporting the results of the 3D model evaluation is the use of a VDC/BIM score card. These reports will generally break the evaluation down into its component sections and score the model on each section using a percentile or point-based scale.

The score card offers a helpful, visual report to quickly communicate what aspects of the model (if any) need the most work. And, once edits are made to the design, using the same scoring method can help confirm improvements without having to translate more subjective analysis of both models.



The deliverables

The deliverables you should expect at the end of a 3D model evaluation include a detailed report covering all the aspects of the provider's evaluation methods and results, as well as a thorough list of recommendations for improving any areas deemed deficient.

Any suggestions provided by an outsourced VDC services provider should be well-documented and adequately supported if it's going to add real value.

3D MODEL COORDINATION

Coordination of all the various 3D and 2D models being produced in a large-scale construction project has always been a difficult task, and coordination errors — which occur regularly — can be costly in terms of time, labor, and money.

Quality 3D model coordination, performed by an experienced VDC services provider, can save countless hours and dollars, and make the entire project run faster and with less stress.

A good way...

In a standard BIM coordination process, the contractor has to integrate numerous 3D models from design teams and subcontractors across mechanical, electrical, plumbing, and fire protection. They'll need to run clash detection checks for clashes between systems, and run coordination meetings to review conflicts so they can be resolved.

In comparison to the traditional 2D-based coordination process (using light tables), that's a vast improvement. However, even this style of coordination suffers from inefficiencies:

- **As one trade moves an element to resolve a clash it creates two more clashes down the line**
- **Subcontractors spend a lot of time communicating with the design team because it's impossible to make their systems fit within the given ceiling space.**



VDC SERVICE DELIVERABLES

- **Coordinated 3D Models**
 - Clash detection against structural and MEP models
- **Constructability report**
- **Updated 2D layout drawings**



A better way...

The goal of advanced 3D model coordination and clash resolution services should be to resolve clashes among all trades before the subcontractors begin their detailed shop drawings. This can be accomplished by following a set of rules that clearly define typical system elevations and determine system priority in shared spaces. Accomplishing this task can have a huge impact on the value of VDC coordination:

- **Decrease the duration of 3D coordination by as much as 40%**
- **Decrease the number of change orders caused by RFIs**
- **Can result in lower subcontractor bids (if implemented before buyout) due to the lower perceived risk associated with pre-coordination**

These days, a VDC service provider should really be coordinating with the latter goals in mind. If so, they're going to offer the highest level of value and help produce a better finished product when they're done.

The deliverables

If you hire a VDC services provider to handle 3D model coordination services, you can expect the coordinated 3D models, a constructability report describing clashes that could not be resolved without design team input, and 2D layout drawings based on coordinated geometry.

3D MODELING

While the previous two services presuppose a 3D model has already been generated prior to bringing in the outside VDC service provider, that's not required. In fact, for many companies, bringing the VDC experts in at the start of the 3D modeling process makes the most sense in terms of cost and peace of mind.

When provided by an outsourced VDC service, 3D modeling can often be accomplished faster and with a greater degree of accuracy. This is especially true if your in-house team hasn't yet gained experience with the particular type of design needed, or if previous model evaluations have noted consistent deficiencies in the models they're producing.

WHAT IS LOD?

Level of Detail: The way a model looks.

The level of detail refers to the *input of the model*.

EXAMPLE: Specific shapes and measurable location of steel pipes in a model.

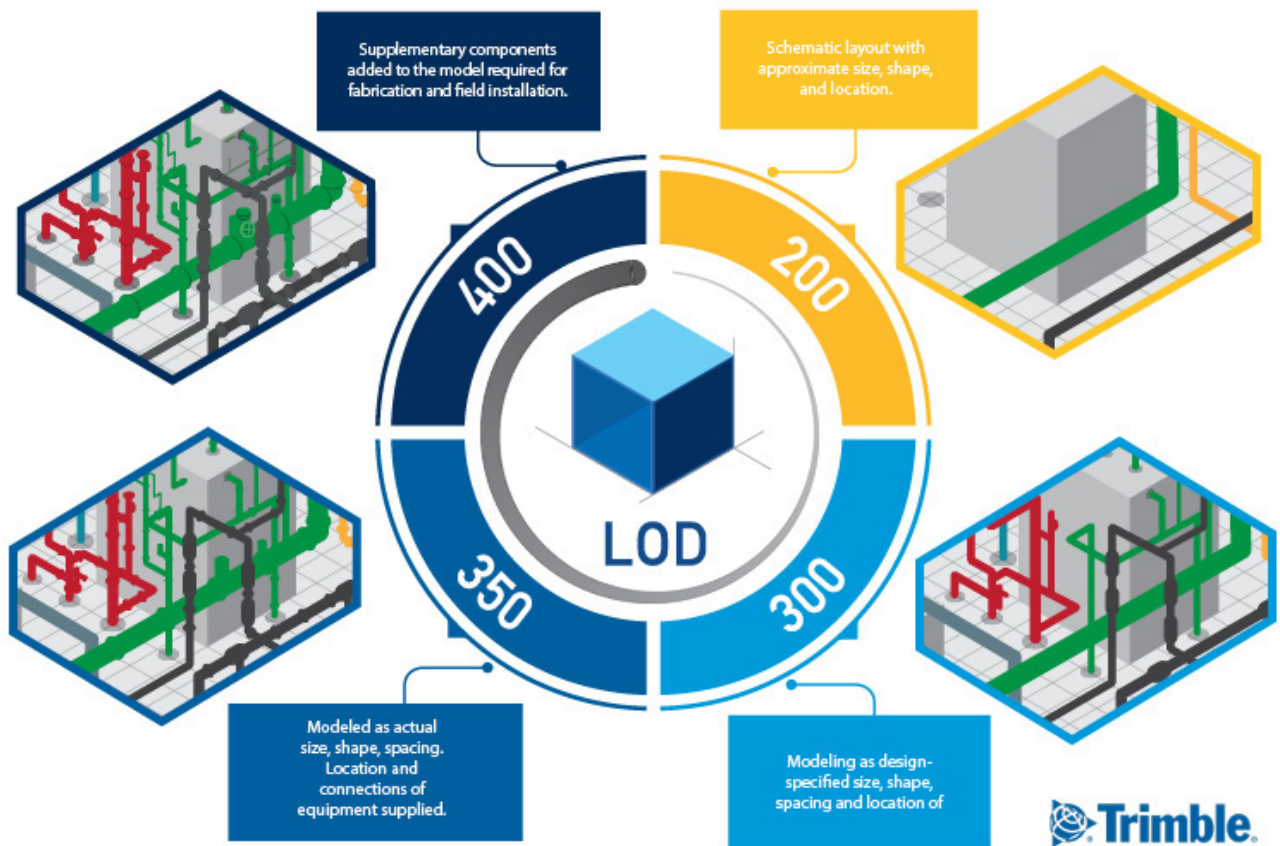
Level of Development: The depth of thinking applied to the model.

The level of development refers to *the reliability of the model*.

EXAMPLE: Whether the pipes in a model have been engineered and the permanence of their placement.

By today's standards, Level of Development is the common reference. It might help to consider the level of detail as a criteria of the level of development. The more that a component is developed, the more detail is provided in the model.

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Based on the LOD

The VDC provider will produce all 3D models based on the LOD required for the project. Different LODs are required at different stages of the construction lifecycle, with LOD 400 being the industry standard for building-ready plans that can be used onsite.

Of course, with every increase in LOD, the model becomes more complex and time-consuming, and therefore, more expensive. So, during the planning stages, LOD 300 is normally more than sufficient.



VDC SERVICE DELIVERABLES

- **3D MEP models**
- **Architectural models**
- **Structural models**
- **Hangers**
- **Fabrication data file**
- **Spool drawings**
- **Bill of materials (BOM)**
- **Field layout points**
- **Penetration/sleeve drawings**



Includes several disciplines

To provide adequate 3D modeling services from start to finish, the VDC provider needs to employ a number of different disciplines, including (but not limited to):

- **3D modeling capability**
- **3D scanning**
- **Field point layout experience**
- **Knowledge of model coordination best practices (including clash detection and resolution)**
- **Local compliance and building code requirements**

There's overlap between a VDC provider who is just handling model coordination and one who is handling the full 3D modeling job. Specifically, clash detection and constructability reporting were also available under model coordination services. This can be another source of savings and efficiency when you bring the VDC experts in at the beginning of the 3D modeling process, since these coordinating tasks can be undertaken *during*, rather than *after*, production of the model.

The deliverables

Based on the data and plans supplied, and the LOD you choose, the VDC provider will be able to produce a long list of valuable deliverables:

- ▶ **3D MEP models** — modeling mechanical, electrical, and piping systems, and defining spaces and zones in the building model.
- ▶ **Architectural models** — a virtual representation of a structure, built to study aspects of an architectural design or to communicate design ideas.
- ▶ **Structural models** — a dimensionally correct and coordinated model describing all the main components of the building and how they fit together.
- ▶ **Hangers** — a model outlining size, shape and placement for any strip, strap, rod, or similar hardware for connecting pipe, metal gutter, or framework, such as for a hung ceiling, to its overhead support.
- ▶ **Clash detection against structural and MEP models** — a report of any predetermined clashes that can be resolved by adjusting the design or coordinating work teams.
- ▶ **Fabrication data file** — raw data the fabrication site needs, formatted to hold the graphical and non-graphical information required for fabrication of ductwork, pipework, and electrical containment systems.
- ▶ **Spool drawings** — a pipe spool drawing shows a single spool — an assembly of pipe and components that can be built in the workshop and then shipped to site for erection — and is optimized to provide all the information needed by the fabrication workshop to accurately manufacture or assemble the spool.
- ▶ **Bill of materials (BOM)** — a list of the raw materials, sub-assemblies, intermediate assemblies, sub-components, parts and the quantities of each needed to manufacture an end product.
- ▶ **Field layout points** — model-to-field translation of field points for objects such as anchor bolt locations, curtain wall attachments, and hanger or sleeve locations.
- ▶ **Penetration/sleeve drawings** — describing the detailed location and measurements for steel, plastic, or sheet metal sleeves and penetrants.
- ▶ **Constructability reports** — a report describing the ease and efficiency with which structures can be built. The more constructible a structure is, the more economical it will be.

HOW CAN YOU SUPPORT YOUR VDC SERVICES PROVIDER?

Considering the responsibility you're entrusting to an outsourced VDC services provider by hiring them to provide any of the services described above, it's not surprising to learn that **trust** and **communication** are the keys to a successful collaboration.

It's important to remember that your VDC provider wants to do the very best job for you and your client, but they are generally limited to making the most of what they receive from you. Make it a point, then, to ensure they have everything they need:

- **Keep the lines of communication open**
- **Be open about potential project risks and foreseeable challenges**
- **Provide all relevant information in a timely manner**
- **Be responsive to reviews and requested approvals**
- **Provide necessary updates and changes as soon as you are aware of them**
- **Trust the professionals to deliver**
- **Ensure they have the most updated schedules in hand**

That last point is incredibly important:

If you've taken the step of hiring a VDC services provider, it's because you recognize that their skill and experience in this discipline are greater than your own or your team's. You've chosen to invest in their knowledge and ability because it's going to be faster, easier, and less expensive in the long run for you to rely on them than to handle it yourself.

That being the case, it only makes sense to give them what they need to do the job, then **let them do it**. Micromanagement and second-guessing aren't going to help you or them accomplish the goals you share in common.



HOW DO YOU KNOW YOU'RE WITH THE RIGHT VDC PROVIDER?

Of course, if that trust is misplaced, it can be detrimental for you and your client. That's why it's important to choose your VDC services provider wisely, and to pay attention during the job to ensure they're living up to your reasonable expectations.



WHAT TO LOOK FOR IN A QUALITY VDC SERVICES PROVIDER

Everything in the following list should be apparent right from the start of your relationship with any VDC provider who deserves the trust they're requesting:

- ▶ **Transparency** — it should be clear from the start what the project scope includes, what is expected of all parties involved, and what you can expect to get for the price you're paying.
- ▶ **Integrity** — there's no excuse for omitting important facts, being deceptive, or unethical.
- ▶ **Open communication** — communication is a two-way street, and you deserve to be kept in the loop as much as they do.
- ▶ **A focus on value engineering** — they're not just there to "do the job" and go home; the focus should be on using their skills and experience to make sure the job goes as well as it possibly can.
- ▶ **A consultative approach** — again, you're paying for knowledge and experience that you would otherwise need to develop internally, and the provider should readily share those with you.
- ▶ **Field experience** — if the VDC provider has only ever sat behind a desk, there are going to be logical gaps in their understanding of what's actually practical and smart on a job site.
- ▶ **A full catalog of quality deliverables** — this should go without saying, but no matter how much they seem to know, if it doesn't come out in their deliverables, you're not going to benefit.



WHAT TO WATCH OUT FOR WHEN WORKING WITH A VDC SERVICES PROVIDER

On the opposite end of the spectrum, if you see any of the following warning signs while you're working with a VDC provider, grab your stuff and hit the road as soon as possible:

- ▶ **Speed over quality** — doing it fast should never trump doing it right.
- ▶ **Price over quality** — similarly, doing it cheap should never trump doing it right.
- ▶ **Lack of teamwork** — you and your VDC provider should be a team; they need to act that way.
- ▶ **Over-promising and agreeing to unrealistic expectations** — as in most areas of life, if it sounds too good to be true, it probably is.
- ▶ **Lack of field experience and fabrication detail capabilities** — if they don't have a full set of skills and experience, then they're not in a position to completely fill the gaps that led you to seek them out in the first place.

And, with that, we can wrap up this discussion of what your VDC service provider is really delivering. At this point, you should be in an excellent position to confidently choose the best provider for your unique needs and to work hand-in-hand with that provider to gain the full value from the deliverables they offer.



IF YOU'D LIKE TO EXPLORE THE CAPABILITIES OF A TOP-QUALITY VDC SERVICES PROVIDER, CONTACT TRIMBLE TODAY.