



# The Time Control Tower

An operating model for the data center delivery ecosystem

How owner-operators, delivery partners, professional services firms, capital stakeholders and Foresight can create a shared system for predictable delivery, evidence-based challenge and clear decision rights.

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# THE BIG IDEA

**The optimal delivery ecosystem is not one in which a single party takes charge of everything. It is one in which the owner retains authority, delivery partners retain responsibility, separate controls provide challenge, and a shared control tower keeps every participant aligned around one honest view of time.**

## Executive summary

Between 42% and 52% of data center owners and operators had a capital project delayed in the last twelve months.<sup>1</sup> Sightline Climate expects 30% to 50% of large facilities scheduled to come online in 2026 to slip.<sup>2</sup> Bernstein puts 35% to 40% of announced global capacity at risk of delay or cancellation, against interconnection queues of three to four years in Northern Virginia, Frankfurt and London, and 80 to 100 week lead times for high-voltage transformers and switchgear.<sup>3</sup>

The cost is not abstract. Independent analysis commissioned by Foresight put the cost of a single month of delay on an indicative 60 MW single-tenant US facility at USD 14.2 million, and showed a six-month delay cutting project IRR from 17.1% to 8.8%.<sup>4</sup>

Yet almost none of that delay originates inside one organization. It accumulates in the seams between them. This paper sets out four findings and the operating model that follows from them.

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<sup>1</sup> Uptime Institute, Data Center Spending and Supply Chain Survey 2025 (survey of more than 400 owners and operators, September–October 2025), reported in UII Field Report 189, “Supply chains show signs of stability, but delays persist,” December 2025. 52% of colocation providers and 42% of enterprise owner/operators reported a delayed capital project in the preceding 12 months. [https://intelligence.uptimeinstitute.com/sites/default/files/2025-12/UII%20Field%20189\\_Supply%20chains%20show%20signs%20of%20stability\\_0.pdf](https://intelligence.uptimeinstitute.com/sites/default/files/2025-12/UII%20Field%20189_Supply%20chains%20show%20signs%20of%20stability_0.pdf)

<sup>2</sup> Sightline Climate, Data Center Outlook, reported by Latitude Media, February 2026. <https://www.latitudemedia.com/news/up-to-half-of-the-worlds-data-centers-may-be-delayed-this-year/>

<sup>3</sup> Bernstein research, reported by ET EnergyWorld, July 2026. <https://energy.economictimes.indiatimes.com/news/power/data-center-pipeline-faces-construction-delays-cancellations-to-mount-through-2027-bernstein/132342300>

<sup>4</sup> STL Partners, Preventing Multimillion Dollar Data Centre Losses Through Reporting, March 2025 — independent research commissioned by Foresight. Figures assume a single-tenant 60 MW US facility, 6% interest and 30–40% equity. <https://www.foresight.works/resource-center>



Risk does not sit  
inside any one  
organization.  
It sits in the space  
between them.

## ONE.

The critical path crosses company boundaries, but accountability does not. A data center is delivered by an ecosystem — owner, customers, capital providers, EPCs, designers, project management consultants, subcontractors, OEMs, utilities, regulators and insurers. Each controls a decisive fragment. None controls the whole. So every party can report its own scope as green while the integrated ready-for-service date is already deteriorating. This is the watermelon project: green outside, red underneath.

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## TWO.

Owners have plenty of data and very little foresight. Schedules sit in Primavera P6 and Microsoft Project. Documents, RFIs and field workflows sit in Procore, Autodesk Construction Cloud or a common data environment. Cost, procurement, BIM and commissioning systems sit elsewhere again. A master schedule can exist without ever producing a shared understanding of the program.

## THREE.

Transparency alone changes nothing. Technology can make the truth visible. Only governance converts visibility into action. No party should be permitted to produce an output, act as its sole reviewer, control the narrative and approve the response.

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## FOUR.

Time evidence compounds. Owners who retain schedules, actual durations, field evidence, decisions and recovery outcomes in a consistent structure build a proprietary delivery memory. Those who do not restart every project from first principles and pay for the same lesson repeatedly.

The answer is a time control tower: not another project management office and not another system of record, but the coordination and intelligence layer that connects the plans, evidence, forecasts and decisions of every participant into one forward-looking view of whether the facility will be delivered on time, why that is changing, and what should happen next.

# Four aims of a time control tower

A control tower is easy to describe as technology and hard to describe as purpose. It has four aims, and every design decision in this paper follows from one of them.

**One. Build and maintain a holistic view of the whole project.** In a large program every party has hold of a different part of the animal and nobody has seen the animal. The tower's first job is to assemble the whole picture and keep it current — not fourteen accurate partial views, but one integrated view of the outcome.

**Two. Produce a view of time that is immune to any single party's narrative.** Reported status is a negotiated artifact. It reflects commercial position, contractual exposure and ordinary optimism as much as it reflects site conditions. The tower's second job is to produce a view grounded in evidence rather than assertion, so that attention goes to the work instead of to the framing of the work

**Three. Ensure that no party marks its own homework.** Financial statements are audited for a reason, and the reason is not that finance directors are dishonest. Without separation between the party that produces a number, the party that tests it and the party that acts on it, the reliability of the number degrades — through external misrepresentation, certainly, but far more often through internal delusion. The tower institutionalizes that separation for time.

## Four. Restore the owner's bargaining power.

The owner carries the most risk and typically holds the least information. That asymmetry is why owners accept a contractor's or an OEM's refusal to release a native schedule, or a rebaseline whose stated cause has never been tested. Information is leverage. The tower's fourth job is to return it to the party carrying the exposure.

### STRATEGIC IMPLICATIONS FOR OWNERS AND CAPITAL STAKEHOLDERS



Secure native schedule access, data rights and site-verification rights in procurement, not after mobilization. Retrofitting governance costs more than buying it..



Insist on a second forecast of every key milestone, produced separately from the contractual forecast.



Verify physical progress against reported progress. "Done" and "done-done" are not the same claim.



Keep production, review and approval of any material output in different hands.



Treat delivery data as an asset on the balance sheet of the portfolio, not as project exhaust.

<sup>1</sup> Uptime Institute, *Data Center Spending and Supply Chain Survey 2025* (survey of more than 400 owners and operators, September–October 2025), reported in Ull Field Report 189, "Supply chains show signs of stability, but delays persist," December 2025. 52% of colocation providers and 42% of enterprise owner/operators reported a delayed capital project in the preceding 12 months. [https://intelligence.uptimeinstitute.com/sites/default/files/2025-12/Ull%20Field%20189\\_Supply%20chains%20show%20signs%20of%20stability\\_0.pdf](https://intelligence.uptimeinstitute.com/sites/default/files/2025-12/Ull%20Field%20189_Supply%20chains%20show%20signs%20of%20stability_0.pdf)

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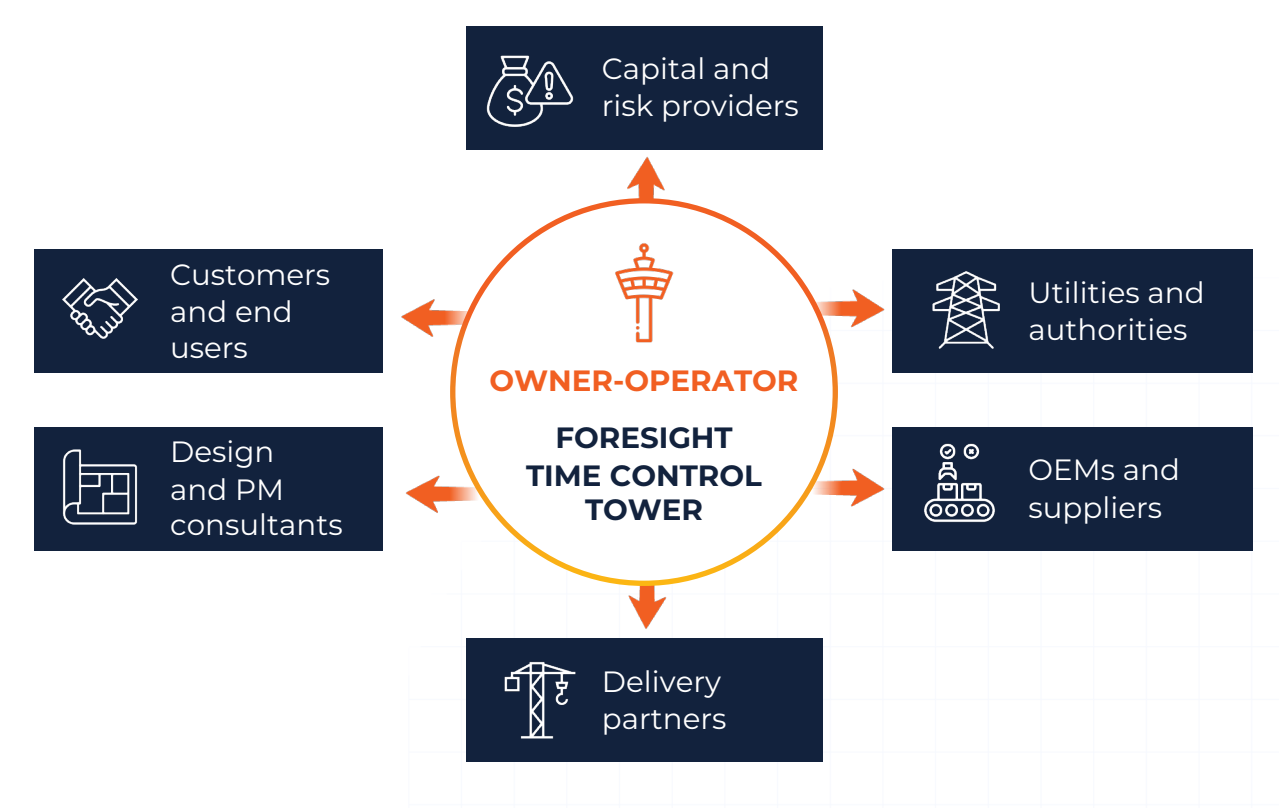
# 1. The problem is not performance. It is integration.

Behind every data center is an ecosystem of organizations that must converge on a single date. The owner-operator is the linchpin, translating customer requirements and capital commitments into the work of contractors, consultants, manufacturers and utilities. Sometimes these arrangements are formalized as a consortium; more often they are an ecosystem assembled contract by contract. Either way the governance problem is the same.

Every participant holds a legitimate but partial view. Customers focus on capacity and service dates. Investors focus on return and downside exposure. Contractors focus on constructability and contracted scope. OEMs focus on specifications and manufacturing slots. Utilities focus on external infrastructure and approvals.

Each of those views can be individually accurate and collectively useless. They become collectively useful only when they are pointed at the same object: defending the final completion date.

## A time-centric data center delivery system



**Figure 1.** The owner-operator remains at the center while Foresight provides the coordination and intelligence layer across the ecosystem.

The critical path of a data center is not confined to the construction site. It runs through design approvals, procurement, fabrication, logistics, civil readiness, installation, energization, commissioning and customer acceptance. The most consequential risks therefore sit at the interfaces — where a contractor performs its own scope competently while a design approval, a utility dependency, an equipment delivery or a commissioning interface quietly moves the ready-for-service date.

*"Power availability, not capital,  
is now the primary gating factor."*

**Bernstein**

This is the structural point that most governance arrangements miss. Risk does not sit inside any one organization. It sits in the space between them. Every party can discharge its obligations faithfully, and all the pieces of Humpty Dumpty can still fail to fit back together — because no party is contractually accountable for the fit.

Uptime Institute survey of 400+ owners

▶ **42%**

manufacturing and  
equipment delays are the  
single largest driver of  
capital project delay

The market data confirms where the seams are. Uptime Institute's 2025 survey of more than 400 owners and operators found manufacturing and equipment delays to be the single largest driver of capital project delay, cited by 42% of respondents.<sup>1</sup> CBRE reports that power and electrical equipment remain the main driver of construction delays.<sup>2</sup> Bernstein's conclusion is blunter still: "power availability, not capital, is now the primary gating factor."<sup>3</sup> None of those three constraints sits inside the general contractor's scope. All three land on the owner's date.

## THE WATERMELON FAILURE MODE

Projects are reported green because each party describes its own scope and current activity. They turn red only when an integrated milestone is visibly missed. The control tower is designed to detect the deterioration before it becomes a surprise.

<sup>5</sup> Uptime Institute, UII Field Report 189, December 2025, as cited above.

<sup>6</sup> CBRE, North America Data Center Trends, H2 2025, reported by Utility Dive, March 2026.  
<https://www.utilitydive.com/news/data-center-building-boom-slows-despite-massive-spend/815694/>

<sup>7</sup> Bernstein research, reported by ET EnergyWorld, July 2026, as cited above.



## 2. What is a time control tower?

A time control tower is a system for governing time across organizational boundaries. It brings together the underlying delivery data, applies common standards, produces a second, evidence-based forecast and directs attention to the decisions that matter most.

Critically, it does not require anyone to abandon their own systems. Contractors continue to plan in Primavera P6 or Microsoft Project. Teams continue to manage documents and field workflows in Procore, *Figure 2. The control tower connects source systems to evidence, forecast, action and governance.*

data environment. Cost, procurement, BIM and commissioning systems also remain in place. The control tower connects these sources and maintains the ecosystem-level integrated master program, while each party remains accountable for the accuracy and completeness of its own inputs.

### THE SWITZERLAND OF DATA

A control tower is neutral to every party's commercial position. It is not built to make anyone look good, and it is not built to make anyone look bad. It has one interest, and the interest is the completion date. That neutrality is what makes its output usable by an owner, a contractor and a lender at the same time — and it is why the tower must never be in a position to approve its own work.

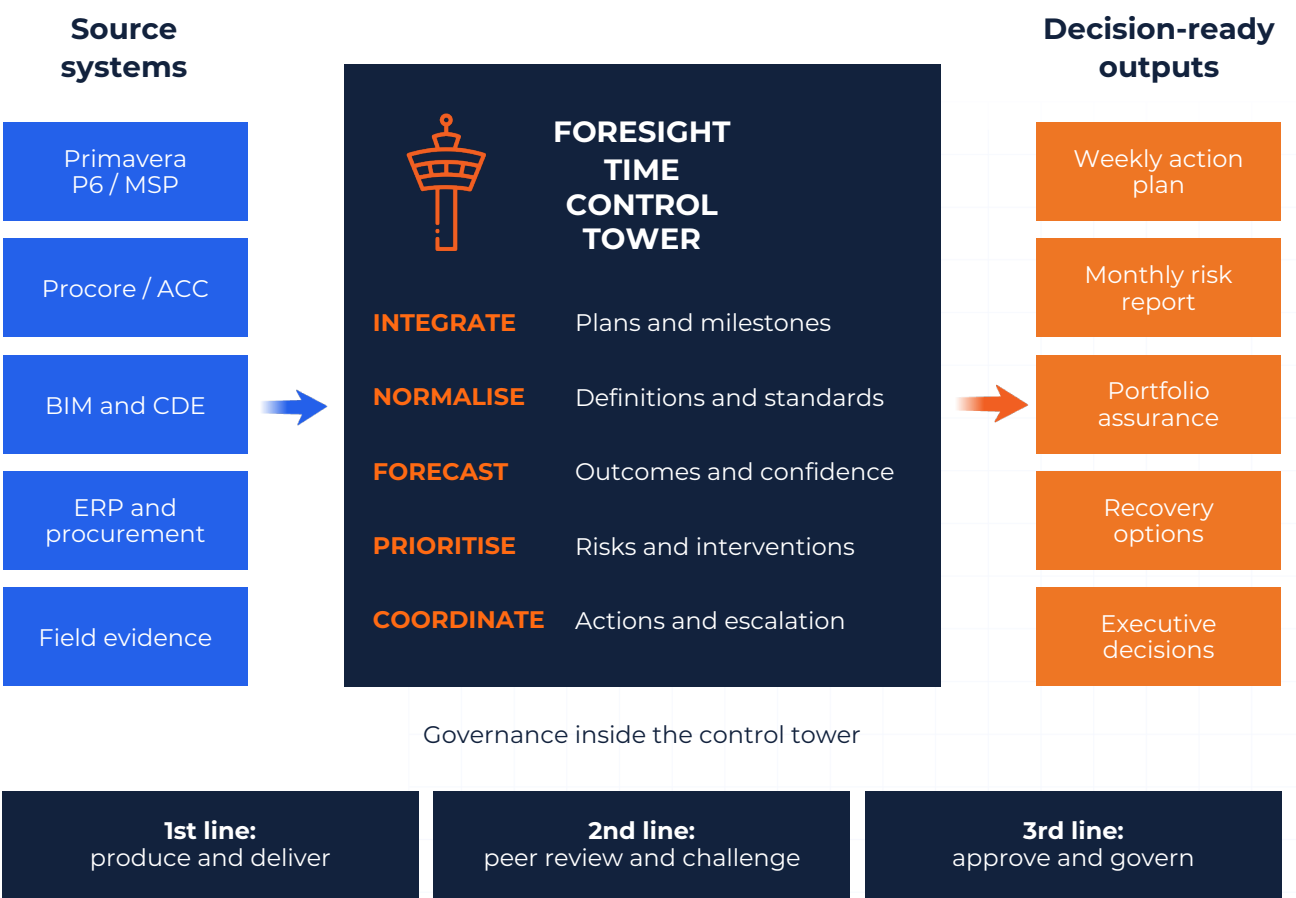


Figure 2.



## 2.1 What the tower is made of, and what it does

The control tower is built in four components, best understood as a sequence rather than a menu. The foundation comes first — the standards, definitions and cadence that make cross-party data comparable at all. The integrated master program is then generated from the source schedules the foundation has made compatible. Second-line control tests what that program claims against physical evidence. Only then can ecosystem-wide insight be produced, because insight drawn from unverified inputs is not insight. The governance position changes at each step, and that change is what preserves role separation and credible challenge.

| Component                              | What it involves                                                                                                                                                                           | Governance position                                                                                                                                          |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Provide the foundation                 | Establish SOPs, templates, best practices, schedule and data standards, operating cadence and SLAs, upskilling and change management, integrations and cybersecurity.                      | The control tower provided the technical design. Delivery parties validate practicality. The owner approves and mandates the foundation.                     |
| Generate the integrated master program | Act as lead editor of the ecosystem-level coordination schedule, combining source schedules across design, procurement, construction, utilities and commissioning into one governing view. | A first-line production and coordination role for this specific artifact. Source parties own their inputs. Owner controls or the PMC peer review the result. |
| Provide second-line on-site control    | Human 360-degree site walks, photographic evidence, computer vision and BIM-to-schedule cross-checks, with optional independent verification of claimed completion.                        | A second-line control over first-line progress updates. Evidence remains traceable to source and exceptions are escalated.                                   |
| Provide ecosystem-wide insight         | Portfolio, progress, risk and schedule-health reporting; diagnostic, predictive and prescriptive intelligence; milestone second forecasts; and recovery and acceleration analysis.         | A shared evidence base used across all three lines. The provider does not approve its own outputs or replace formal independent assurance.                   |

Across those four components the tower performs six functions repeatedly, in every reporting cycle and at every gate.

# Exhibit 1. The six functions of the control tower

| Function   | What it means in practice                                                                                                                                      |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Integrate  | Bring owner, contractor, consultant, OEM, utility and commissioning schedules into a common view of milestones and dependencies.                               |
| Normalize  | Apply consistent definitions for status dates, progress, gates, checkpoints, coding, schedule quality, change and risk thresholds.                             |
| Forecast   | Assess the likely completion date and confidence in key milestones, rather than relying only on the latest contractual date.                                   |
| Prioritize | Separate late but immaterial activities from risks that can affect ready-for-service, customer commitments or capital decisions.                               |
| Coordinate | Turn risks into named actions with owners, deadlines, evidence and escalation routes.                                                                          |
| Learn      | Retain schedule history, actual durations, recurring failure patterns and effective recovery actions so that the next project begins from a stronger baseline. |

## 2.2 From reporting to intervention

The control tower that becomes a more sophisticated reporting factory has failed. Its purpose is to shorten the distance between signal and action. Every useful output — a look-ahead action plan, an acceleration plan, a resequencing recommendation, a forecast revision, an escalation pack — answers five questions:

- 01

What outcome is now most likely?
- 02

What changed, and what is driving the change?
- 03

Which party can act?
- 04

What action has the highest recovery value?
- 05

What requires approval or escalation?

The analysis stays human-in-the-loop. Machine intelligence identifies patterns and options. Delivery experts assess constructability and execute the response. Analytics proposes; delivery expertise validates; governance decides.

# A SYSTEM OF INTELLIGENCE ABOVE THE SYSTEMS OF RECORD

Procore and similar platforms help teams manage work and information. P6 and Microsoft Project hold the detailed plans. The control tower answers a different question: whether the total system will deliver on time, why it may not, and what should happen next.

## WHY THE CONTROL HAS TO SIT OUTSIDE ARM’S REACH

Waking up at five in the morning is an unpleasant thing to do. If you do not set the alarm the night before, the odds of it happening are close to zero. And if the alarm is on the nightstand, the snooze button usually wins. Put it across the room and you have to stand up to silence it — by which point you are already up.

A control tower does both things for a project deadline. It makes sure the alarm is set, in the form of standards and rights agreed before mobilization. And it puts the alarm out of arm’s reach, so that the decision to ignore an early warning has to be made deliberately, in front of other people, rather than quietly at the moment it is most tempting. This is not distrust. It is the ordinary practice of committing in advance to the thing you have already decided you want.

### 2.3 What a control tower does not replace

It does not replace the contractual schedule, the project management consultant, the contractor planner, the owner project director, executive governance or the Independent Engineer and Lender’s Technical Adviser (IE/LTA). It does not make commercial decisions, issue the lender’s independent opinion or assume delivery liability. It supplies the common evidence and the second forecast through which those parties discharge their own responsibilities more effectively.

### 2.4 The compounding advantage of a shared delivery memory

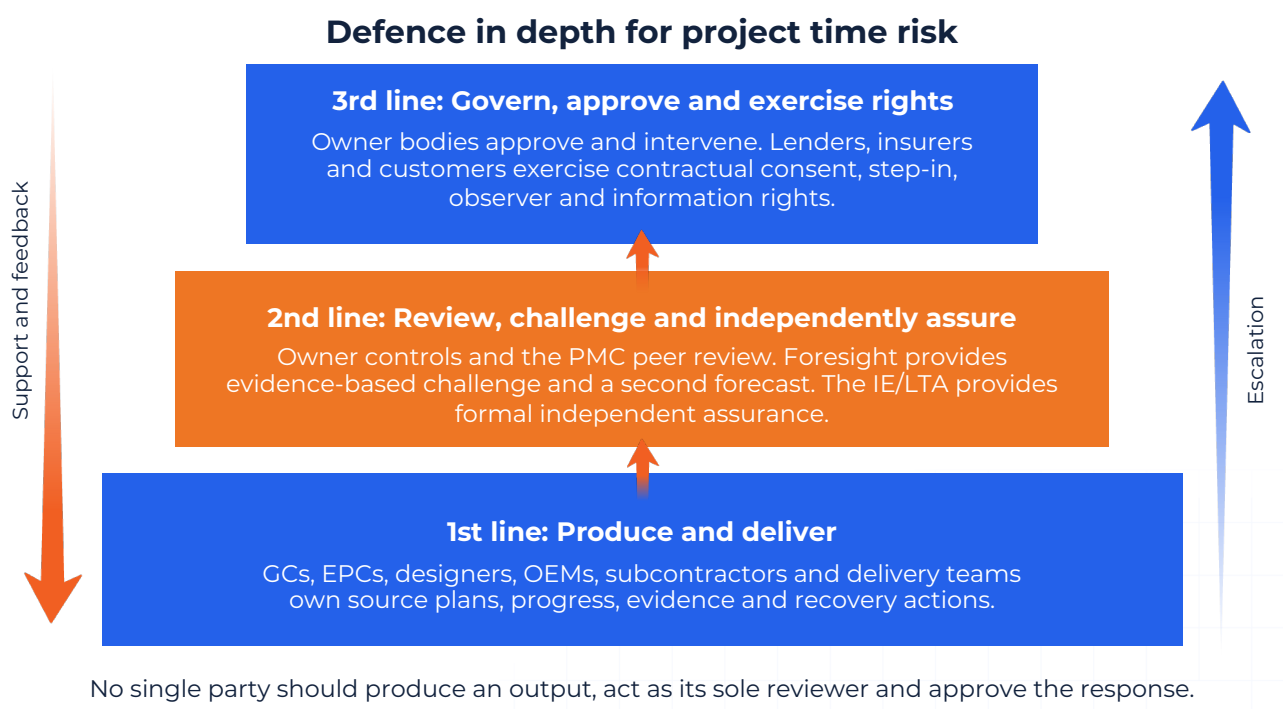
The control tower should become more valuable with every project, because each class of retained evidence feeds a different decision.

| Data retained                           | How the organization becomes smarter                                                    |
|-----------------------------------------|-----------------------------------------------------------------------------------------|
| Baseline and update history             | Builds reference classes for realistic durations, sequence and contingency.             |
| Actual milestone and activity durations | Improves future schedule generation and benchmark challenge.                            |
| Supplier and contractor performance     | Informs procurement choices, buffers, oversight intensity and commercial strategy.      |
| Field evidence and completion criteria  | Improves definitions of progress and reduces false completion reporting.                |
| Risks, causes and interface failures    | Reveals recurring failure patterns across projects and counterparties.                  |
| Recovery and acceleration actions       | Creates a library of interventions with evidence of time gained, cost and side effects. |
| Forecasts versus actual outcomes        | Allows forecast models and governance thresholds to be calibrated continuously.         |

### 3. Governance: the Three Lines Model

Visibility is necessary and insufficient. What determines whether an owner acts on what it can see is the separation of duties around the evidence. The reference framework is the Three Lines Model, published by the Institute of Internal Auditors in July 2020 as an update to the model long known as the three lines of defense. Applied to time, it reduces to three verbs: the first line produces, the second line reviews, and the third line approves — and observes.

The Institute of Internal Auditors, The IIA's Three Lines Model: An Update of the Three Lines of Defense, July 2020. <https://www.theiia.org/en/content/position-papers/2020/the-iias-three-lines-model-an-update-of-the-three-lines-of-defense/>



**Figure 3.** The Three Lines Model operates as layers within the time control tower.

That last point is easy to underweight. Not every party in the third line holds command authority; lenders, insurers and major customers frequently hold observer or information rights instead. Observation alone still changes behavior. Sunlight is the best antiseptic, and a party that knows its reported progress is visible to someone outside the delivery chain reports differently from one that does not.

Each line has a discipline to keep. The first line must not outsource ownership of delivery. The second line is not a shadow delivery organization; its task is to test whether the first-line plan and narrative are supported by evidence. The third line should not attempt to manage thousands of activities; approvers and observers need a concise, reviewed and, where required, independently assured view of likely outcomes, drivers, actions and decisions.

<sup>8</sup> The Institute of Internal Auditors, *The IIA's Three Lines Model: An Update of the Three Lines of Defense*, July 2020. <https://www.theiia.org/en/content/position-papers/2020/the-iias-three-lines-model-an-update-of-the-three-lines-of-defense/>



### 3.1 Why one line is never enough

Four structural paradoxes explain why letting a single party mark its own homework is a predictable failure mode rather than a lapse of character.

**Risk is necessary.** A business must take risks to build, grow and earn a return. The objective is not to eliminate uncertainty, but to identify which risks are being taken, by whom and within what tolerance.

**Responsibility is both individual and collective.** Each participant must manage the risks within its own scope, while the ecosystem must manage the integrated outcome. Individual compliance does not guarantee collective success.

**Individual and collective interests can diverge.** A party may be rewarded for protecting its own scope, commercial position or narrative even when the total project would benefit from earlier disclosure or a different intervention. The answer is not distrust, but trust and verify.

**The span of accountability exceeds the span of control.** Frontline teams may be held accountable for a milestone even though design, customer, utility, supplier or owner decisions sit outside their direct control. They need support, cross-party coordination and top cover, not merely more pressure.

**PROJECTS DO NOT GO WRONG. THEY START WRONG.**

### 3.2 How the three lines work across the lifecycle

The three lines are not sequential phases. They operate simultaneously at every stage, on every material artifact. The matrix below shows how production, review, assurance, approval and information rights can be allocated from strategic definition through use.

It is a working tool rather than a reference table, and the most useful way to read it is as an allocation exercise to run with delivery partners at mobilization. The control tower provider does not have to occupy any of the first-line rows, and in many projects it should not. But somebody must be named in each cell, because ambiguity about who produces, who reviews and who approves is the condition in which delay hides.

| SCHEDULE MANAGEMENT ACTION                                                                                         | FIRST LINE: PRODUCE                                                                                                               | SECOND LINE: REVIEW AND ASSURE                                                                                                                  | THIRD LINE: APPROVE, CONSENT OR OBSERVE                                                                      |
|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Define portfolio standards — schedule levels, gates, checkpoints, coding, reporting, evidence, change and risk     | The provider leads the technical draft with input from delivery parties                                                           | Owner controls or the PMC peer review; the IE/LTA may comment where standards affect capital reporting                                          | The owner approves and mandates; rights holders are informed or consent where required                       |
| Develop the Level 0 program duration and high-level milestones such as NTP and RFS                                 | Owner and PMC develop assumptions; the provider lead-edits the Level 0 program                                                    | Owner controls test duration and milestone logic; the IE/LTA reviews independently                                                              | Owner steering group approves outcomes and tolerance; capital observers receive agreed information           |
| Develop the Level 1 milestone map and reporting framework                                                          | The provider lead-edits with owner, PMC and delivery inputs                                                                       | Owner controls or the PMC peer review against the portfolio standard                                                                            | Owner approves gates and governance; other rights holders exercise contracted rights                         |
| Develop the Level 2 schedule aligned to concept layouts, stakeholders and key decisions                            | Design and delivery teams own source schedules; the provider lead-edits the integrated program                                    | Owner controls or the PMC test interfaces, maturity and integration                                                                             | Owner resolves strategic dependencies; observers receive required reporting                                  |
| Develop Level 3 logic, work packages, long leads and baseline; run Monte Carlo and predictive analysis             | Delivery parties produce and socialize source plans; the provider lead-edits the integrated program                               | Owner controls or the PMC review logic and integration; the IE/LTA forms its own view                                                           | Owner accepts the baseline and key risk response, subject to reserved consent rights                         |
| Expand Level 4 with procurement, fabrication and approvals; update pre-construction progress; run risk elimination | Design, procurement and delivery teams update source plans; the provider updates the integrated program                           | The provider verifies evidence and produces the second forecast; owner controls or the PMC review integration                                   | Owner clears decisions and approves material change; observers are informed                                  |
| Capture field evidence; update P6 with controlled change; issue weekly progress and turnaround reporting           | The GC, PMC and trades update source schedules and execute recovery; the provider maintains the integrated program as lead editor | The provider performs site walks, computer-vision verification and second forecasting; owner controls review; the IE/LTA assures where required | Owner governs exceptions and approves commercial intervention; reserved-matter consents obtained             |
| Align with commissioning phases, track RFS and manage change control                                               | Commissioning and delivery teams own readiness inputs; the provider integrates them                                               | The provider tests the forecast and verifies evidence; owner controls or the PMC peer review; the IE/LTA assesses independently                 | Owner approves readiness, customer communication and material changes; observers exercise contractual rights |
| Collect lessons learned and standardize templates for the next build                                               | Delivery teams validate actuals; the provider compiles the evidence base                                                          | The provider and portfolio controls analyze durations, patterns and standard improvements                                                       | Owner mandates portfolio changes and shares lessons with capital and customer stakeholders                   |



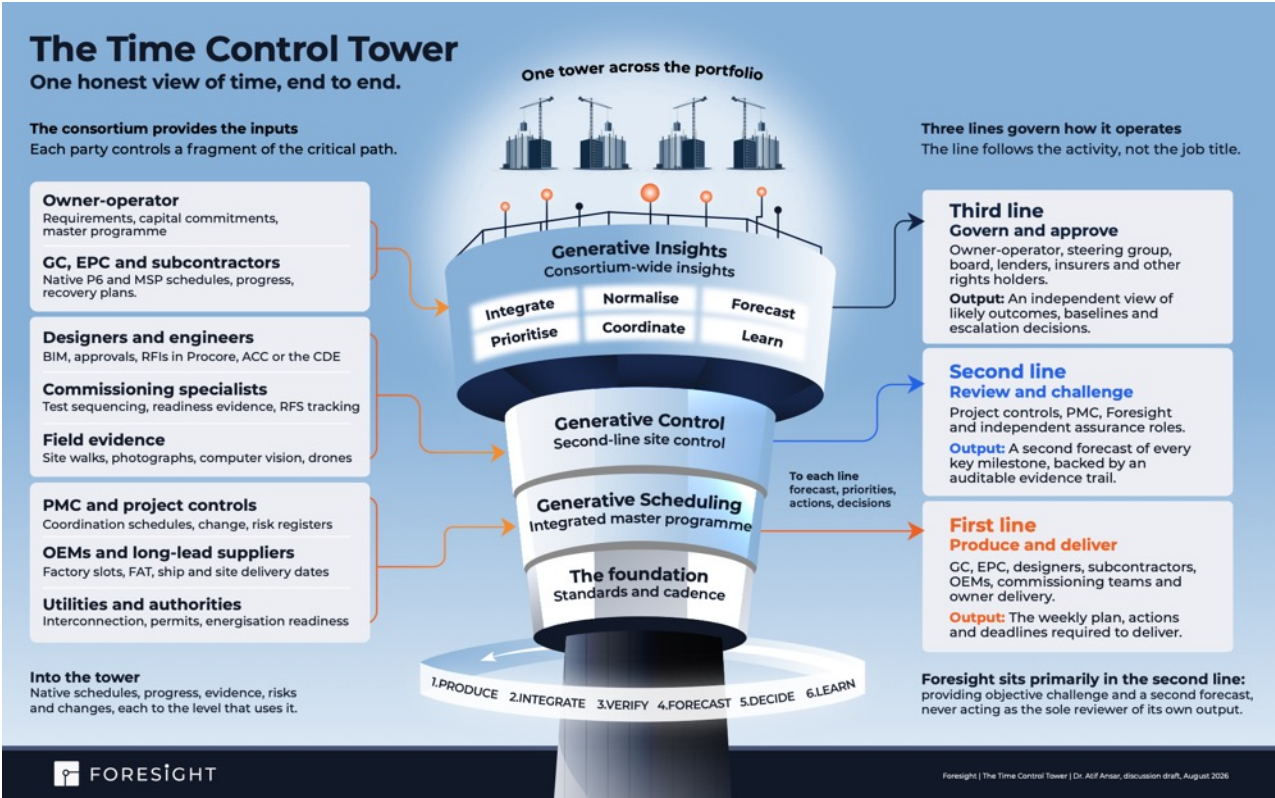
### 3.3 The lines are assigned by activity, not by job title

This is the point most often missed. The same organization can legitimately sit in different lines for different artifacts. A control tower provider may act as lead editor of the integrated master program — a first-line production role for that artifact, with source parties owning their inputs — while simultaneously providing second-line verification of reported site progress. The non-negotiable principle is separation: the same output should not be produced, solely reviewed and materially approved by the same party. Where one organization performs more than one role, the artifacts, people, methods and approval rights must be explicit.

One boundary is worth stating plainly, because capital stakeholders ask about it directly. A control tower provider appointed and paid by the owner is not independent in the legal or project-finance sense; it provides objective, evidence-based challenge and a second forecast. The Independent Engineer and Lender’s Technical Adviser continue to play their role in the third line and remain the source of the formal independent opinion. The control tower does not supplant them — it reduces their information friction, because the same source data, evidence trail and analytics are available for them to form their own view.

### 3.4 What this means for each participant

| If you are                  | What the control tower gives you                                                                                                                                                 | What it asks of you                                                     |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Owner-operator              | One governing view of time; a second forecast you can stand behind with your board and customers; earlier intervention windows; leverage restored to the party carrying the risk | Mandate the standards and secure the data and access rights in contract |
| GC, EPC or PMC              | Fewer competing reports, clearer interface visibility, cross-party support for dependencies you cannot control                                                                   | Native schedule submission, honest progress evidence, early disclosure  |
| Lender, insurer or investor | Traceable evidence behind reported dates; earlier warning of covenant-relevant slippage                                                                                          | Define your information and consent rights precisely                    |
| IE/LTA                      | A shared, auditable evidence base instead of periodic snapshots and incomplete access                                                                                            | Independent challenge of methods, assumptions and conclusions           |
| Hyperscaler or end customer | Credible confidence ranges on service dates rather than binary commitments                                                                                                       | Stability of specification and timely acceptance decisions              |



4. How to establish and run a control tower

The control tower can be established without waiting for a portfolio-wide systems transformation. The practical sequence is to define the governance first, connect the minimum viable evidence base, prove the operating rhythm on one project, and then scale the standards across the portfolio.

Sequence should reflect maturity. An active construction project may begin with the integrated schedule, the evidence protocol and the weekly intervention rhythm, then backfill standards. A new development should establish standards and contractual rights before mobilization.

4.1 A practical sequence

| Phase                             | Timing       | Minimum outputs                                                                                                                                |
|-----------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 0. Mobilize                       | Weeks 0–2    | Named executive sponsor; target project; decision rights; data-access rights; baseline evidence inventory; initial success measures            |
| 1. Establish the foundation       | Weeks 2–4    | Schedule and data standards; milestone taxonomy; reporting cadence; roles across the three lines; escalation thresholds                        |
| 2. Create the governing time view | Weeks 3–6    | Integrated master program; source ownership map; quality review; first second forecast; critical interfaces and risk concentrations            |
| 3. Connect evidence to the plan   | Weeks 4–8    | Progress-evidence protocol; site-walk or image workflow; procurement and design dependencies; controlled change; traceability to source        |
| 4. Run the intervention rhythm    | Weeks 6–12   | Weekly action forum; monthly risk and forecast review; named decisions; owners and deadlines; recovery and acceleration tracking               |
| 5. Calibrate and scale            | From month 3 | Lessons review; forecast calibration; reference-class updates; portfolio templates; contractor onboarding standard; repeatable operating model |

## 4.2 The eleven rights to secure in contract

The operating model depends on rights that are often treated as administrative details until they are needed. The owner should establish them in procurement and contracting rather than relying on goodwill after mobilization.

| Provision Area                    | What the contract or appointment should enable                                                                                    |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Native schedule access            | Submission of native P6, MSP or agreed machine-readable schedule files at defined intervals, not only PDFs                        |
| Common schedule standards         | Compliance with agreed coding, calendars, levels, status dates, milestone definitions, logic and minimum quality requirements     |
| Integrated planning participation | Obligation to provide inputs to the owner-level integrated master program and participate in interface reviews                    |
| Progress evidence                 | Defined evidence for claimed completion, including photographs, system records, quantities or inspection status where relevant    |
| Site and system access            | Reasonable access for agreed site verification, data integration, audit and assurance activities                                  |
| Change notification               | Prompt disclosure of changes that may affect key milestones, logic, procurement, interfaces or completion confidence              |
| Baseline preservation             | Retention of prior baselines and updates so that rebaselining does not erase performance history                                  |
| Forecast and risk disclosure      | Disclosure of assumptions, constraints, known risks and recovery actions supporting reported completion dates                     |
| Data retention and permitted use  | Retention of delivery evidence and clear rights to use project data for owner governance, benchmarking and lessons learned        |
| Escalation and attendance         | Named participation in weekly, monthly and gate reviews, with authority levels defined for material decisions                     |
| Reserved rights                   | Clear owner, lender, insurer or customer consent, audit, information and step-in rights where required by the governing documents |

These are operating requirements, not model legal drafting. Contract language must be adapted to the delivery model, jurisdiction, financing documents and commercial allocation of risk. The [Foresight Schedule Information Rights Specification](#) develops each of these into drafting-ready language.

## 4.3 The milestone hierarchy and stage gates

A control tower requires a milestone hierarchy stable enough for governance but detailed enough to expose interface risk. The integrated master program may contain thousands of activities, but owner governance should focus on a smaller set of gates connecting investment, design, procurement, construction, power, commissioning and customer readiness.

| Stage                     | Illustrative owner-level gates and milestones                                                                                           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Strategic definition      | Site control; power strategy; customer capacity requirement; investment decision; notice to proceed target; ready-for-service target    |
| Design and approvals      | Concept freeze; spatial coordination; major design releases; permitting gates; approved-for-construction packages                       |
| Long-lead procurement     | Specification freeze; purchase order; factory slot; FAT; ship date; site delivery; energization readiness of major electrical equipment |
| Enabling and construction | Site access; civil readiness; building dry-in; rooms ready for equipment; major systems installed; utility interface readiness          |
| Power and commissioning   | Permanent power available; energization gates; system commissioning complete; integrated systems testing; reliability demonstration     |
| Customer and handover     | Customer readiness; documentation complete; operational acceptance; ready for service; final handover                                   |

Each gate should have a defined owner, entry criteria, required evidence, forecast confidence and approval authority. The milestone set should be consistent across the portfolio while allowing project-specific additions. The *Data Center Milestone and Stage-Gate Framework* provides the full taxonomy and governance templates.

## 4.4 Operating cadence

Governance works when it is repeated at the speed of the risk.

| Cadence                       | Control tower output               | Primary users                                         | Purpose                                                                            |
|-------------------------------|------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------|
| Weekly or bi-weekly           | Look-ahead action plan             | Project managers, subsystem leads and delivery teams  | Priority milestones, blockers, named actions and overdue commitments               |
| Monthly                       | Schedule quality assessment        | Planners and project controls                         | Logic, coding, change discipline, schedule quality and required corrections        |
| Monthly                       | Progress and risk report           | Project controls, PMCs and project directors          | Progress, forecast milestones, trends, risk density, change and required decisions |
| Quarterly or at major gates   | Portfolio assurance                | Executives, owner leadership and capital stakeholders | Cross-project comparison, confidence in key dates and systemic risks               |
| As needed                     | Forensic or recovery analysis      | Commercial, controls and delivery leadership          | Baseline versus actual, delay drivers, recovery options and responsibility         |
| At project close and annually | Reference-class and lessons review | Portfolio community of practice                       | Actual durations, recurring risk patterns, template updates and future standards   |

Reports should pass through the appropriate line before reaching senior leadership or external rights holders: the first line validates factual accuracy, the second line performs peer review and evidence-based challenge, and owner decision-makers receive a concise, pre-vetted view while lenders, insurers and customers receive the information to which they are entitled. This prevents both unfiltered detail and management reporting sanitized beyond usefulness.

## 4.5 Decision architecture and management forums

The control tower creates value only when information is attached to a decision. Each recurring forum should therefore be designed around the decisions its participants are authorized to make, rather than around a generic status presentation.

A practical structure is small and decision-led: a weekly delivery and recovery forum for near-term interventions; a monthly integrated risk and forecast forum for cross-party issues and material decisions; stage-gate reviews at defined lifecycle points; and an executive or investment forum for changes to capital, customer commitments, risk appetite or baselines.

The test is the same in all four. Every forum should name the decision it exists to make, the authority that makes it, and the evidence required before it is made — a rebaseline approval, for example, needs preserved history, exhausted recovery options and a new forecast. The *Control Tower Decision Rights and Forum Framework* maps each recurring decision to its forum, authority and evidence set, with sample agendas, RACI and escalation thresholds.

## 4.6 How to tell whether it is working

A control tower should be evaluated on outcomes, not activity. Six measures:

|                                                                                                                                        |                                                                                                                             |                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>01</b><br><b>Forecast accuracy over time</b> — is the variance between the second forecast and the actual milestone date narrowing? | <b>02</b><br><b>Warning lead time</b> — how many weeks earlier is a material risk now surfacing than it did before?         | <b>03</b><br><b>Evidence-verified progress</b> — what proportion of claimed completions survive independent verification? |
| <b>04</b><br><b>Recovery run rate</b> — what share of agreed recovery actions are closed on time?                                      | <b>05</b><br><b>Rebaseline frequency and cause</b> — is it falling, and is the stated cause supported by preserved history? | <b>06</b><br><b>Reporting overhead</b> — how much manual effort now goes into producing the view, versus acting on it?    |

## 5. Evidence from practice

### 5.1 A global data center owner, its PMC and GC

The challenge was not a shortage of data. The project had a detailed schedule and established delivery organizations. The challenge was converting schedule complexity into a shared understanding of which milestones were at risk, which underlying activities and predecessors were driving that risk, and where the owner needed to intervene.

The control tower focused the review on key milestones, then traced performance through the activities and predecessor relationships beneath them, so that the owner and PMC saw the same evidence at the same level of detail rather than debating separate interpretations of the schedule.

| Control tower role | How it applied                                                                                                                                                                             |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| First line         | The GC retained responsibility for the detailed plan, delivery and corrective action.                                                                                                      |
| Second line        | The PMC and Foresight reviewed milestone performance, underlying logic and evidence, and identified a concerning risk.                                                                     |
| Third line         | The owner used the reviewed evidence to escalate immediately and hold the GC accountable. Lenders, insurers or customers would have received the information required by their agreements. |

The owner’s response was immediate: the information was sufficiently concerning to raise with the GC straight away, avoiding delay exposure measured in millions. The PMC highlighted the value of moving from the headline milestone into the activities and predecessors that explained its true performance. Evidence-based analysis did not displace the contractor or PMC; it made their roles clearer.

## 5.2 A global data center portfolio: 15 projects

Across a 15-project portfolio, one project was found to be 245 days behind. Reporting overhead was reduced by 90%, from USD 2 million to USD 200,000, and more than USD 100 million of lost revenue was prevented.

## 5.3 A US owner, its prime contractor and a full-lifecycle deployment

This implemented collaboration with a US data center owner and its prime contractor shows how the model can operate across the full project lifecycle and then scale across a portfolio. The objective was to support growth without losing control of quality or timelines, establish consistent contractor data and schedule standards, and feed lessons from early projects into future builds.

The operating model combined all four components. Foresight helped establish the foundation, acted as lead editor of the ecosystem-level integrated master program in the first line, provided second-line site control and progress verification, and supplied insight for third-line work — while remaining accountable to the owner and separate from formal independent assurance. Because every party benefited from the completion deadline being met, that common evidence base helped align incentives around the integrated outcome. The owner retained approval and governance; the prime contractor, which also supplied the PMC and delivery organization, retained responsibility for delivery inputs and execution; and the IE/LTA could use the same evidence base for independent assurance.

| Lifecycle stage       | How the lines were allocated                                                                                                                                                                         | Outcome                                                                                    |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Strategic definition  | The owner and PMC provided the Level 0 assumptions; Foresight lead-edited the Level 0 program; owner controls and the IE/LTA reviewed as required                                                    | A common definition of the outcome before detailed planning began                          |
| Preparation and brief | Foresight led the technical draft of gates, coding, reporting, evidence and risk standards; delivery parties validated it; owner controls and the PMC peer reviewed; the owner approved and mandated | Repeatable governance across projects and contractors                                      |
| Concept design        | Design and delivery teams owned the Level 2 source inputs; Foresight lead-edited the integrated program; owner controls and the PMC reviewed                                                         | Design and delivery commitments connected early                                            |
| Spatial coordination  | Foresight lead-edited the Level 3 baseline from party inputs and ran Monte Carlo analysis; owner controls and the PMC peer reviewed; the IE/LTA reviewed independently                               | A constructible baseline with a second forecast and an independent capital-assurance route |
| Technical design      | First-line teams updated Level 4 procurement, fabrication and approval dates; Foresight updated the integrated program and verified evidence; owner controls reviewed                                | Design, procurement and manufacturing risk brought into one time view                      |
| Construction          | Delivery teams updated and recovered; Foresight performed site walks, computer-vision verification, second forecasting and prioritization                                                            | A weekly loop from physical evidence to action, escalation and assurance                   |
| Handover              | Commissioning teams owned readiness inputs; Foresight integrated them and produced the second forecast; owner controls and the PMC reviewed                                                          | One governing view of readiness and customer commitment                                    |
| Use and next build    | Foresight and portfolio controls analyzed the evidence; delivery teams validated it; the owner mandated improvements                                                                                 | Continuous improvement rather than repeated reinvention                                    |

Source note: this section describes an implemented client operating model. Client and PMC names are withheld for confidentiality. Named customer references can be provided later in a mature procurement process, subject to client consent, so buyers can verify the implementation and claims.

Acceleration followed the same principle. High-value activity groups were identified from proximity to the critical path, float, duration and network criticality. The delivery team then tested constructability and site feasibility, and the owner approved any additional capital, commercial change or customer commitment.

## 6. Six failure modes to avoid

### 1. Fragmented planning.

Delivery is divided across specialist organizations, each responsible for its own scope, schedule and commercial obligations, while the critical path rarely respects those boundaries. Sponsors are left with a collection of contractor schedules built for different purposes, at different levels of detail, on different assumptions — and no view that reliably tests whether all parties can converge on the required date.

### 2. Interfaces that fall between organizations.

Each party may perform its own scope competently while the dependencies between them create delay that no single organization sees or owns. Interface risk is structurally unowned unless somebody is appointed to own it.

### 3. Commitments made ahead of the evidence.

Boards, investors and customers are given dates before the underlying program is mature enough to support them — creating pressure to defend a fragile commitment rather than reassess it.

### 4. Rights negotiated too late.

Access to native schedules, design systems, field evidence, progress data and the site itself should never be assumed. If those rights are not established before mobilization, the sponsor retains ultimate accountability while progressively losing the information required to govern.

### 5. Rebaselining that erases history.

Repeatedly resetting the schedule makes the current plan look credible while deleting the record of how performance actually evolved. It weakens accountability and destroys organizational learning.

### 6. Reporting instead of intervening.

Teams become increasingly sophisticated at explaining what has already gone wrong while remaining weak at identifying what must happen next. The signals exist across schedules, field evidence, procurement systems and risk registers, but never reach decision-makers early enough, or precisely enough, to change the outcome.

## THE DESIGN TEST

For every material activity, ask four questions. Who produces it? Who separately reviews or assures it? Who has authority to approve or intervene? Who has consent, step-in, observer or information rights? If the same party controls production, sole review and approval, the ecosystem has a governance weakness — regardless of how good the reporting looks.

# Conclusion

The optimal data center delivery ecosystem is time-centric. The owner-operator remains at the center, delivery partners remain responsible for execution, separate controls provide challenge, the IE/LTA provides formal independent assurance where required, and governance bodies retain authority.

Foresight is the control tower that connects these roles through four components: the governance foundation, the integrated master program, second-line on-site control and ecosystem-wide insight. Its value is not another schedule or dashboard, but a common, forward-looking and evidence-based understanding of time linked directly to decisions — and, as the evidence base accumulates, a delivery memory that improves planning, supplier challenge, forecasting and recovery across the portfolio.

The Three Lines Model sits within that control tower. It prevents the concentration of production, review and approval in one party, while recognizing that lenders, insurers and customers may hold consent, step-in and information rights rather than delivery approval authority. The system is strongest when the second forecast and evidence trail can be tested by the IE/LTA and acted on by the owner.

In high-stakes construction, the real risk is not complexity. It is being too late to act.

## Companion tools

Three companion resources expand this paper into implementable detail:

- [Foresight Schedule Information Rights Specification \(FSIRS\)](#) — the control tower contracting checklist and model schedule of provisions, developing the eleven rights in section 4.2 into drafting-ready language
- *Data Center Milestone and Stage-Gate Framework* — milestone taxonomy, evidence requirements and governance templates
- *Control Tower Decision Rights and Forum Framework* — sample agendas, RACI and escalation thresholds

Each is available at [foresight.works](https://www.foresight.works) as it is published; remaining links will be added in the next edition of this paper.

# About Foresight

Foresight is the digital Chief Time Officer for major infrastructure programs.

The company's Predictive platform helps owners and operators protect schedule value, accelerate time-to-revenue, and improve delivery certainty across large-scale capital projects. By combining predictive analytics, project intelligence, and one of the world's largest datasets of planned versus actual project outcomes, Foresight enables organizations to identify emerging risks earlier, make better decisions, and deliver critical infrastructure faster.

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# Appendix A. Participants in the data center delivery ecosystem

| Participant                                       | Primary objective                                                                                                              | Common time risk                                                                                                       |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Owner-operator                                    | Integrate customer, capital, design, procurement, construction, utility and operational requirements                           | Fragmented contracts, weak standards, inaccessible schedules and late cross-party escalation                           |
| Hyperscaler or end customer                       | Receive capacity that meets technical, sustainability and service-date commitments                                             | Aggressive timelines, changing specifications and delayed acceptance                                                   |
| Investors, lenders and insurers                   | Protect return, liquidity and downside exposure through predictable delivery and consent rights                                | Delay, cost escalation, weak forecast confidence and poor visibility                                                   |
| Independent Engineer / Lender's Technical Adviser | Provide formal independent technical due diligence, monitoring and opinion for capital stakeholders                            | Periodic snapshots, incomplete access, unclear scope, duplicated controls or reliance on untested management reporting |
| GC, EPC and construction manager                  | Deliver contracted scope safely, efficiently and within agreed milestones                                                      | Design maturity, labor constraints, access, sequencing and inherited dependencies                                      |
| Subcontractors and trades                         | Complete specialist installation in the required sequence                                                                      | Trade stacking, predecessor delay, incomplete work fronts and resource competition                                     |
| Design and engineering consultants                | Develop coordinated, compliant and buildable design                                                                            | Late decisions, design change, procurement mismatch and approval bottlenecks                                           |
| PMC and project controls                          | Coordinate the program, review integration and challenge performance                                                           | Responsibility without authority, stale data and becoming a shadow delivery team                                       |
| OEMs and long-lead suppliers                      | Manufacture and deliver compliant equipment to required dates                                                                  | Long lead times, specification change, fabrication slippage and obsolescence                                           |
| Commissioning specialists                         | Validate systems, coordinate integrated testing and demonstrate readiness for service                                          | Late system completion, incomplete documentation, test-sequencing conflicts and insufficient commissioning float       |
| Environmental consultants                         | Secure and maintain environmental compliance, permits, surveys and mitigation requirements                                     | Late surveys or permits, seasonal constraints, mitigation requirements and design changes affecting approvals          |
| Community engagement and stakeholder relations    | Maintain constructive relationships with local communities and support consultation, access and social license to operate      | Late consultation, unresolved concerns, access restrictions and objections affecting approvals or sequencing           |
| Utilities and authorities                         | Provide power, water, telecoms, permits and statutory acceptance                                                               | External dependencies, approval timing and infrastructure readiness                                                    |
| Control tower provider                            | Provide the foundation, lead-edit the integrated master program, perform second-line site control and supply ecosystem insight | Role ambiguity, being treated as formal independent assurance, or acting as sole reviewer of an output it produced     |

# Appendix B. Glossary

| Term                      | Definition                                                                                                                                                    |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CDE                       | Common data environment — the shared repository for project documents, models and information                                                                 |
| Ecosystem                 | The full set of organizations that must converge on a single completion date. Sometimes formalized as a consortium, more often assembled contract by contract |
| IE / LTA                  | Independent Engineer / Lender’s Technical Adviser — the formal independent technical opinion relied on by capital stakeholders                                |
| Integrated master program | The single owner-level coordination schedule combining source schedules across design, procurement, construction, utilities and commissioning                 |
| Level 0 to Level 4        | Schedule levels from portfolio milestones (Level 0) to detailed activity-level plans (Level 4)                                                                |
| NTP                       | Notice to proceed                                                                                                                                             |
| PMC                       | Project management consultant                                                                                                                                 |
| RFS                       | Ready for service — the date on which the facility can accept customer load                                                                                   |
| Second forecast           | A forecast of key milestones produced independently of the contractual forecast, from the same evidence base                                                  |
| Three Lines Model         | The IIA governance framework separating production (first line), review and assurance (second line), and approval, consent or observation (third line)        |
| Watermelon project        | A project reported green at the surface while the integrated outcome is red underneath                                                                        |