

Pervasive Datacenter Architecture (PDx™)

OPTIMIZING RETAIL DATA EXCHANGE

DESIGN GUIDE

CONTENTS

2	Using This Guide	7	PDx Methodology	12	PDx Design Model
3	Storyboard	8	PDx Step 1: Plan	13	PDx Toolkit
4	PDx Strategy Model	9	PDx Step 2: Identify	14	Value Impact
5	Current State Constraints	10	PDx Step 3: Map	15	Platform and Enablement
6	Future State Capabilities	11	PDx Step 4: Deploy	17	Integrated Checklist

CURRENT STATE CHALLENGES

Data gravity poses a significant challenge to traditional IT infrastructures within the retail industry. Typical problems with current architectures include:

- + Fragmented architectures constraining performance
- + Not designed for responsive hybrid-cloud data access
- + Compliance difficult to maintain with data sprawl
- + Sources of data not being unlocked to fully enable analytics

CALL TO ACTION

This Design Guide is intended as a companion to the Optimizing Retail Data Exchange Blueprint found in the Pervasive Datacenter Architecture (PDx™) library.

Leverage this guide and the companion blueprint to build your centers of data exchange designed to:

- + Optimize data exchange between users, things, networks and clouds
- + Maintain data compliance and sovereignty
- + Enable real-time intelligence across workflows

OVERVIEW

EXECUTIVE SUMMARY

The digital world is reshaping the retail industry, transforming and enhancing the consumer experience and creating new ways to optimize intelligence for competitive advantage.

To succeed, retail firms require a business platform that:

- + Operates ubiquitously and on-demand
- + Augments workflows with real-time intelligence
- + Serves customers, partners and employees via digitally-enabled interactions across all channels, business functions and points of business presence

To enable this business platform retail companies require a data-centric infrastructure architecture designed to:

- + Defy data gravity;
- + Secure data near the customer;
- + Enforce data compliance, and is
- + Engineered for artificial intelligence (AI)

The global data center platform to enable this is PlatformDIGITAL®

USING THIS GUIDE

This guide is intended for:

- + Business Strategists
- + Technology Leaders
- + IT Architects
- + Those responsible for the design and implementation of technology solutions

This design guide is intended as a companion to the Optimizing Retail Data Exchange Blueprint found in the Pervasive Datacenter Architecture (PDx™) content library.

The PDx library contains blueprints, architectural patterns and design guides for common building blocks and use cases.

Together, these assets provide a roadmap for the successful deployment of solutions to real-world digital transformation use cases. They cover critical steps and important considerations when architecting and implementing.

To obtain a copy of the blueprint and other documents related to PDx™, please visit: www.digitalrealty.com/PDx-Library

STORYBOARD

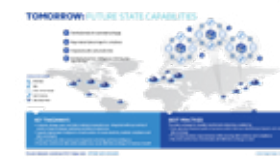
SET CONTEXT



Strategic considerations, recommendations and what is driving them



Current state constraints and challenges with data exchange



Future state capabilities and objectives of an optimized data exchange architecture

APPLY METHODOLOGY



Introducing PDx™ methodology, aligning business requirements with technical objectives



Checklists to ensure PDx steps are executed and required information is collected



Point of presence strategy aligned to business requirements and objectives

DESIGN SOLUTION



PDx™ methodology and library to support activation of optimized data exchange



Advantages unlocked by optimizing data exchange



Experience and capabilities to assist you on your digital journey

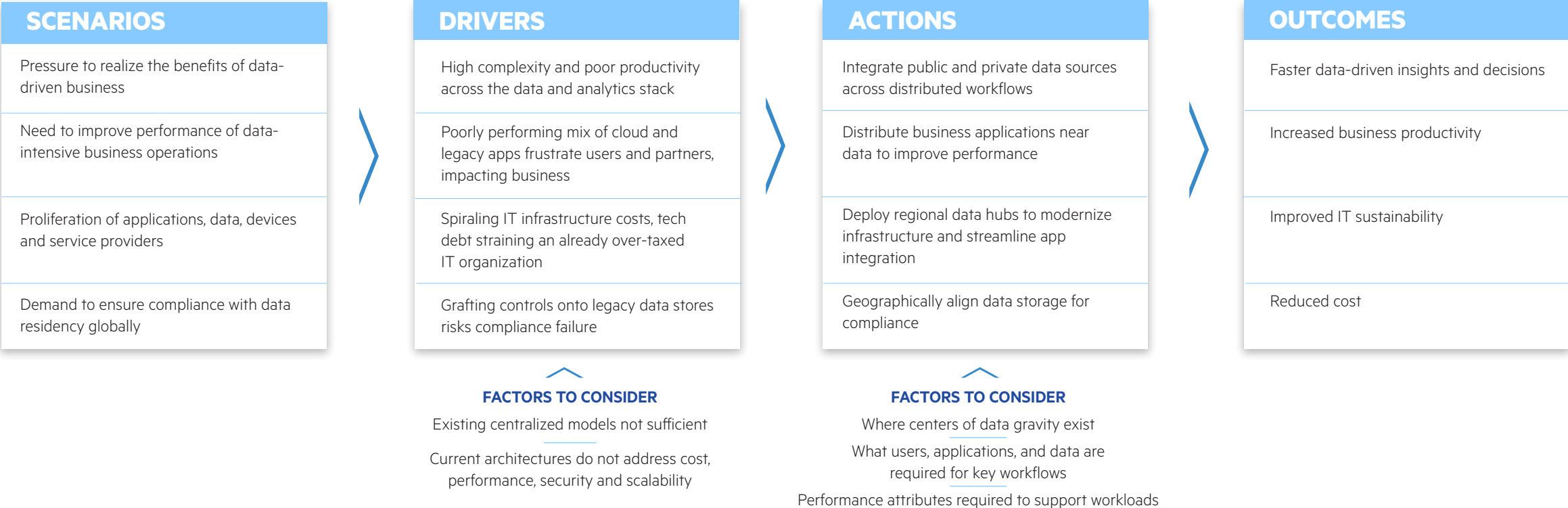
KEY TAKEAWAYS

Retail organizations require a new data infrastructure architecture that localizes data aggregation, staging, analytics, streaming and management at global points of business presence. PDx™ methodology helps you to :

- + Triangulate business, infrastructure and architecture requirements to determine data availability and retention requirements by location
- + Create portfolio view of applications and workloads with data sources to tailor infrastructure deployments for in-motion/at-rest data exchange
- + Enable global workflows and integrate ecosystems with distributed data management hosted at points of B2B data exchange

This improves performance and data compliance control necessary to support exploding volume, variability and velocity of data creation, processing and storage to accommodate digital business. The strategy brings the users, networks, systems and controls to the data, which removes barriers of data gravity and creates centers of data exchange to scale digital business.

STRATEGY MODEL: OPTIMIZE DATA EXCHANGE



KEY TAKEAWAYS

The digital economy is remaking retail organizations, transforming how they create and deliver value.

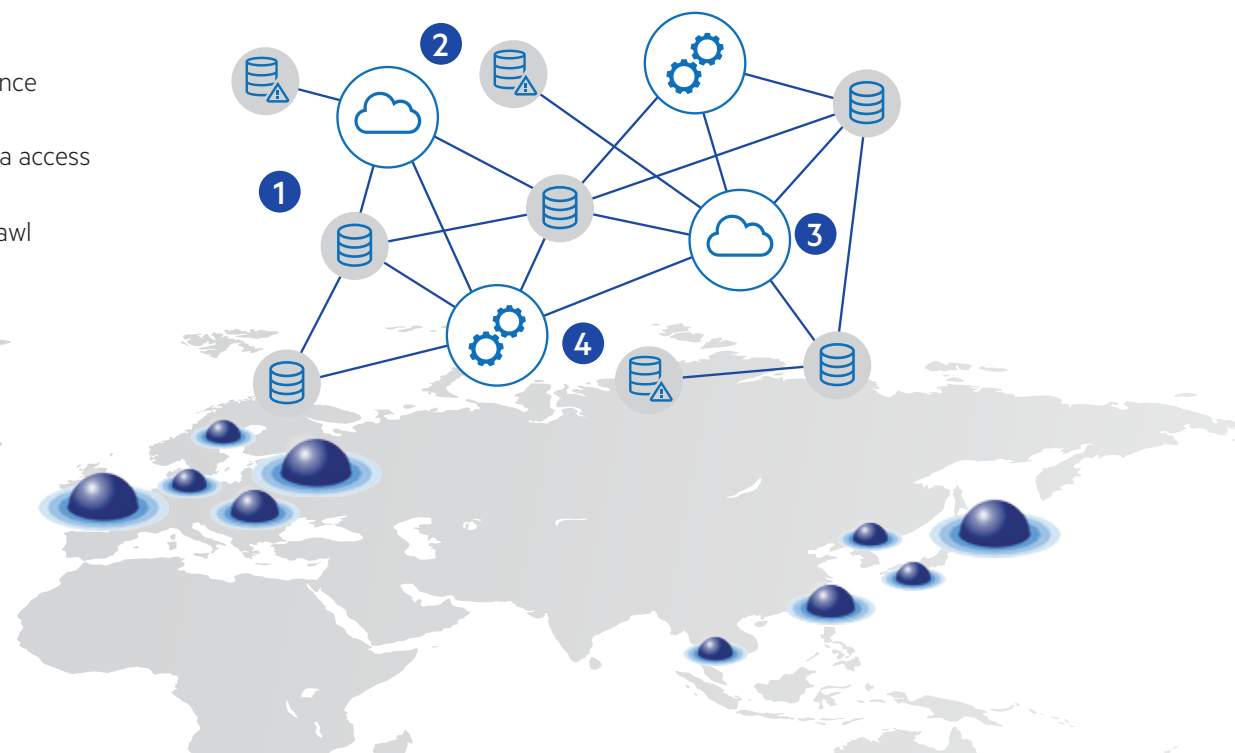
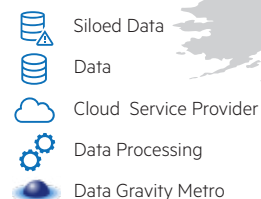
- + Operate ubiquitously – meet the customer in their market
- + Service on-demand – real-time is the new reality
- + Augment systems with real-time intelligence

Retail organizations need to serve customers, partners and employees across all channels, business functions and points of business presence. This is forcing IT to implement a decentralized infrastructure which removes data gravity barriers to accommodate distributed workflows which vary by participant, application, information and location specific needs. Combine this strategy with PDx™ methodology and blue-prints to optimize data exchange, enabling distributed workflows at global points of presence.

TODAY: CURRENT STATE CHALLENGES

- 1 Fragmented architectures constrain performance
- 2 Not designed for responsive hybrid-cloud data access
- 3 Compliance difficult to maintain with data sprawl
- 4 Sources of data not being unlocked

Optimize Data Exchange



KEY TAKEAWAYS

- + Retail organizations are too often driven to point solutions that accumulate over time, resulting in fragmented architectures burdened by significant technical debt
- + Cloud connectivity is typically inefficient, undermining the value of both cloud applications and local data
- + Storage sprawl originates from conflicting cost and compliance challenges
- + Siloed data creates barriers to new business opportunities and the analytics that enable them






BEST PRACTICES

- Recognize the gaps in this architecture. The problems with this approach include:
- + Architecture – lacks a consistent and coherent foundation to enable data exchange
 - + Cloud – uses inefficient connectivity to connect data and applications
 - + Storage – data storage and access methods to drive sprawl and cost
 - + Analytics – data not unlocked to enable new business models based on data

TOMORROW: FUTURE STATE CAPABILITIES

- 1 Distributed data for optimized exchange
- 2 Regionalized data storage for compliance
- 3 Integrated public and private data
- 4 Distributed business intelligence unlocking new opportunities

Optimize Data Exchange

-  Siloed Data
-  Data
-  Cloud Service Provider
-  Data Processing
-  Data Gravity Metro



KEY TAKEAWAYS

- + Compute, storage, users, and data creation/consumption are integrated within proximity of centers of data exchange, optimizing workflow & experience
- + Capacity deployment is aligned to cloud locations to create elasticity, maintain compliance and data sovereignty
- + Public and private data sources are integrated, unlocking real time intelligence
- + Proactive control over data estate enables new, secure B2B data exchange for business benefit

BEST PRACTICES

- True data exchange for digitally transformed retail organizations, enabled by:
- + Hubs placed at business points of presence, where there are identified participants and centers of data exchange
 - + IT increases business responsiveness while ensuring data residency, compliance and security
 - + Plan data architectures intentionally with B2B data exchange in mind

A PROVEN APPROACH: PDx™ METHODOLOGY



KEY TAKEAWAYS

PDx™ provides a methodology and repeatable strategy to enable retail firms to:

- + Plan distributed workflows where your customers/partners/employees engage
- + Identify users, apps, data, and things that will participate in distributed workflows
- + Map workload types with performance attributes to ensure a performant quality of experience
- + Deploy fit for purpose footprints to support the organization

BEST PRACTICES

- + The digital business supports new models that require a new IT architectural approach, incorporating a holistic view of business and technical requirements
- + Apply this model to each use case to optimize data exchange for workflows that vary by location, type and participant
- + Apply the output of the PDx™ approach against established architectural blueprints from the PDx™ library to create a tailored IT plan for optimizing data exchange

PDx STEP 1

PLAN Zones of Data Exchange



Checklist

ACTION	ACTION STEP	COMPLETE
1 DOCUMENT LOCATIONS	<ul style="list-style-type: none">• Legal Presence• Employee Concentration/Branch Office• Ecosystem Partners• Regional Headquarters	<input type="checkbox"/>
2 DETERMINE WORKFLOWS	<ul style="list-style-type: none">• Revenue• Risk & Regulatory• Collaboration/Decision Support• General Purpose	<input type="checkbox"/>
3 BUILD WORKFLOW OPERATIONAL PROFILE	<ul style="list-style-type: none">• Priorities x Workflow x Location• Downtime acceptable• Data loss acceptable	<input type="checkbox"/>

KEY TAKEAWAYS

To optimize data exchange, first plan distributed workflows at business points of presence requiring centers of data exchange

Three main actions:

- + Document Locations
- + Determine Workflows
- + Build Workflow Operational Profile

BEST PRACTICES

- + Location-based design enables the correct data source and sink placement for user, partner and customer facing use-cases
- + Understanding workflows, and placing emphasis on revenue, risk and regulatory workflows and designing from that perspective solves for business requirements first instead of as an afterthought
- + An optimized data exchange architecture begins with an inversion of traditional architectures, bringing key people, applications and things to the data

PDx STEP 2

IDENTIFY Distributed Workflow Participants



Checklist

ACTION	ACTION STEP	COMPLETE
4 DOCUMENT USERS	<ul style="list-style-type: none">• Employees• Customers• Ecosystem• Things	<input type="checkbox"/>
5 DOCUMENT APPLICATIONS	<ul style="list-style-type: none">• Applications and supporting services• Data repositories and data types	<input type="checkbox"/>
6 DETERMINE WORKLOADS	<ul style="list-style-type: none">• Latency sensitive (i.e. Interactive)• Throughput sensitive (i.e. Distribution)• Scale sensitive (i.e. Analytic)• Security sensitive (i.e. Ecosystem)	<input type="checkbox"/>

KEY TAKEAWAYS

Optimizing data exchange requires you to identify users, apps, data and things that will participate in distributed workflows

Three main actions:

- + Document users (and user types)
- + Document applications (and supporting data repositories)
- + Document workloads (and their characteristics)

BEST PRACTICES

- + Designing around users and what they are using is critical in order to avoid performance and security issues that can plague legacy architectures
- + Determining the workloads to be supported and to what data they require access is key to architecting for optimized data exchange in the environment
- + Document the data requirements to ensure compliance with regulatory issues, and to ensure that all dependencies are satisfied before deployment decisions are made

PDx STEP 3

MAP Workloads and Performance Attributes



Checklist

ACTION	ACTION STEP	COMPLETE
7 WORKLOAD ATTRIBUTES	<ul style="list-style-type: none">• Concurrency and messaging behaviors• User or event-driven workflow• Compute and I/O dependencies• Policy enforcement requirements	<input type="checkbox"/>
8 SIZE WORKLOAD	<ul style="list-style-type: none">• Daily workload volumes• Size and variability of data sets, files, content• Exception-based processing needs• Response time, availability, priority tiers	<input type="checkbox"/>
9 WORKLOAD PROFILE	<ul style="list-style-type: none">• Sensitivities x Attributes x Sizing• Cross reference with workflow profile• Combine reference with participant profile	<input type="checkbox"/>

KEY TAKEAWAYS

- Successfully optimizing data exchange requires mapping types with performance attributes to support participants in distributed workflows
- Three main actions:
- + Determine workload attributes
 - + Size workloads based on key characteristics
 - + Create workload profiles to inform infrastructure requirements

BEST PRACTICES

- + Consider carefully the requirements for workloads (including dependencies between workloads) interaction with data to ensure that performance targets can be met
- + When sizing workloads, be mindful of dataset sizes and time of day considerations to avoid performance problems that can result from concurrency or oversubscription
- + A comprehensive workload profile considers both priority and performance and takes into account the business criticality of the workflow that a given workload supports

PDx STEP 4

DEPLOY

Fit for Purpose Footprints



Checklist

ACTION	ACTION STEP	COMPLETE
10 PROFILE DETAILS	<ul style="list-style-type: none">• Workflow Profile (type(s), priority, location, downtime, data loss)• Participant Profile (users, applications, data sources)• Workload Profile (type, attributes, sizing, dependencies)	<input type="checkbox"/>
11 DETERMINE DEPLOYMENT	<ul style="list-style-type: none">• Public Cloud w/adjacent datacenter• Hybrid Cloud w/adjacent datacenter• Private Cloud w/adjacent datacenter	<input type="checkbox"/>
12 SELECT FOOTPRINT	<ul style="list-style-type: none">• Network Hub• Control Hub• Data Hub• SX Fabric	<input type="checkbox"/>

KEY TAKEAWAYS

Deploy fit for purpose footprints matched to workflow profiles & workload attributes interconnecting participants at centers of data exchange zones to enable distributed workflows

Three main actions:

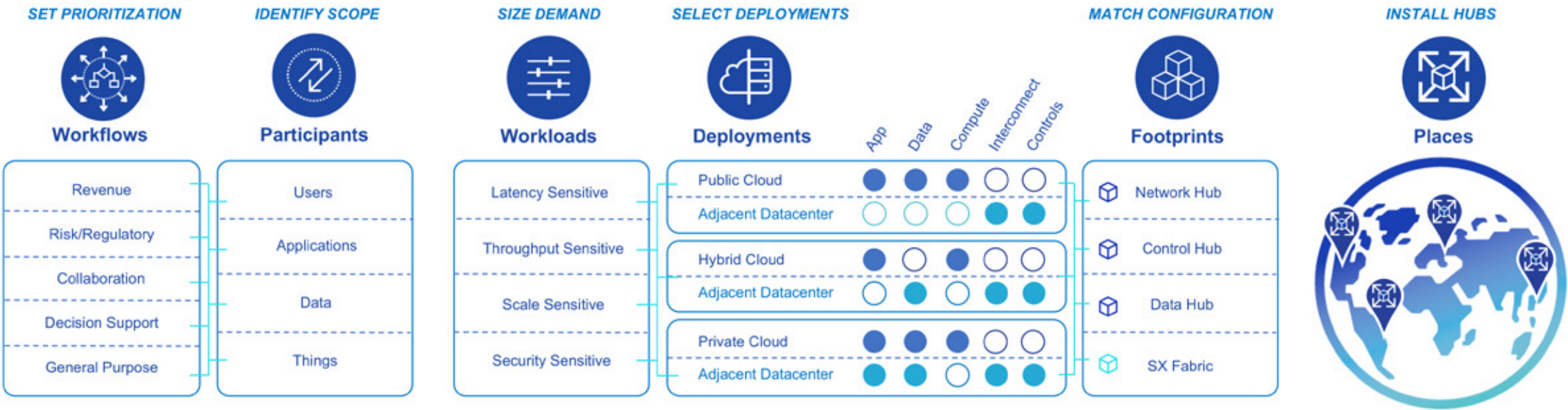
- + Aggregate Profile Details
- + Determine Deployment Strategy
- + Select Footprints

BEST PRACTICES

- + For each workload, determine whether it will be supported by public, private or hybrid cloud, and what scale will be required to support the workload profile
- + Determine what services are needed to support the workload, including network and security services, and determine if they will be in-cloud or adjacent to the cloud
- + Select the footprints required to support the deployment - for example, in addition to a Data Hub it is likely that a Control Hub will be deployed to provide security and a Network Hub to provide optimized access to the data sources in the Data Hub

DESIGN MODEL: Optimized Digital Workplace Deployment

MAP DEMAND PROFILE → MATCH SUPPLY DEPLOYMENT CONFIGURATION → DEPLOY ZONES



KEY TAKEAWAYS

In the previous steps, you have mapped the demand profile of the workflows, participants and workloads. Now you must select deployments and match the configuration of supporting footprints. Use the design model to select appropriate footprints and be certain to factor in the architectural standards of your organization in the deployment. With this data, you now can deploy complete digital points of presence in key centers of data exchange. It is typical to have multiple footprints deployed in multiple zones in order to support the demands of your workloads and couple complimentary or supporting services. This point of presence strategy that incorporates these elements is how the PDx methodology drives success.

TOOLKIT: Methodology and Blueprint

PDx™ METHODOLOGY



PDx™ Optimizing Retail Data Exchange BLUEPRINT



KEY TAKEAWAYS

Optimizing Retail Data Exchange requires leveraging the entire PDx Toolkit. PDx is a library, consisting of strategy, methodology, blueprints and architectural patterns designed to inform, codify and expedite your IT deployments. The Optimizing Retail Data Exchange Blueprint outlines the three simple steps needed to enable a digital workplace:

- + Implement data staging/aggregation to maintain compliance and data sovereignty
- + Integrate public/private data sources to optimize data exchange between users, things, networks and clouds
- + Host data and analytics adjacent to network ingress/egress points to enable real-time intelligence across distributed workflows locally and globally

By applying the PDx methodology along with using the Optimizing Retail Data Exchange Blueprint, you will create a target state architecture tailored to your specific requirements.

VALUE IMPACT



OPTIMIZE DATA EXCHANGE BETWEEN USERS, THINGS, NETWORKS & CLOUDS

- Host secure data lakes/warehouses
- Integrate public/private data sources
- Eliminate network-centric backhaul challenges



MAINTAIN DATA COMPLIANCE & SOVEREIGNTY, AND IMPROVE PRIVACY & SECURITY

- Provide a single global data platform of secure, compliant data centers
- Host data locally between cloud & edge
- Lower risk and reduce effort required for audit and compliance validation activities
- Reduce risk with secure data exchange



ENABLE REAL-TIME INTELLIGENCE ACROSS WORKFLOWS

- Host data & analytics adjacent to network control points
- Remove performance limitations with data-centric architecture
- Distribute business intelligence within proximity of users and data

KEY TAKEAWAYS

Using the Optimizing Retail Data Exchange Design Guide and Blueprint to determine data placement and interconnection, you can achieve this type of value. Data Gravity forces a new architecture, one that inverts traffic flow and brings users, networks and clouds to privately hosted enterprise data. This means that data needs to be hosted locally whether it is in the public or a private domain. With this new architecture, Data Gravity barriers are removed, and new capabilities and growth opportunities are unlocked.

YOUR PARTNER: Platform and Enablement

PlatformDIGITAL®



FIT FOR PURPOSE INFRASTRUCTURE

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FIT FOR PURPOSE INTERCONNECTION

Optimize right-size connectivity via a fabric of physical and virtual direct interconnections to whom they need on PlatformDIGITAL®



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600+ Cloud and IT Providers
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PROVEN EXPERIENCE

PDx™ Blueprint – Solution Enablement Workshop

PDx™ WORKSHOP



PDx™ TOOLKIT



SCOPE

- + Pre Workshop Call
- + ½ Day Workshop
- + 2 Week Elapsed Time

DELIVERABLES

- + Tailored Blueprint
- + Value Model Strawman

BENEFITS

- + Identify Optimization Opportunities
- + Accelerate Time to Value
- + Compress Time to Execute

Combining our PDx™ methodology, blueprints and the power of PlatformDIGITAL® can solve for the needs of digital transformation.

Our expert Solution Architects can help accelerate your transformation with workshops built to leverage the PDx™ methodology, customized to your unique requirements.

Send an email to workshop@us.digitalrealty.com to coordinate your workshop (include “Workshop” in the subject line).

PROCESS MODEL

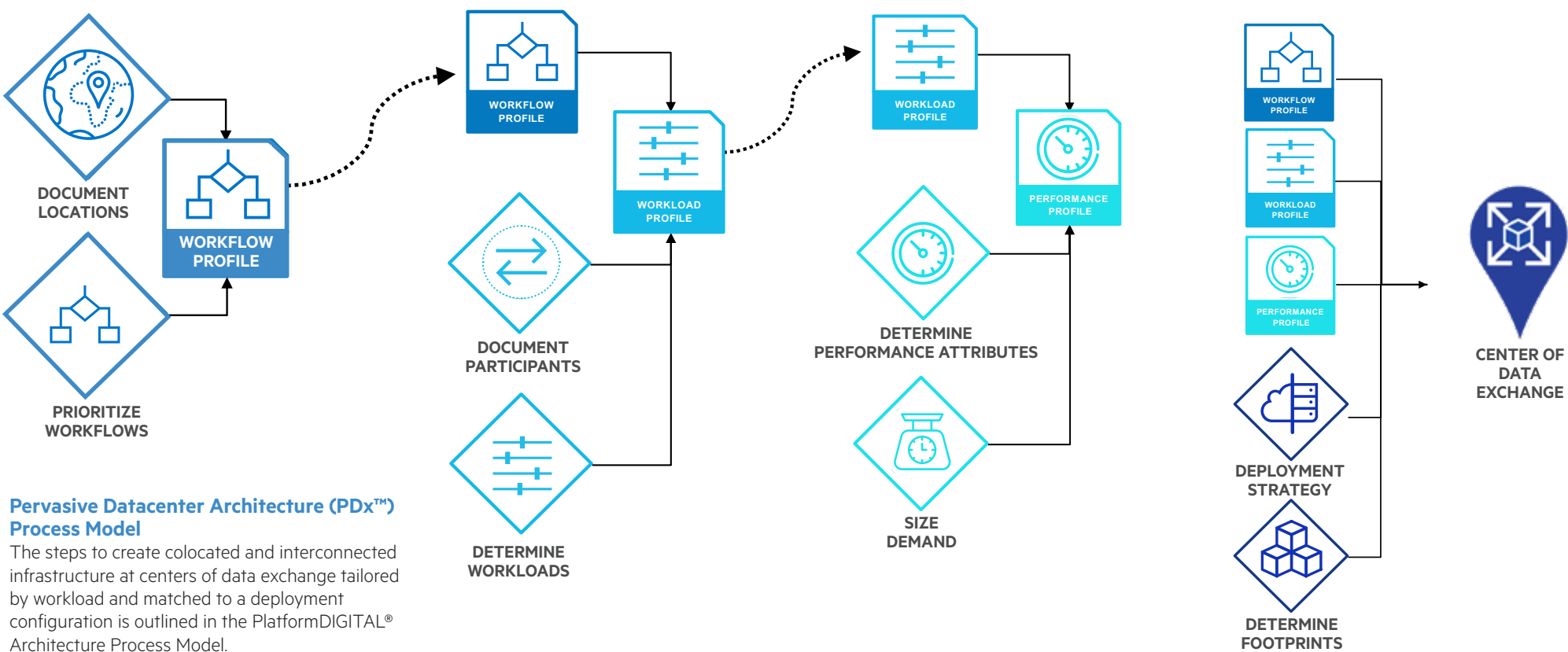


Plan distributed workflows at **business points of presence** requiring centers of data exchange.

Identify the **users, applications, data and things** that will participate in distributed workflows.

Map workload types with **performance attributes** required to support participants in distributed workflows.

Deploy **fit for purpose** footprints **matched to workflow profiles and workload attributes** interconnecting participants at centers of data exchange zones to enable distributed workflows.



INTEGRATED CHECKLIST



Checklist

ACTION	ACTION STEP	COMPLETE
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2 DETERMINE WORKFLOWS	<ul style="list-style-type: none"> Revenue Collaboration/Decision Support General Purpose <ul style="list-style-type: none"> Risk & Regulatory 	<input type="checkbox"/>
3 BUILD WORKFLOW OPERATIONAL PROFILE	<ul style="list-style-type: none"> Priorities x Workflow x Location Downtime acceptable Data loss acceptable 	<input type="checkbox"/>
4 DOCUMENT USERS	<ul style="list-style-type: none"> Employees Customers <ul style="list-style-type: none"> Ecosystem Things 	<input type="checkbox"/>
5 DOCUMENT APPLICATIONS	<ul style="list-style-type: none"> Applications and supporting services Data repositories and data types 	<input type="checkbox"/>
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12 SELECT FOOTPRINT	<ul style="list-style-type: none"> Network Hub Control Hub <ul style="list-style-type: none"> Data Hub SX Fabric 	<input type="checkbox"/>



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