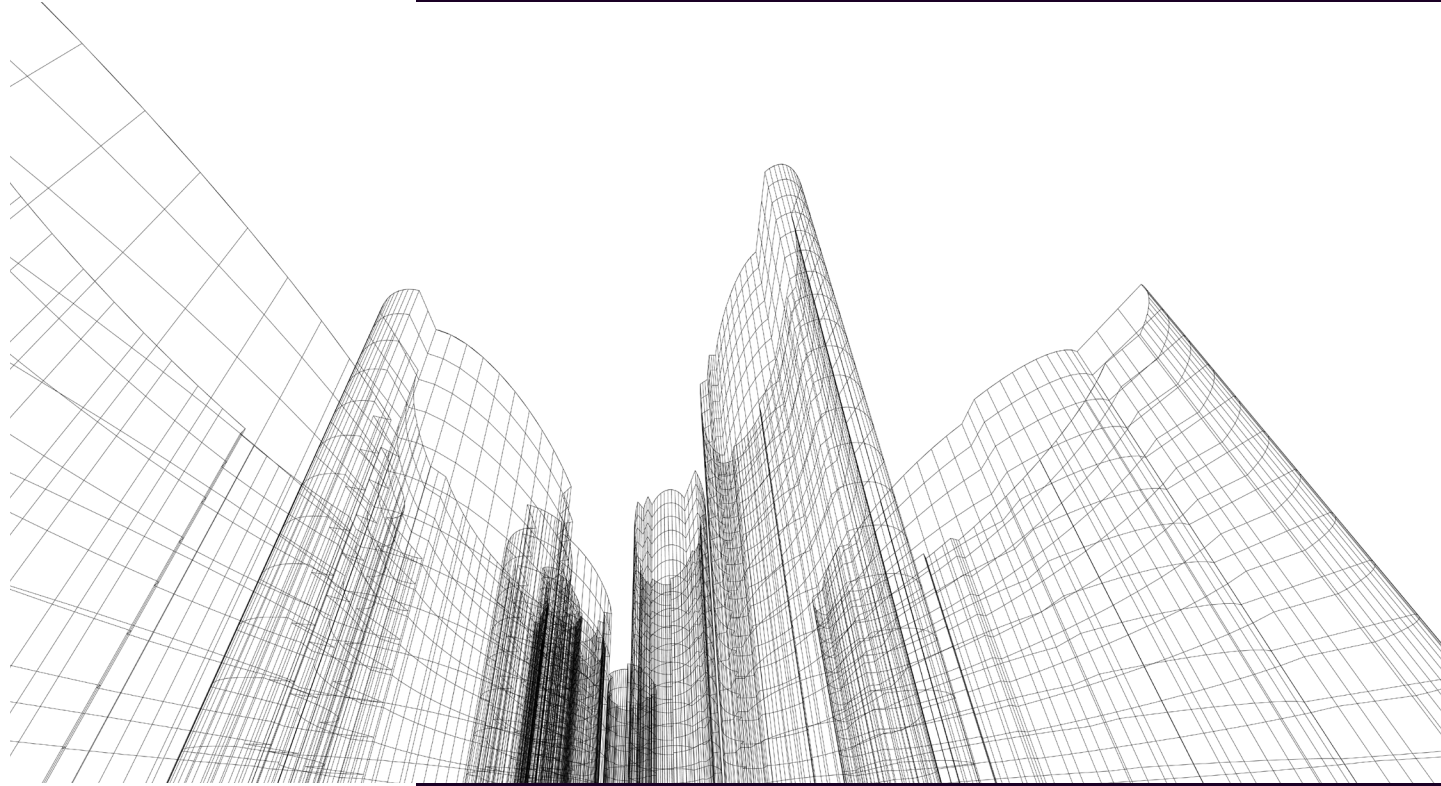**Reality Capture Software**

Avvir's reality capture software offers a new level of analysis for the built world.

AVVIR

eBook

BIM Best Practices for Downstream Data Analytics

How to connect data across platforms and project phases for better collaboration and downstream analysis.

www.avvir.io

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Introduction.

As **reality capture and BIM become the standard way of working**, a common data environment alone is not enough. Working within a common data environment facilitates better collaboration, but to extract the most value from your existing processes, we need data to be connected across platforms and project phases. By utilizing your BIM as the Single Source of Truth, you can decrease project variables while simultaneously increasing project confidence. In this eBook, we will explore the current problems with data in construction and how we can implement a series of best practices to reap more benefits from connected data.

A lack of communication between teams plagues today's construction sites. As a result, general contractors and subcontractors often find themselves working with outdated data and plans riddled with omissions and errors. This scenario's apex is **data silos, disconnected teams**, and **poor visibility into real-time information**, which negatively impacts project performance, leaving stakeholders pointing fingers and taking blame instead of celebrating a successful job.

This guide outlines the benefits of a connected data environment utilizing your BIM as the single source of truth. In addition, it features the opportunities and methods for connecting data across platforms and project phases. Finally, learn about Avvir's unique approach to creating a connected data environment for more successful business outcomes.

Emerging reality capture technology has made it possible for project executives to gather progress data on construction projects without having to physically walk the jobsite. Getting the most out of this new paradigm requires developing new skill sets and following best practices.

The data problem in construction.

At Avvir, **we've worked with a variety of stakeholders across the industry, ranging from different Owners, GCs, Subcontractors and consultants**. Our collective experience also varies widely across industries, from residential to mission critical.
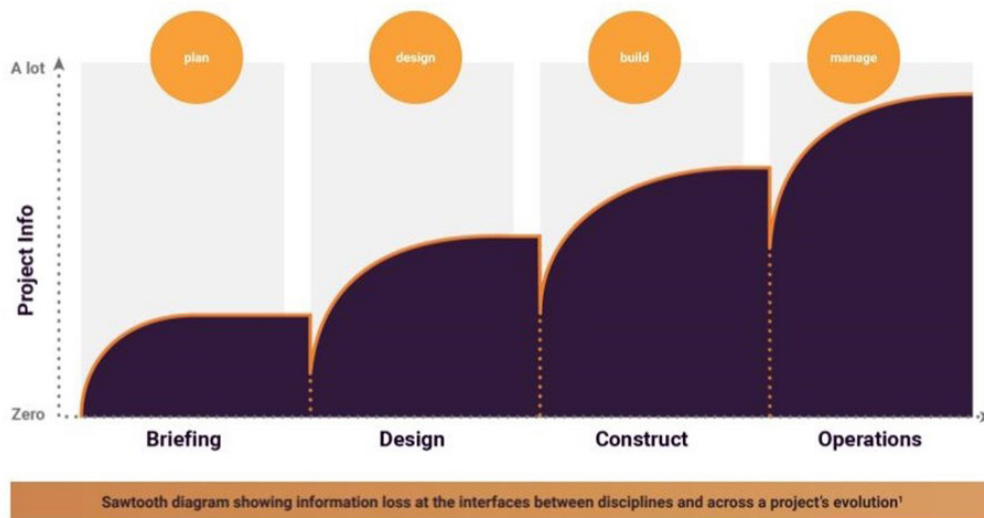
What has emerged as a result of our experience is a common theme: **the data problem in construction**. This problem can be broken down into three main themes.

1. The **lack of standards** between all of these groups leads to severe loss of information, or data. This data loss happens within projects and even within organizations.

2. All of the different roles involved in project execution, use **different software tools** to produce their deliverables. Again, this is a problem both within and between organizations. The main issue this causes is that planning and reporting on a project in an objective and systematic way is extremely difficult.

3. There is **no way to meaningfully measure production** or productivity because we are all using different systems of measurement.

Sawtooth diagram showing information loss at the interfaces between disciplines and across a project's evolution[1]

This is a visual representation of that data loss within a project. At each stage of the project, more and more information becomes available. Inevitably this information gets lost at handoff.

The benefits of a connected data environment.

BIM as a Single Source of Truth (SSOT) Theory

In information systems design and theory, a single source of truth is the practice of structuring information models and associated data schema such that every data element is mastered (or edited) in **only one place**.

Any possible linkages to this data element are by reference only, because all other locations of the data just refer back to the primary "source of truth" location. Updates to the data element in the primary location propagate to the entire system without the possibility of a **duplicate** value somewhere being forgotten.

What was BIM meant to be?

BIM was created to form an ecosystem of value props centered around one master model. It was first conceived to be a 'Living Model' designed to facilitate better decision making during the design, construction, and operation phases of a built asset. BIM is a true reflection of the building it represents, which is a step towards a **Digital Twin**, providing accurate, up to date, and easy-to-interpret information about a built asset.

The Reality of BIM

The complexity of construction can hinder effective quality-control measures. BIM can act as the **central data repository** to simplify the process, allowing rapid communication between teams in a shared, transparent environment. In addition, when paired with **Avvir** as the **system of record**, the BIM model can include data on every component and its change history – giving project owners a clear and objective understanding of their building status (e.g., installed, not-installed, percent complete, etc.). BIM supporting technology is a crucial asset to **supporting your work in progress** if managed correctly and intentionally.

Typical BIM Deployments Today

Deploying BIM introduces unique challenges for the stakeholders if done incorrectly or haphazardly.

A few pitfalls to avoid include the management team **cherry-picking specific value props** that unintentionally c**reate orphaned data** without business ownership. Or, in some cases rolling out the "*bare minimum*" of BIM, which ends up using duplicate or outdated models.

Issues to Consider

Other issues include adopting **generic model geometry** that **lacks metadata** or **usable properties** or deploying BIM **without a unified model database**, preventing the project team from l**everaging model-based scheduling and cost tracking.**

This disconnects the model from a master project schedule and tracking costs.

How we got here:
Primary Challenges.

Primary Challenges in Implementing BIM

Some of the main challenges that are faced during the implementation of BIM is that teams relied on **outdated practices** or **BIM standards**.

Other challenges include avoiding **"minimal aligned goals"** when the project delivery tends to limit shared interests (DBB). Teams implementing the "**bare minimum BIM"** have a difficult time later in the process for **spatial coordination, creating shop drawings** and **coordinating logistics**. These common mistakes cause the BIM model to be disconnected from shop drawings, the schedule, estimates and overall project management, which severely limits the effectiveness of using BIM.

Mitigating Past BIM Mistakes

Your number one goal should be to "increase collaboration and coordination among *all* stakeholders with the ecosystem of value props based on one master model" that includes these critical components: Model based financial insights; Model based schedule insights; QA/QC insights, and Facilities management.

It's mission critical to create a **SSOT** database for project specifications. This creates a S**ystem of Record** for what has been built, and provides insights for **building future projects** and facilitates **better decision making**. The new consensus is that BIM is underutilized unless the entire construction project team leverages it as a single source of truth. When the BIM process is used effectively, the business value of BIM provides owners an incredible advantage.

The Reality of BIM

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Issues to Consider

At Avvir, we've worked with a variety of stakeholders across the industry, ranging from different Owners, GCs, Subcontractors and consultants. In our experience, project teams fail to utilize BIM models to their fullest extent due to competing priorities and a lack of standardization.

4 Steps to Use BIM as a
Single Source of Truth.

To tackle the data problem in construction, project teams can focus on how they approach the building information model with a focus on generating a single source of truth. This begins with educating stakeholders on how they are expected to use and contribute to updating the model. A premium should be placed on enriching content with financial and management data.

A Single Source of Truth

1. Education

Education is the first step because all stakeholders need to be on the same page regarding the BIM database creating the single source of truth for the lifecycle of the project. Owners need guidance along the right path (RFP language) along with general contractors working closely with trade partners on expectations, responsibilities and standard operating procedures.

2. BIM Quality

Secondly, improving **BIM Quality** requires a higher level of development (LOD) to support collaboration and greater execution, but this requires teams to revisit authoring platforms, and using BIM as a database.

3. BIM Enrichment

Thirdly, **BIM Enrichment** helps the team reference the project schedule and project estimate (SOV, WBS) during the project. There should be a way to directly tie BIM elements with schedule and cost data.
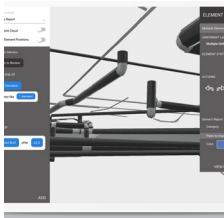
4. BIM as a Database

Leveraging *"BIM as a Database"* means more data enables actionable insights and valuable project metrics during its lifecycle. BIM as a database helps teams manage every phase of the project and can provide historical insights (for future projects).

5 BIM Best Practices
+ Benefits.

1. **Align on a standard classification system** such as Uniformat or Masterformat

- Ensure that project execution plans standardize how these codes can be applied across models, schedules and schedule of values.
- Enables easier 4D and 5D integration standardizing data.

2. **Standardize units of measurement** for purposes of quantity take offs and progress monitoring.

- Model components should align with how the object will be physically constructed and billed for, so that there can be consistency between model, schedule, and schedule of values. Example: Utilize standards set forth under NRM because it provides a standard set of measurement rules and essential guidance for the cost management of construction projects and maintenance works.

3. **Avoid the temptation to start from scratch** at critical hand off points, and instead build on the information provided to you by the previous team.

- Utilize and build on design models instead of completely starting from scratch to produce trade/fabrication models.
- Preserves metadata important to the design team/owner.
- Potentially saves time.

4. **Prioritize quality of information over precise geometric accuracy**

- Avoid over modeling geometry. If an item is prefabricated offsite, there's no reason to fully detail its assembly, you just need manufacturer info and basic geometric representations, which optimizes model size for performance and usability

5. **Communicate regularly** with various project stakeholders and ensure data strategy is aligned with ultimate goals.

Conclusion.

Getting construction teams to work from a single source of truth is less a technology issue and more a culture change. Technology is only part of the solution; understanding, knowledge, behavior, and shared purpose are just as crucial.

Building owners **can rectify this disconnect**. The Owner's role typically remains constant throughout the stages of building and can dictate how designers, contractors, and subcontractors work together. By getting involved in this process, Owners can help with the handoffs, increase trust and data, and offer incentives for teams to work more collaboratively.

Owners need to align teams and processes from the project outset because the initial planning and work provide an estimated 50% residual asset value* over the building or project lifecycle. BIM offers a dataset that can lead its

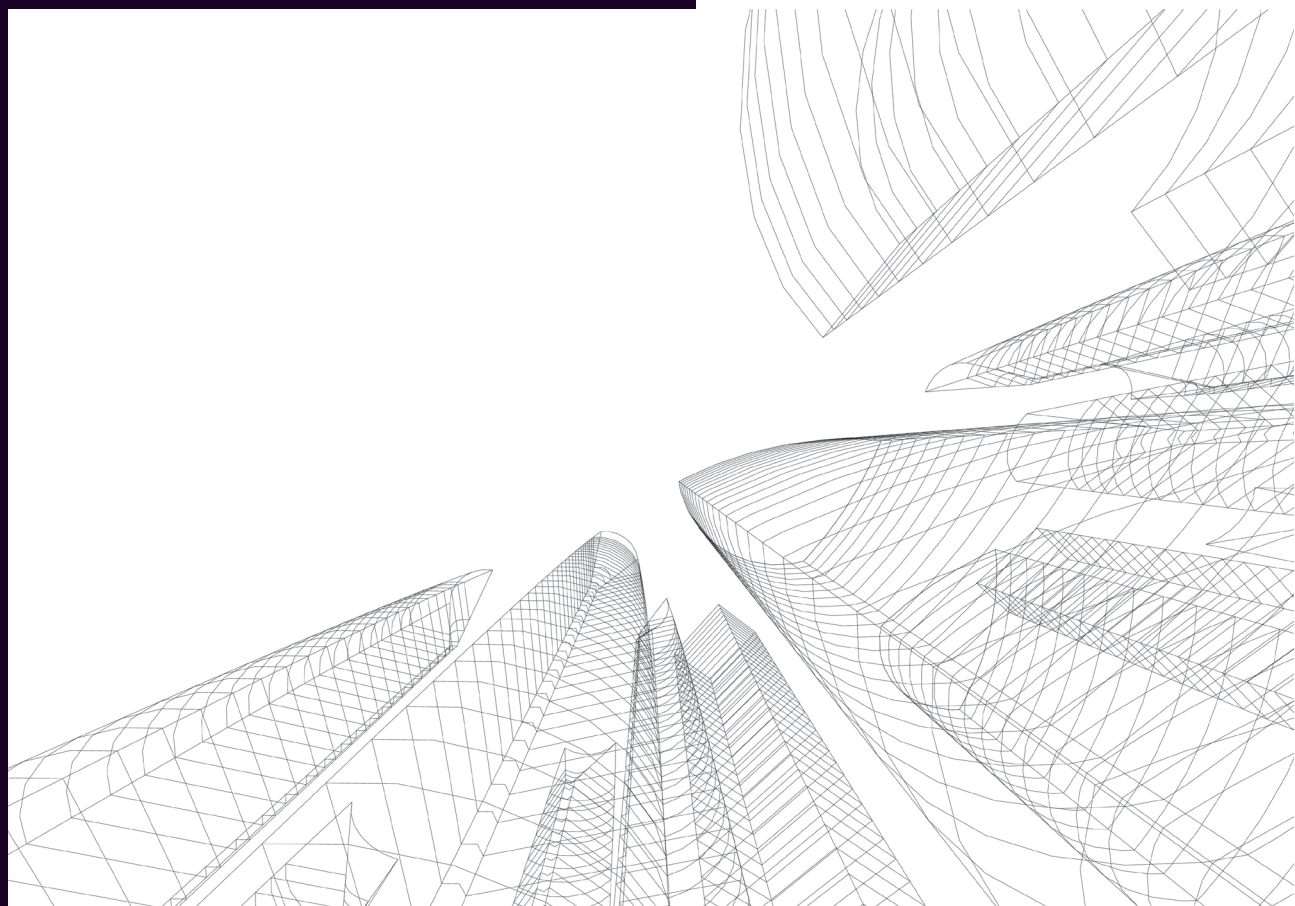architects and builders to successful outcomes.

General contractors **can rectify this disconnect.** General contractors can leverage BIM to generate better insights and project controls based on visual data. GCs can audit quantity variances, validate change orders, verify cost submittals by subcontractors, creating more transparent relationships with the teams on every project.

With **Avvir**, general contractors and their teams have unprecedented and complete knowledge of the Build and its progress. A new level of analysis for the **built world**. Harness the power of reality capture data by automating progress & earned value tracking, quality control, & as-built creation to build a **true system of record**.

* Estimated 50% residual asset value based on independent research performed by fortunebuilders.com

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