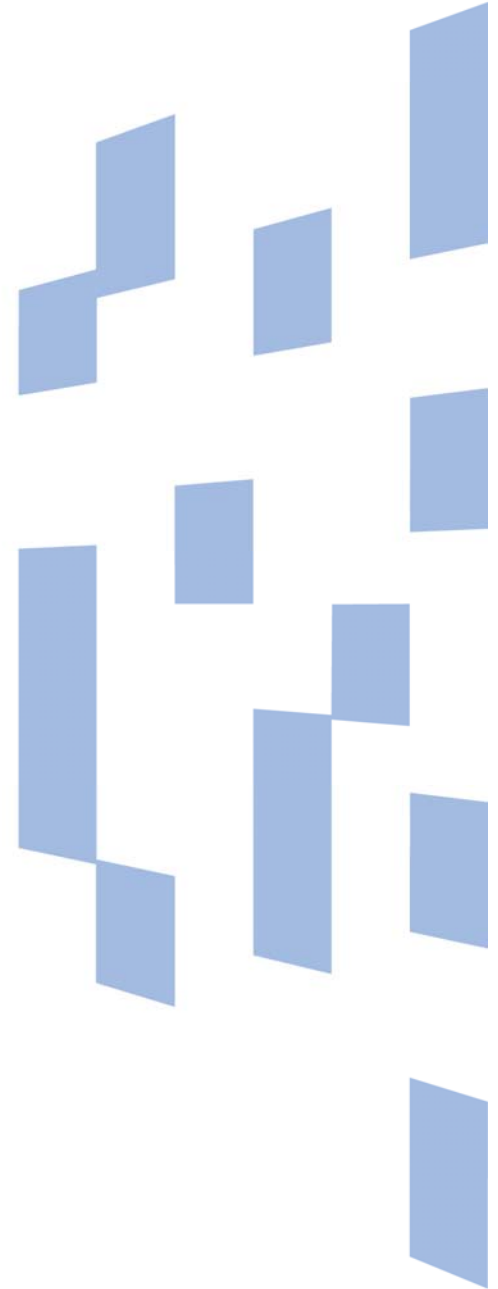




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## The Real Datacentre Timeline



71 FENCHURCH STREET, LONDON  
EC3M 4BS, UK  
TEL +44 (0) 20 7954 9100  
FAX +44 (0) 20 7702 4874  
WWW.DIGITALREALTYTRUST.COM

UNIT 9, BLANCHARDSTOWN CORPORATE PARK  
BLANCHARDSTOWN, DUBLIN 15, IRELAND  
TEL +353 (0)1 245 0660  
FAX +353 (0)1 245 0601  
WWW.DIGITALREALTYTRUST.COM



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Despite the current issues surrounding today's economic climate the demand for datacentre space continues to escalate. In Digital Realty Trust's most recent market survey of Fortune 2000 businesses 86% of respondents indicated that they will be adding capacity in the next 12 to 24 months.

Ironically, this rush for space has been fueled in large measure by the economic downturn. The push to reduce costs through datacentre consolidation and increased merger and acquisition activity has only compressed the timeframes that CIO's have to deliver new facilities.

This pressure to deliver datacentres in an ever shorter period of time has prompted many companies to re-evaluate their traditional mode of "Do it Yourself" (DIY) site development with a specific focus on the length of time required for project completion.

In order to make an educated decision as to whether to build a new facility themselves, or use a wholesale datacentre provider, decision makers need to understand the real datacentre timeline.

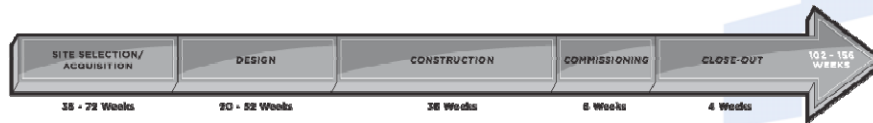
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**Bernard Geoghegan, Senior VP, International Operations,  
Digital Realty Trust**



## The Components of Building a Datacentre

Building a datacentre is a non-trivial exercise with a great deal of inherent risk if each of the elements that are associated with its development are not fully understood and administered by experienced personnel. The basic components that characterise any datacentre development timeline fall into five (5) specific areas:



**5 components of the data centre timeline:**  
Site selection and acquisition  
Design  
Construction  
Commissioning  
Close-out

### *Site Selection and Acquisition*

In this portion of the timeline companies must determine their requirements, and identify and procure the physical site.

### *Design*

During the design phase of the timeline, firms must quantify their level of risk tolerance and determine if they want to build the required resiliency into the site. This period also focuses on developing the master plan, schedules, budgets, hiring consultants, contractors and obtaining necessary permits.

### *Construction*

The construction portion of the timeline is the longest of the entire development process. It is also the area most prone to cost overruns and contingency payments due to equipment delays and use of non-standard components and processes.

### *Commissioning*

Throughout the five (5) levels of commissioning all of the systems components are tested at their maximum load volumes and the interoperability between systems must also be verified.

### *Close-Out*

During close-out all punch list items must be identified and corrected. All operational procedures and processes must be documented and in place, and all support personnel trained and certified.

How Long Does it Take?



Although timeframes may vary slightly between organisations attempting to acquire and build their new datacentre themselves these deviations tend to be relatively small. Each of the components that will be described below require specific skill sets and experience that may, or more typically, may not reside within an organisation. This lack of expertise is not meant as a disparagement to today's IT organisations but is rather a statement of fact, as the majority of companies are not structured to build multiple datacentres annually. Since each component of the development timeline has its own specific elements and timeframes it is important to examine each individually:

**Site selection and Acquisition**  
DIY = 36 – 72 weeks  
Wholesale = 12 - 36 weeks

*Site Selection and Acquisition (DIY 36-72 weeks, Wholesale Provider 12-36 weeks)*



**A site isn't selected as much as it is the end result of an elimination process in which all unsuitable alternatives are cast aside**

This phase of the timeline begins with determining the business requirements of the site and then aligning the associated physical capabilities that are necessary to support them. From here the actual selection process begins. It is important to note that site selection is actually a misnomer. A site isn't selected as much as it is the end result of an elimination process in which all unsuitable alternatives are cast aside. Unfortunately, this process usually always starts from scratch because no one in the company is regularly monitoring the availability of suitable properties in key markets as is the case with wholesale providers. Thus, potential markets must be identified, suitable locations found and evaluated to begin the process of acquiring the most desirable site.

Once the site is identified it then must be acquired. There is no substitute for real estate expertise at this point. Understanding the prevailing rates within the market and the legal, environmental, and insurance requirements necessary to facilitate the sale are all critical during the negotiations to acquire the site. This level of expertise should also extend down to the various covenants, zoning and planning considerations at the local level. In many instances what is permissible in one city (generator location for example) may not be the same in the next city over. Not having this level of local knowledge at your disposal can lead to extensive delays in construction from both a time and cost standpoint.

**Design**  
DIY = 20 – 52 weeks  
Wholesale = 2 - 10 weeks

*Design (DIY 20-52 weeks, Wholesale Provider 2-10 Weeks)*





The design process needs to achieve a balance between the four “special forces”, risk, design, operations and cost

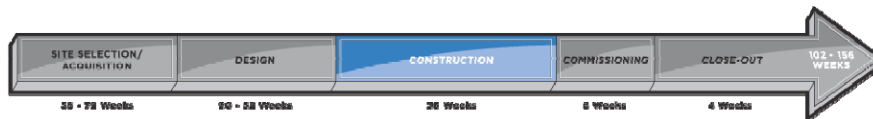
Designing a datacentre must embrace the concept of achieving a balance between the four “special forces”, risk, design, operations and cost, (see Special Forces white paper at <http://www.digitalrealtytrust.com/knowledge-library-LP.aspx>) of the datacentre. This balance is reflected in the company’s decision as to how much it is willing to pay to mitigate potential business impacting risk scenarios. Whether they elect to address these issues by building remedies into the facility or handling them operationally, the design of the facility must reflect these business-driven decisions. In order to make these essential determinations your organisation must include individuals with datacentre design, construction and operations experience.

As part of the design phase of the timeline the following components are developed and agreed upon:

- Site plans
- Schematics
- Schedules
- Budgets

The issue that often arises in relation to these items in DIY projects is that most companies have no standard processes and procedures to govern these efforts so each project that is undertaken literally begins at the whiteboard. This is opposed to the approach used by some wholesale providers that views the data centre as a commodity that is built using a standard architecture with a fixed bill of materials and standard construction and operations processes and procedures. The end result of the wholesale approach is a dramatic reduction in the time required for data centre design as each project begins with a standard product platform rather than a blank slate.

**Construction**  
DIY = 36 weeks  
Wholesale = 18 weeks



*Construction (DIY 36 weeks, Wholesale Provider 18 weeks)*

The construction phase of the data centre timeline is fraught with pitfalls that can easily escalate the cost (and delay the delivery) of a Do it Yourself data centre. In order to avoid the myriad of issues that may arise during the construction of the site, an organisation must possess a high degree of expertise in data centre design and construction as well as operations. From a cost standpoint there are two (2) major areas that can quickly put your project’s budget in jeopardy:

- 1) Component costs



Two (2) major areas that can quickly put your project's budget in jeopardy:  
**Component costs**  
**Design variances**

## 2) Design Variances

### *Component Costs*

Since most organisations that follow the DIY model only build a new datacentre every 3-5 years they lack purchasing power. Components like generators, UPS, etc., are purchased in low volumes that result in little of any discount being applied by the manufacturer. This situation is diametrically opposed by that of wholesale providers who purchase these same units in quantities large enough to receive not only optimised pricing but favorable delivery terms as well. In many instances the cost of a component purchased in a DIY scenario is quickly eclipsed by the associated fees (and schedule impact) incurred due to a delay in the delivery of a generator or PDU. Through their ability to enter into volume purchase agreements with manufacturers, many wholesale providers benefit from precise delivery schedules and the ability to work with their vendor to modify manufacturing slots to receive a necessary component earlier than it would otherwise be available.

### *Design Variances*

Another factor that can dramatically impact the duration of the construction phase is the identification and assembly of contractors and sub-contractors that will actually build the site without standard processes and procedures. Firms employing the DIY model must institute these processes anew with each project that they undertake. The issue that typically arises from this lack of standardisation is a regular series of design variances to accommodate unforeseen issues. Additional costs resulting from contractor contingencies are the end product of these fluctuations in design. Since many wholesale providers build multiple datacentres in a market annually they are able to leverage long term contractor agreements and use their own field tested processes and procedures to guide the construction process and eliminate unforeseen variances, delays and cost overruns.

**Commissioning**  
**DIY = 6 weeks**  
**Wholesale = 4 weeks**



*Commissioning (DIY 6 weeks, wholesale provider 4 weeks)*

Commissioning a datacentre is an essential element necessary to ensure the facility will operate at the highest possible level of reliability. Full commissioning is a five (5) phase process that tests all datacentre components and systems in a progressive fashion. Level five (5)



**Full commissioning (Level 5 Commissioning) is a five (5) phase process that tests all datacentre components and systems in a progressive fashion**

commissioning is particularly important in environments that are to be built out “modularly”. Only a modular approach in which each module is a discrete unit featuring its own power and mechanical architecture can be reliably tested at this level. Other modular approaches often rely on a shared backplane architecture (power and mechanical) that cannot be effectively tested for system reliability as the failure of a backplane element can bring down all attached modules. This makes achieving reliability levels of five (5) 9’s virtually impossible.

A third party agency is required to conduct a true commissioning of the datacentre whether it is built as a DIY project or a wholesale provider. The primary difference in the time required to complete this phase is due to the existing relationship that wholesale providers have with these testing firms. Perhaps more importantly than the reduced time element, is the familiarity gained by the testing agency in commissioning the standards-based facilities completed by wholesale providers. This repetition in the testing process allows commissioning to take place in an environment with known specifications and thresholds versus their varying DIY counterparts.

#### Clarifying the Risks

As evidenced by the issues discussed earlier, the extended timeframe associated with DIY datacentre projects makes this a less than desirable option in today’s time sensitive environment. However, it is important that the underlying risks associated with this mode of datacentre fulfillment also be understood as they are assumed in their entirety by firms electing to build their own datacentres.

#### *Financial Risk*

Datacentre projects are capital intensive by nature and have substantial impact on the corporate income statements and balance sheet. Long term depreciation schedules can exceed the life of the datacentre and force companies to carry it as a non-performing asset on its income statement for years. For example, if the finance department elects to depreciate the datacentre over 39 years but correspondingly you decide the site is good for only 20 years, this may make a decision to build the site yourself look attractive but you’ll be paying for a good portion of its assets for another 19 years. These costs would also not include any additional capital charges you incurred to replace any of the original components. The end result is that the company pays for a dead asset on its balance sheet for almost 20 years! Also when comparing “apples to apples” versus 20 year lease options, you may artificially give one advantage over another.

#### *Time Risk*

**Consider the risks for the data centre project:**

- Financial Risk**
- Time Risk**
- Expertise risk**



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As previously stated, the demand for datacentre space far exceeds supply. Mergers and acquisitions are only continuing to drive a consolidation trend that makes “time to market” for firms to move into new datacentre facilities more critical than ever. On average, Do it Yourself solutions take 40% to over 250% longer to complete than their wholesale provider delivered alternatives.

## *Expertise Risk*

Since most DIY projects are performed only every 3 to 5 years the majority of organisations do not have the design, construction and operational expertise to deliver a professional “best-in-class” facility. This lack of in-house experience typically manifests itself in costly overruns during the build-out phase and less than satisfactory site operations that drive up costs and reduce your level of uptime.

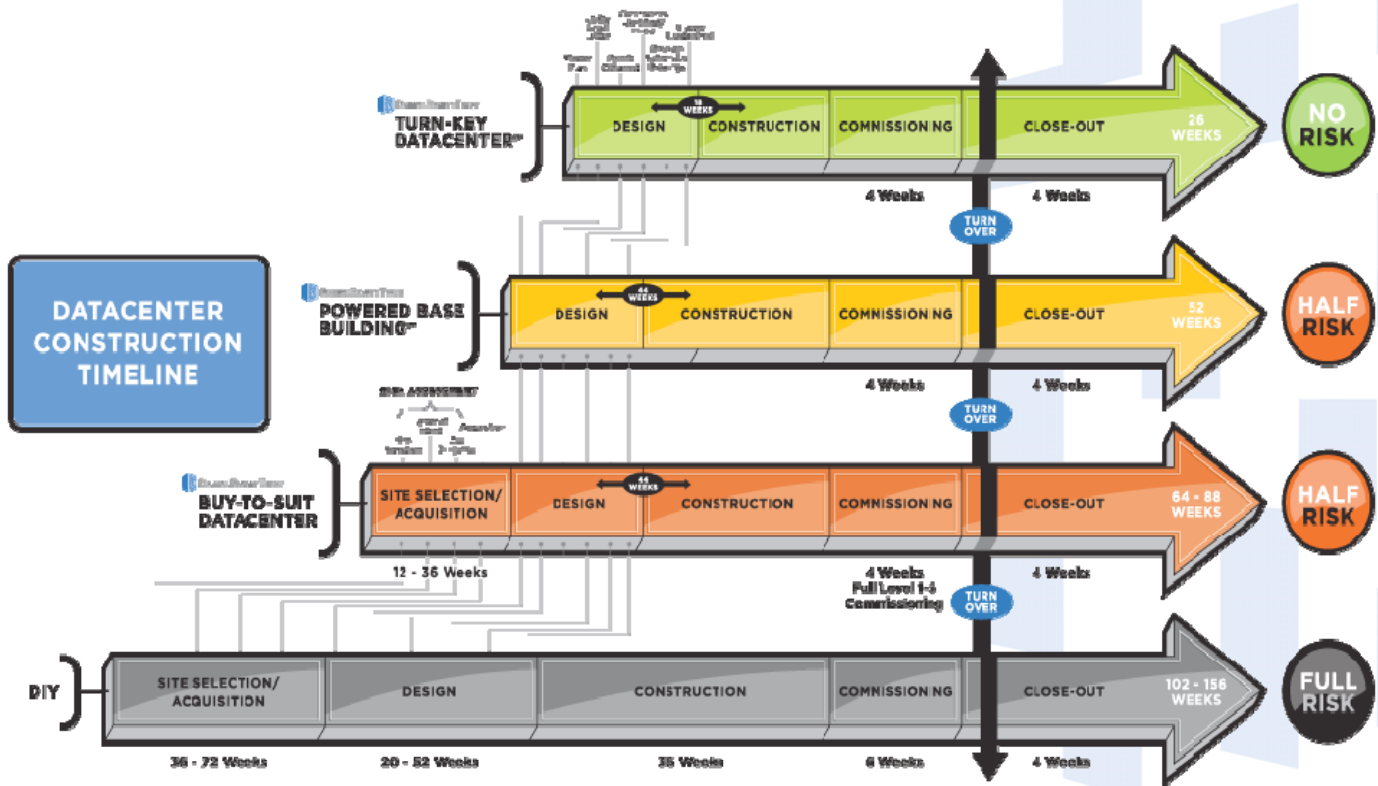
## Wholesale Alternatives...Accelerating the Timeline, Reducing the Risks

Products provided by wholesale providers, like Digital Realty Trust, leverage the expertise gained in building multiple datacentres annually to offer customers products that dramatically reduce the timeline and the risks associated with DIY projects. For example, our Powered Base Buildings<sup>®</sup> and Turn-Key Datacentres<sup>®</sup> products provide clear product flexibility for customers and we are able to build both in less than 26 weeks. Powered Base Buildings<sup>®</sup> are designed for companies that possess the ability to build out and operate the facility on their own. Since Digital Realty Trust builds out the shell of the facility including the utilities, fibre and planning approvals, the overall risk associated with these projects, particularly in the areas of finance and time, is cut in half.



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Move-in ready Turn-Key Datacentres® are the most efficient alternative to the DIY model. Even if one is not currently available it can be completed in 26 weeks or less (some as quickly as 16 weeks), all of the risks associated with finance, time to market and expertise are taken off the shoulders of customers. By using our standard POD Architecture® and Gating Process® each Turn-Key facility is built to a defined standard with local partners to eliminate costly construction cost overruns and schedule



delays due to equipment unavailability. Operational expertise is also eliminated as a risk factor since fully trained and certified Digital Realty Trust personnel operate the facility in conjunction with standardised Critical Facilities Management® tools.



## Summary

Time to market is becoming increasingly important to today's IT professionals. Cost reduction demands driven by existing consolidation strategies that are being exacerbated by merger and acquisition activity and, unfortunately, layoffs will only continue to cultivate this trend. This new emphasis on speed necessitates that the DIY model must be viewed in a new light. The inherent limitations of organisations in the areas of real estate, design, construction and operations give birth to DIY developmental timelines of two years or more with the company carrying all risk liability. Products like Powered Base Buildings<sup>®</sup> and Turn-Key Datacentres<sup>®</sup> that can be delivered in 25% of the time to offer customers faster and substantially less risky "construction to production" alternative to DIY solutions.



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## About Digital Realty Trust

Digital Realty Trust, Inc. owns, acquires, redevelops, develops and manages technology-related real estate. The Company is focused on providing Turn-Key Datacentre<sup>®</sup> and Powered Base Building<sup>®</sup> datacentre solutions for domestic and international tenants across a variety of industry verticals ranging from information technology and internet enterprises, to manufacturing and financial services. Digital Realty Trust's 79 properties, excluding one property held as an investment in an unconsolidated joint venture, contain applications and operations critical to the day-to-day operations of technology industry tenants and corporate enterprise datacentre tenants. Comprising approximately 1.4 million rentable square metres (14 million rentable square feet), including 190,000 square metres (1.9 million square feet) of space held for redevelopment, Digital Realty Trust's portfolio is located in 27 markets throughout Europe and North America. For additional information, please visit Digital Realty Trust's website at <http://www.digitalrealtytrust.com>.