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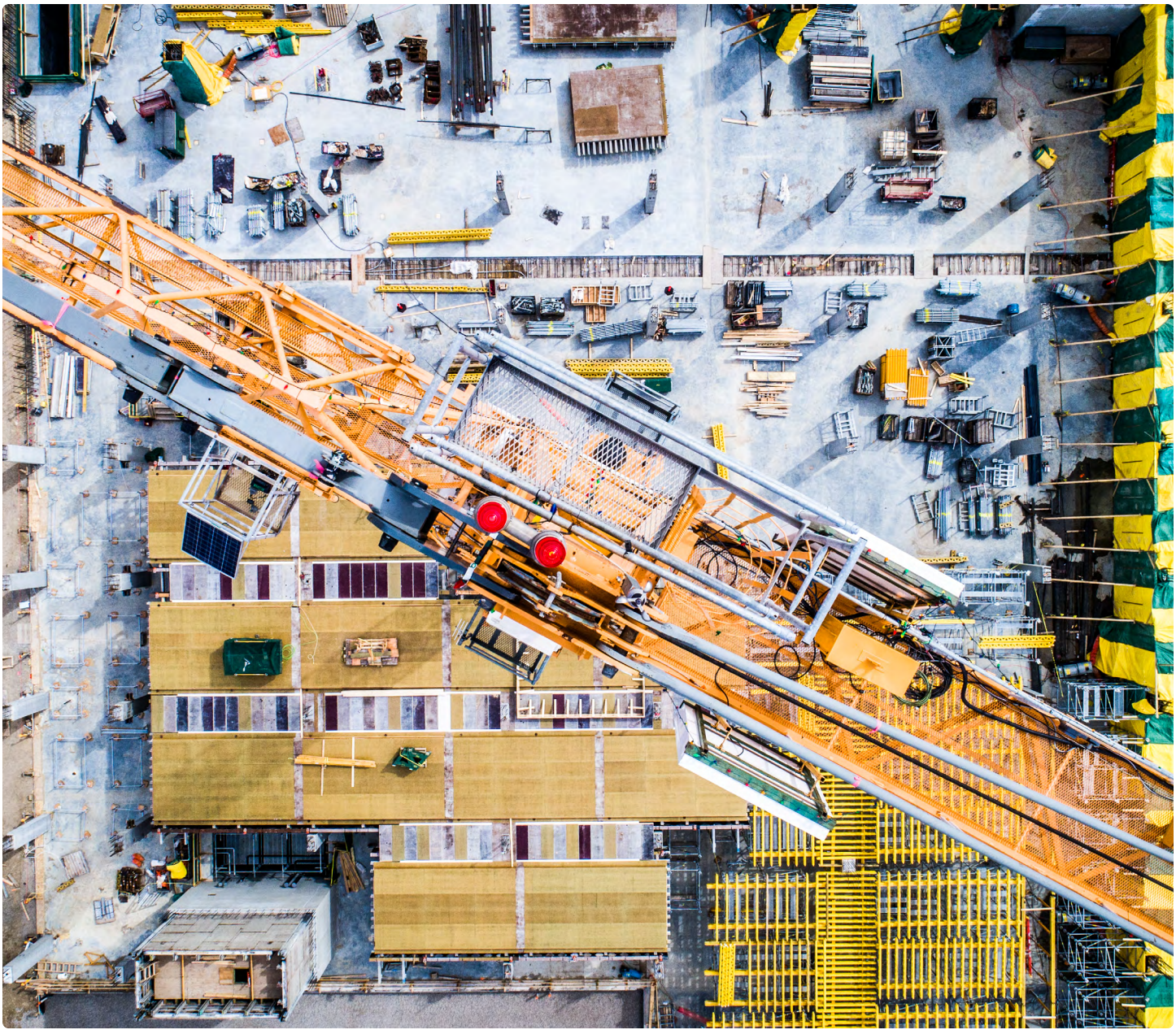
Breaking New Ground with Connected Construction

Palantir Technologies
→ palantir.com



The Future of Construction

Construction sector revenue has experienced steady growth in recent years, and construction spending is predicted to grow by at least 5%[1] in 2023, according to Building Design + Construction. To keep pace with this momentum, the industry is at the precipice of massive digital transformation. Palantir technology already plays a role in this tectonic shift: Palantir Foundry is deployed globally by leading engineering, construction, and shipbuilding enterprises including Jacobs and Hyundai Heavy, to help centralize operations and improve data-driven decision-making.

Challenges facing the Construction Industry

However, massive growth like this comes with challenges. Indeed, a recent McKinsey & Co study[2] showed that construction projects are typically finished 20% later than scheduled, at 80% over budget. The reasons for these delays and increased costs include:

- → A labyrinth of data architecture: from spreadsheets, to ERPs, to data warehouse to data lakes, built on top of asset-, contractor-, project- and portfolio-management systems, overlaid by payroll, insurance claims, audit logs, and more.
- → A fragmented landscape of contractors and subcontractors, with a complex web of contracts and negotiations
- → Siloed design, sourcing, procurement, labor, and warehousing teams, without cross-functional visibility into project planning
- → Thousands of raw materials, each subject to supply chain disruptions, shortages, and delays
- → The need to balance these raw materials against hundreds of conflicting crew schedules, which in turn are complicated by labor shortages
- → A competing portfolio of built assets, each with highly complex project plans, each subject to delays that hinder work orders

The danger to construction companies lies in continuing to operate in this status quo. This whitepaper will demonstrate how Palantir Foundry can be deployed to integrate disparate data at speed, creating a digital twin, complete with pre-configured material, crew, and asset management underpinned by BIM (Building Information Modeling) modules, that combine to optimize your entire project portfolio, and protect your organization from these challenges.

1 Construction demand will be a double-edged sword in 2023 (www.bdcnetwork.com/construction-demand-will-be-double-edged-sword-2023)
2 Imagining construction's digital future (https://www.mckinsey.com/capabilities/operations/our-insights/imagining-constructions-digital-future)

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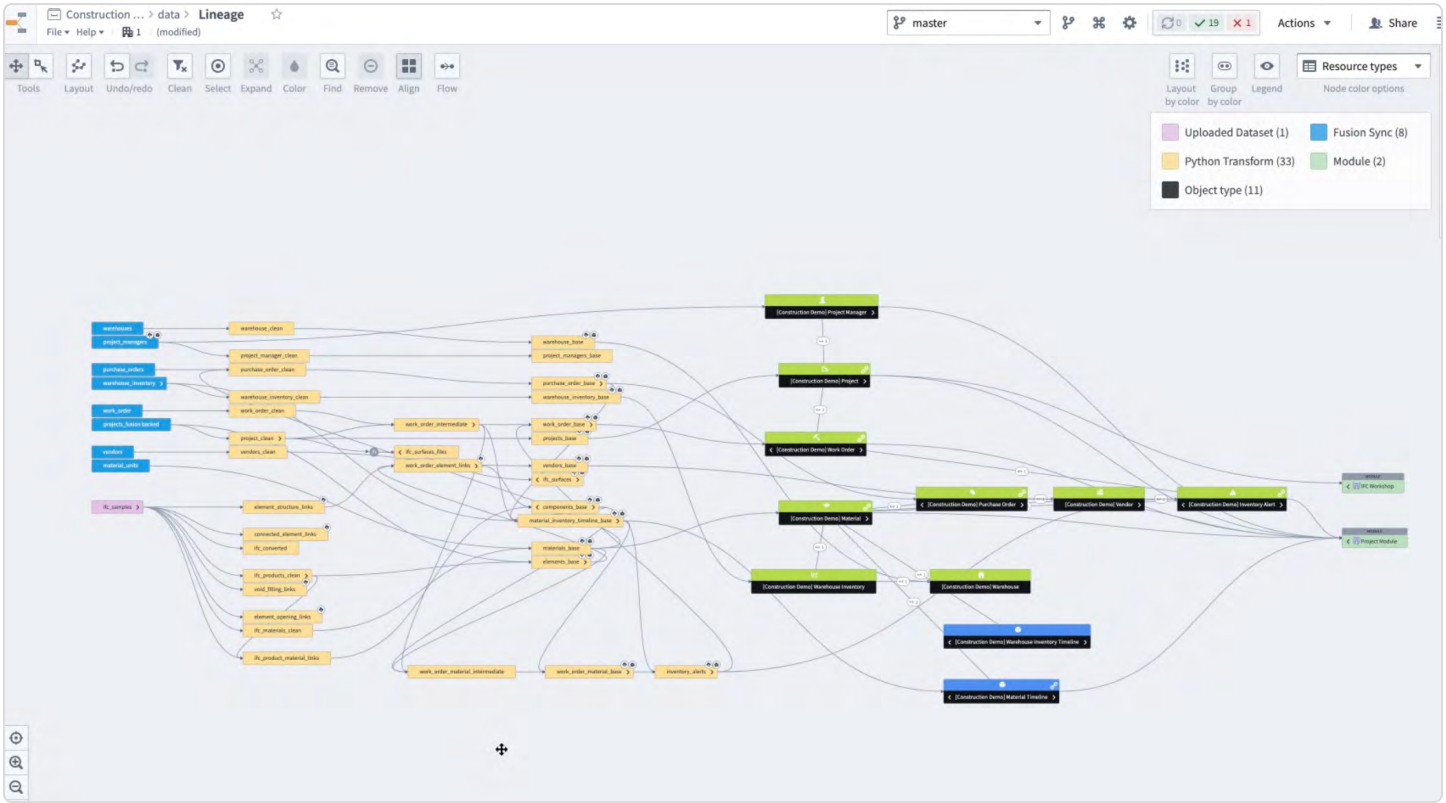
The Palantir Construction Offering

Module 1 ↘

Construct a Digital Twin in days, not months

Module 1 creates a common data foundation for the digital twin.

A clear, accurate picture of your entire project portfolio, the resources needed to build the project, and the various stages of production of each built asset, is the backbone of data-driven decision-making workflows. This visibility can only be established by connecting disparate IT source systems, such as Primavera P6, IBM Maximo, Oracle, SAP, and AutoCAD. Palantir Foundry has over 200 built-in connectors that enable rapid ingestion and integration of source data, wherever it's stored, in a matter of days.



A digital twin is built on top of this common data foundation, and structured across four core concepts:

Concept 1
↳ Entities

Illustrate the objects, places, people, and materials that make up your project portfolio

- → Project
- → Project Manager
- → Contractor
- → Vendor
- → Warehouse
- → Material
- → Inventory
- → Purchase Agent
- → Portfolio

Concept 2
↳ Events

Depict the intersection of disparate entities to visualize an entire map of relationships

- → Work Order
- → Purchase Order
- → Material Estimate
- → Crew Schedule

Concept 3
↳ Models

Visualize interactions between entities and events

- → Project Management and Scheduling
- → Out of Stock Risk
- → Vendor Performance Monitoring
- → Delayed Material Deliveries

Concept 4
↳ Actions

Execute construction operations from within the Foundry platform, guided by system recommendations, and ensure decisions are written-back to source systems

- → Draft an optimized portfolio project plan and amend it on-the-fly
- → Create, amend, move, and trace purchase orders guided by system recommendations
- → Optimally schedule and reschedule work orders
- → Optimize post-construction performance:
  - i. Predictive maintenance alerting
  - ii. Predictive security alerting
  - iii. Energy usage prediction and optimization
  - iv. Financial impact modeling

Establish company-wide 360-degree visibility with a Digital Twin

This digital twin provides up-to-date visibility across the entire construction portfolio, and supports seamless collaboration across your organization:

- → Designers can consult Foundry to estimate material and crew needs appropriately
- → Project Managers can:
  - i. Ensure that the correct volume of raw materials are delivered to the correct worksites in time
  - ii. Guarantee that crew schedules are properly aligned to satisfy planned work orders
  - iii. React to disruptions swiftly, balancing work orders against available resources
- → Procurement teams can benefit from:
  - i. Greater visibility into vendor performance over time, which in turn strengthens negotiating power with poorer-performing vendors and cements relationships with stronger vendors
  - ii. Greater raw material allocation accuracy, which can reduce the volume of materials ordered. Last-minute Purchase Orders to replace delayed materials become a thing of the past.
- → Warehouse Operators can consult Foundry to stage material for just-in-time delivery to construction sites
- → Crew Coordinators can determine the best-available construction crews for particular work orders

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Module 2 ↘

Data-Driven Decision-Making Improves Material and Labor Management

Module 2, built upon the digital twin, provides core project management functionality with a wide variety of alerting and simulation capabilities.

Typically, material and labor management are siloed processes, often involving different software systems, spread across a network of contractor and sub-contractor IT architectures. Foundry integrates these processes and overlays them with alerting and simulation capabilities. Through the Foundry Alerting Inbox, planners are automatically alerted when Foundry detects a potential shortage of labor or raw materials that will impede construction. These shortages may stem from new work orders, or disruptions to the existing project plan that require the schedule to be updated, creating knock-on effects on demand.

Foundry is constantly and automatically running calculations in the background to capture and surface these alerts. Material or crew planners can mitigate shortages by directly taking action - for example - creating a fresh Purchase Order to replenish raw materials. Moreover, project planners can simulate different paths of action and subsequently implement the best possible decision, re-organizing work orders across the global construction portfolio.

This entire process can happen weeks, if not months, ahead of the disruption, preventing day-of interruptions and idle crews and helping to optimize the carrying costs of inventory. Once a decision is made, Foundry captures that decision, logging a trail, and makes it visible to the entire organization. Over time, Foundry supports material managers and crew planners to make smarter decisions during their initial planning, and proactively mitigate shortages in both materials and labor.

With a few clicks, a Foundry user can evaluate available mitigation options, and determine the propagated impact of any decision that they make across their global portfolio. Equipped with historical records, this Foundry user can also identify repeat offenders - for example - raw materials that are consistently late - and make a business-optimal decision - for example - switching suppliers.

Real-World Example
↳ Foundry reduces Project Management Costs by 10%

An American Construction & Engineering Company was experiencing constant material shortages, which in turn were creating major project delays. This customer was using more than five different software systems for material and labor management, and had no ability to predict, assess, or proactively mitigate disruptions. Trapped in a reactive mode, the organization reached out to Palantir to deliver a solution.

Palantir software engineers mobilized to deliver a digital twin of this organization's operations in a matter of days. Within weeks Palantir empowered:

- → Project Managers to leverage this digital twin to coordinate their projects, modeling their real-world facilities and equipment in a single source of truth
- → Project Planners to utilize Foundry's decision-simulation capabilities to remodel construction schedules before they could affect the building site
- → Procurement Specialists to proactively mitigate material shortages
- → Design Engineers to plan and request materials more accurately

These company-wide decisions made in Foundry were instantly captured and fed back to source systems, creating one reliable source of truth for the entire organization.

Overall, labor productivity increased, while stranded costs, carrying costs, project delays, and idle crew time decreased, saving 10% in overall project management costs.

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Module 3 ↘

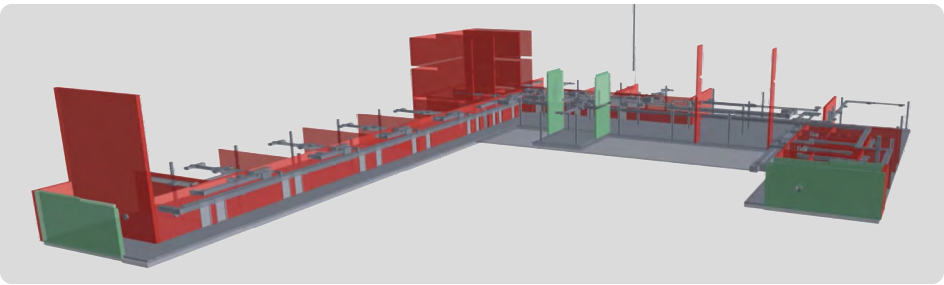
BIM (Building Information Modeling)

Module 3 integrates best-in-class project management with state of the art 3D modeling to streamline large-scale construction projects.

Foundry's BIM (Building Information Modeling) module completes the digital transformation of your construction portfolio. Originally conceptualized in the 1970s[3], BIM continues to be one of the most innovative and promising technologies in the construction sector. It can be defined as the process of planning, designing, constructing, operating, and maintaining a building using a digital representation. This digital representation is not a simple 3D model, but rather a dynamic, intelligent model that contains all of the information regarding the building's entire life-cycle, including its geometry, materials, labor, and associated costs.

With this transparent visualization at hand, the construction professional can expect to:

- → Overlay a 3D model of their building, oil rig, or even aircraft, with inventory stock alerts
- → Identify elements of construction that will be hindered by material or labor shortages and the downstream impacts of these unfinished work orders
- → Make decisions that take proactive action on any bottlenecks that have been identified
- → Rest assured that the impact of those decisions are being written back to source systems
- → Model the future-state of the construction project, to easily see which work orders happen when
- → Communicate any scheduling changes to impacted stakeholders automatically
- → Log every action and decision taken on the project, enabling an audit trail for stronger vendor negotiations, pro-active asset management, and pin-point accuracy in insurance claim allocations



3 www.scientific.net/AMM.567.625

Real-World Example
↳ Foundry reduces yearly pay-out for insurance claims by 15% in a matter of weeks

A major Building & Construction Company was struggling with manual processes, human errors, and opaque business performance. They had antiquated systems and operated largely on-paper, which meant that they were unable to innovate quickly when new opportunities arose.

Palantir Foundry was deployed to integrate all sources of data into a common operating picture, including 3D designs, multimedia assets, contractor information, and material information. The business is now running an enterprise-wide modernization effort to uplift all legacy systems and processes.

- → From first Foundry login, the organization's business intelligence team was self-sufficient and productive, using existing documentation and training to integrate all project data
- → Within weeks of the initial Foundry pilot, existing legacy systems were decommissioned and construction work was migrated to Foundry
- → Since the pilot, the organization has deployed Foundry to help solve over a dozen separate use cases, each with overwhelming business demand
- → The exemplary first use case was building a more robust claims allocation process utilizing the BIM audit trail, to pin-point insurance claims to the respective sub-contractors instead of absorbing them due to lack of record

By fully leveraging the BIM, this use case was delivered in a matter of weeks, and the yearly pay-out for insurance claims was reduced by 15%.

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Module 4 ↘

Optimize Building Management Post-Construction

Module 4 supports the transition from pre-construction to post-construction. Building designers and developers can hand-off the Foundry Operating System (OS) to the building's operations and management teams, who benefit from access to finite details and granular data regarding the building's development.

With the implementation of Module 4, Foundry becomes a "control tower" where asset managers, property managers, tenant software, IoT devices, Building Management Software (BMS) and security systems are integrated into one platform. This integration can help solve a construction company's most complex challenges, resolving inefficiencies. For example, energy usage metrics can be integrated with building occupancy and open source weather data to normalize energy usage for external conditions.

There are a myriad of post-construction workflows available to the Foundry user that optimize the built asset's financial performance. These workflows include but are not limited to:

- → Energy and utility usage tracking, optimizing Net Zero efforts
- → Predictive maintenance, with fully augmented maintenance workflows
- → Vendor software integration
- → Integrated tenant portal
- → Security systems integration
- → Disaster reporting
- → Property and casualty insurance and re-insurance
- → Risk modeling

Build a Smarter, more Effective Construction Portfolio with Palantir

Palantir Foundry can be deployed at speed to integrate and harmonize data from disparate ERPs, asset management software, project portfolio management software, data lakes, and even spreadsheets to create a common data foundation. Foundry is designed for interoperability, seamlessly interfacing with existing construction IT investments such as Primavera P6, IBM Maximo, Oracle, or SAP. Foundry goes beyond working with existing systems - it supercharges them by integrating them into a digital twin that powers 360-degree visibility across the entire construction portfolio, which unlocks proactive, data-informed operations.

Within weeks of this data integration effort, pre-configured project management, material management, crew management, and visualization modules are available. Equipped with these interoperable tools, construction professionals are empowered to navigate a complex portfolio of built assets, networks of supply chains, and landscapes of contractor and sub-contractor negotiations with confidence and accuracy.

Foundry's BIM module completes the digital transformation of the construction portfolio, overlaying traditional project management tooling with real-time inventory and crew data, powering truly data-driven decision-making in the face of shortages and bottlenecks.

Questions that used to be impossible to answer are now answered with the click of a button:

- → "How do I balance work orders against available resources?"
- → "How do I make sure all my projects are completed on time?"
- → "How can I react to external disruptions in the most efficient and swift way?"
- → "How can I capture, combine, and surface all of my information to enable my teams to make the best-possible decisions across the very complex process of construction?"

The Foundry Operating System is equally useful post-build, when the building's operations and management team can access a control tower of integrated tenant software, security software, and building management software to operate a more secure and energy-efficient building.

Don't settle for less - visit palantir.com/contact to schedule a demonstration today.