

# NEXT GENERATION DIGITAL INFRASTRUCTURE

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Michigan's modern private cloud, a platform for reinvention and growth.

Service Release 2015.2



# Modern Government. Modern Cloud.

Next Generation Digital Infrastructure (NGDI) is the cloud for Michigan's modern government. This private cloud is a scalable collection of integrated technologies built on state of the art compute, storage, network and data protection platforms. NGDI provides standardized, highly resilient services that can be tailored to a customer's specific needs.

From mission critical applications to development environments, NGDI enables customers to deploy complete application environments quickly and cost effectively, while ensuring availability and compliance needs are continually satisfied.

# Agile. Open. Always On.

A scalable cloud environment **customized around you**

## ✓ NGDI is designed to provide **AGILITY**

With flexible options for compute, storage, network and data protection, application owners can configure their environments economically without sacrificing performance or scalability.

## ✓ NGDI is designed to be **OPEN**

NGDI is a powerful private cloud that integrates traditional OS platforms with Intel & RISC compute technologies to enable customers to build, deploy and manage their applications and services any way they like.

## ✓ NGDI is designed to be **ALWAYS ON**

Built with enterprise-proven best practices, this modern government cloud is always on, so applications supporting mission critical services are always up and always available.

## A Proven Platform.

Customers that utilize NGDI share the same platform that was chosen to support State-wide Medicaid processing and key Oracle databases for Michigan's Department of Transportation, while leveraging the granular availability, security and isolation controls to ensure continuity and compliance throughout every step of the application lifecycle.

# Cloud Momentum

By 2016, there will be an 11% shift in IT budgets away from traditional in-house IT delivery toward various versions of cloud computing as a new delivery model.

*- IDC 2015-2017 Forecast: Cloud Computing to Skyrocket, Rule IT Delivery*

NGDI was built to enable customers to enhance their capabilities with technology.  
From infrastructure to applications, NGDI is a private cloud that offers flexibility and efficiency for any workload.

# Cloud Momentum

Transition to the cloud **to realize a range of benefits**



## Simplicity

Servers, storage, databases, and a broad set of network and security services are easily deployed. Provisioning of complete application environments is fast and streamlined, with organizations choosing the building block components and options they need.



## Compliance

Combining enterprise-grade security best practices with professional support, NGDI provides the customizable isolation and controls to aid auditing and ensure compliance across all components of an application.



## Flexibility

Cloud resources eliminate the guesswork of sizing infrastructure capacity by enabling organizations to scale up or down on demand to align consumption with changing business needs.



## Savings

In addition to shifting large capital expenditures to smaller, predictable subscription costs, NGDI enables application owners to free up time spent managing servers to focus on customers and key projects.



## Performance

From a leading-edge network backbone, to high-performance compute and robust storage, NGDI provides best of breed technologies without the investment or burden of managing hardware lifecycles.



## Availability

NGDI provides uncomplicated data protection through customizable data replication, backup, and archive services to support diverse business continuity requirements.



## Independence

The cloud allows applications to operate independently from the underlying hardware resources. With NGDI, the distraction of acquiring, deploying, and managing hardware refreshes is eliminated.



## Extensibility

Building on the portability of virtual machines, NGDI private cloud resources are extensible to the public cloud. Hybrid connectivity with external cloud resources offers customers the benefit of multiple deployment models.

# Enhance Your Capabilities

Popular use cases encompass a range of capabilities



## Build Virtual Machines

Provision any number of virtual machines to support diverse requirements.

Use Microsoft Windows, Red Hat Linux, Oracle Solaris, and IBM AIX.



## Enable Continuity

Efficiently select geographical replication and durability features for entire applications or individual servers.



## Store and Protect Data

NGDI provides a comprehensive selection of data storage, performance, and protection options.



## Secure Infrastructure

Flexible networking and security options provide robust Intrusion Prevention and Firewall features. Reduce risk and improve compliance.



## Streamline Deployment & Operations

Comprehensive orchestration capabilities enable automation, simplify management, and enable peace of mind.  
[Limited Preview]





# Customer Spotlight.

NGDI isn't just an idea - it's a powerful infrastructure that's already in place, giving subscribers real business benefits. Today, customers are taking advantage of this innovative solution to cut costs, streamline key processes, and speed time-to-production.



# Diverse Customers

Agencies across all branches of government, both internal to Michigan, and neighboring States, recognize the capabilities that NGDI brings. With flexibility to accommodate virtually any need, Michigan's private cloud is a platform for innovation and growth.



# State of Illinois

## Department of Healthcare & Family Services

“DTMB is focused on providing technology services that enable Michigan’s reinvention, and this partnership to support the needs of the State of Illinois is another strong example of how we are doing just that. Sharing of government services is the right approach for taxpayers and you will continue to see implementation of shared services across all levels of government.”

- David Behen, Chief Information Officer,  
State of Michigan

“Through this exciting joint venture, Illinois will make a dramatic leap forward in delivering high quality healthcare services to our citizens, Medicaid clients, and providers while at the same time increasing the efficiency of state resources and saving taxpayers’ money.”

- Julie Hamos, Director, State of Illinois  
Department of Healthcare & Family Services

# State of Michigan

## Judicial Branch, Information Systems

**“Working with the NGDI team, I felt confident in the decisions we made and the technologies we put in place to achieve our business requirements. I would certainly work with them again, and I trust them to assist with our future challenges.”**

*- Mark Dobek, Director Judicial  
Information Systems*

# State of Michigan

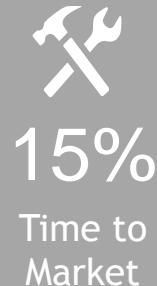
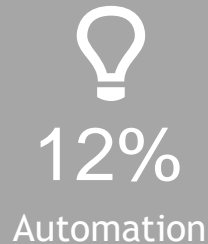
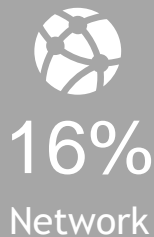
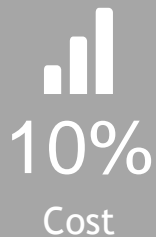
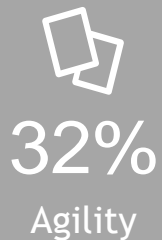
## Department of Technology, Management & Budget

**“Within Technical Services, we strongly believe that if we expect customers to get on board with NGDI, those customers should expect us to do the same. That’s why we were excited to put some of our own critical systems in the cloud, so we could validate the quality and capabilities of the infrastructure. We have converted more than 40 percent of our existing virtual machines to NGDI, and in the process we have also reduced our lifecycle planning burden by 60 percent.”**

*- Vern Klassen, Technical Services Director  
Department of Technology, Management & Budget*

# Driving Transformation

The motivations driving customer adoption of NGDI are many

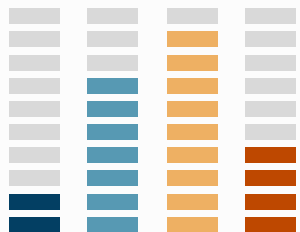


A survey of current and prospective customers categorized motivations for adopting NGDI private cloud services. Whether it's the personal support of the NGDI professional services organization, or the leading technical capabilities of the infrastructure platforms, the NGDI private cloud offers a diverse range of benefits to customers.

# Utilization

A variety of **flexible uses**

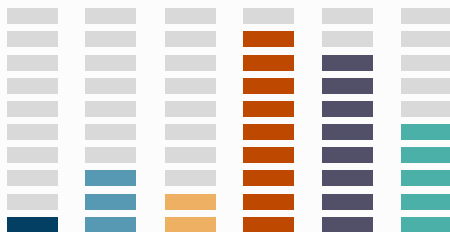
## Virtual Machines



■ IBM AIX PowerVM ■ Microsoft Windows

■ Oracle Solaris ■ Red Hat Linux

## Storage Resources



■ Object Storage ■ Online Archive ■ Performance Optimized

■ Flash Storage ■ General Purpose ■ Capacity Optimized

### Dominant Compute Usage

1. Windows Servers on x86 Architecture
2. Oracle Solaris UNIX on RISC Architecture
3. Red Hat Linux on x86 Architecture

### Dominant Storage Usage

1. General Purpose Storage  
*Balanced Capacity & Performance*
2. Performance Optimized Storage  
*Auto-Tiered Performance w/ Solid-State*
3. Capacity Optimized Storage  
*High Capacity Rotational Drives*



# Local Presence. National Reach.

NGDI is a collection of people, technologies, and facilities to ensure any private, public, or hybrid deployment model can be efficiently accommodated.



# The Problem

## Complex, Disruptive, Costly Upgrades

For many years, Michigan state agencies have relied on their own internal IT systems for everything from database management to benefits administration.

However, these systems are often time-consuming to maintain and upgrades can be complex, disruptive, and costly.

Even though more than 46 percent of the total IT infrastructure at the State of Michigan is now virtualized, these virtual deployments lack consistency and coordination across agencies. This has resulted in inefficiency at the State level, with unnecessary duplication of equipment and licensing, increasingly difficult requirements planning, and extended deployment timelines.

# The Solution

## Next Generation Digital Infrastructure

### ✓ Innovative Architecture

NGDI represents the State of Michigan's innovative design and implementation of a private cloud that is maintained by the Department of Technology, Management & Budget (DTMB). The foundation of the design is to provide access to technology infrastructure and platforms under a simple consumption-based model to enable on-demand expansion or contraction of resources.

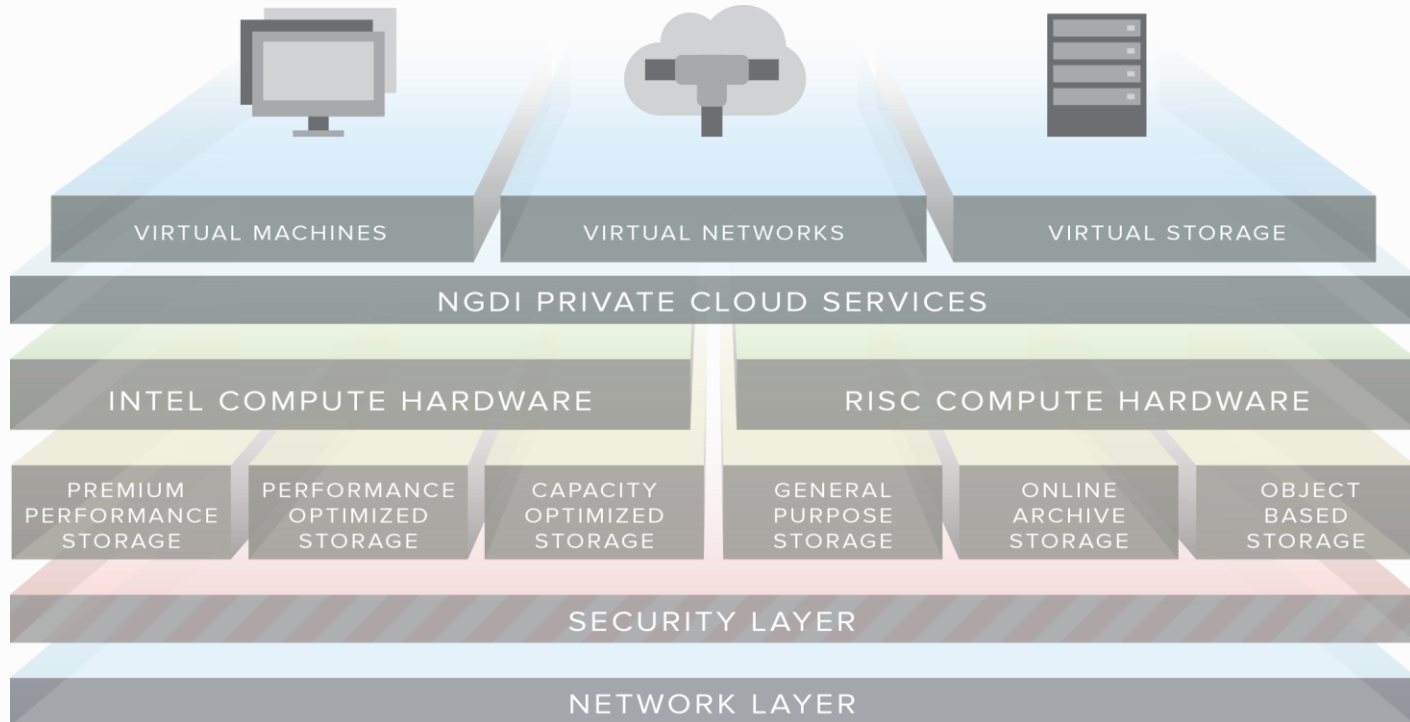
### ✓ Integrated Technologies

NGDI was designed as a vendor agnostic technology infrastructure and is not limited to the capabilities of a single technology provider. Instead, the architecture is based on industry standards at all levels of the stack, allowing NGDI to quickly accommodate advancements in new technologies while not sacrificing existing investments.

### ✓ Comprehensive Capabilities

Subscribers can choose Infrastructure-as-a-Service (IaaS) options such as virtual machines, networking and storage services, and own the associated responsibilities of maintaining their environment, or deploy high-level and fully managed Platform-as-a-Service (PaaS) offerings to focus on applications while NGDI handles the backend infrastructure and operating systems.

# Technology Layers





# Compute

Flexibility, choice, and interoperability are pillars of any cloud environment, yet most vendor cloud solutions only offer compatibility with Intel-based applications running on Microsoft Windows or Linux. Many customers operate a variety of mission-critical services based on Reduced Instruction Set Computing (RISC) architectures for UNIX. NGDI doesn't restrict the benefits of the cloud to Intel only workloads and provides a heterogeneous collection of leading compute platforms to accommodate diverse application and operating system requirements. Agencies have the flexibility to leverage any of the following technologies:

- » IBM AIX instances supported by the advanced PowerVM virtualization platform on IBM Power Systems
- » Powerful Oracle Solaris virtual machines running the latest generation of SPARC processors
- » Industry standard Microsoft Windows Server & Red Hat Linux virtual machines operating on the market leading VMware vSphere hypervisor platform with high performance Intel Xeon processors



# Network

NGDI features a fully-redundant, highly-scalable, and multi-site network backbone for high-speed communication. This leading-edge network converges traditional network and storage communications enabling unified connectivity between all environment components, from the edge to the core. This design provides:

- » A minimum of 80Gb throughout between network components
- » Over 10X the throughput capacity of legacy networks
- » 128Gbps active bandwidth to all supporting storage systems
- » NGDI achieves increased scalability by accommodating future technologies
- » The ability to non-disruptively scale out to accommodate future sites or services

# Security

The NGDI cloud provides defense-in-depth through strategic enablement of security capabilities at each layer of technology, protecting the applications, services, and data that are enabling the reinvention of Michigan. Features include:

- » Encryption at all stages of communication
- » Resilient and adaptive firewalls to protect against known & emerging threats
- » Proactive intrusion detection & prevention systems that inspect and validate traffic
- » Integrated application awareness to protect both custom & commercial software
- » Federal Information Processing Standards (FIPS) 140-2 compliance for all NGDI infrastructure components
- » Professional support in identifying and classifying application data prior to deployment to ensure appropriate safeguards are implemented



# Storage


Storage services within NGDI provide granular customization to support any combination of economy, capacity and performance. For data big and small, subscribers can allocate the right capacity at the right performance to any compute instance running in the cloud with unconstrained scalability or reliability. From unstructured data, to specific block volumes or file protocols, the NGDI private cloud supports all popular accessibility methods, all backed by an expert support team with decades of combined experience managing petabytes of data.

- » Premium Performance all-flash storage for latency sensitive workloads
- » Performance Optimized capacity that balances performance & capacity through auto-tiering
- » Capacity Optimized storage utilizing rotational drives for high-capacity, low performance workloads
- » General Purpose storage for mixed read/write workloads at cost-effective rates
- » Flexible Object Storage to store and retrieve unstructured data over programmatic interfaces
- » Online Archive storage optimized for write performance to cost-effectively support high capacity long-term archival needs

# 💡 Orchestration

All NGDI components integrate with automation technology that spans each layer of the infrastructure, simplifying cloud management and speeding customer deployments. Built with industry leading technologies, NGDI orchestration services are extensible and serve as the integration point to each technology component within the environment. Leveraging this automation, customers benefit from a range of capabilities to help them innovate:

- » Provision & deliver virtual machines, network, and storage quickly, consistently, & reliably, without manual intervention
- » Create scheduled tasks that integrate across platforms and services, both internal and external to NGDI services
- » Simplify snapshots, point-in-time copies, or any recurring task at the application layer to reduce manual points of interaction
- » Setup easy reversion to point-in-time snapshots when testing changes to multi-tiered applications or services
- » Automatically stage code to systems running across NGDI services or to external partners or services



# Flexible Product Customization

With configurable options for continuity packages, support agreements, and professional services, any workload can be customized to meet your unique requirements.



# Key Considerations

Business continuity options **designed around you**

01

## Data Loss (RPO)

How much data can you afford to lose?

02

## Time Loss (RTO)

How much time can data be unavailable?

03

## Retention

How long must I keep data and how must it be accessed?

04

## Change

How often and how much does my data change?

05

## Compliance

What compliance and audit requirements am I subject to?



### *Recovery Time Objective*

RTO is the maximum amount of time a service can be unavailable to the organization or users.

### *Recovery Point Objective*

RPO is the maximum amount of data loss that would be acceptable in the event of a disaster.

### *Flexible Business Continuity Options*

The closer you want to get to your recovery points, the costlier it usually is. NGDI can help you control these costs with flexible continuity options to meet your agreed-upon RTO and RPO needs for disaster recovery.

# Guided Continuity

- When the expectation is that services will always be on, the underlying systems that support these services must be designed to be highly available and resilient.
- From commercially available to custom built applications, NGDI provides professional services to ensure resilient deployment and fault-tolerant operation of any application. With reference architectures, guidance towards implementation, and customizable support models, specific recovery scenarios that enable fast restore with minimal impact are possible.
- The NGDI Solution Design Team, in conjunction with NGDI Professional Services and Support help customers establish a lifecycle model, plan and model expected behavior of a service in the event of specific failure scenarios, and automate the recovery model to ensure consistent availability of applications and services.
- The Architects you'll engage with are experienced across all facets of business continuity planning. You'll have access to subject matter experts across networking, compute, storage, and application specific technologies to assist your design and deployment efforts through candid knowledge transfer and operational support.

## 01

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# Weather Any Storm

## How NGDI Accommodates Your Changing Requirements

NGDI provides a flexible model, where changing requirements can be rapidly accommodated. Across each technology layer, customizable services enhance an agency's capabilities to deliver non-stop access to applications and data without having to acquire, deploy, and maintain complex technology infrastructure.



# Application Availability

- For mission-critical services and applications, accessibility to data can't be interrupted. NGDI offers configurable availability services to accommodate any level of disaster recovery or business continuity requirements.

Traditionally, as the maximum amount of time a service can be unavailable (RTO) and the maximum amount of acceptable data loss (RPO) get closer to zero, the cost of the technology infrastructure to support those requirements rise exponentially.

However, with flexible choices from data durability and multi-site replication, to geographic clustering, workloads hosted in the NGDI private cloud are right-sized for resiliency, reliability, and cost effectiveness.

- » Customizable data durability options from automatic or on-demand volume snapshots at a single site, to replicated full volume cloning
- » Simple replication options for both asynchronous and synchronous multi-site protection efficiently priced based on data change rates
- » Design and implementation support for geographic clustering and load-balancing for any hosted workloads, from UNIX to Windows
- » Powerful dashboards to monitor replication status and simulate or test failover procedures at the application level
- » Service Level Agreements that put the customer in control of costs and availability guarantees

# Data Protection

- Keeping customer data safe and secure shouldn't be complex or costly. Data Protection services for NGDI workloads provide efficient and economical options for backing up applications, servers and data with versatile restore/recovery capabilities.

With agent and agentless options, coupled with disk and tape storage capabilities, customers have unparalleled flexibility in choosing the right fit for specific data protection requirements for any components of their application infrastructure.

- » Benefit from granular subscription models that incur charges only when data is written or restored
- » Initiate manual backups or setup automatic custom schedules to backup multiple systems, specific directories, or individual files
- » Leverage leading deduplication capabilities to minimize costs to only data that changed since the last backup
- » Select from flexible multi-site replication options for backup data at cost-effective deduplicated rates
- » Utilize online (disk) and offline (tape) storage methods to right-size backup requirements, performance and costs
- » Flexible in-place or out-of-place recovery options for entire virtual machines, volumes, or specific data and files
- » Options for fully managed backup and recovery services to assist during regular operations and emergencies

# Monitoring

- The NGDI private cloud provides advanced monitoring for total visibility and control of servers, applications, and services. With extensible controls for reboots or integrating custom scripts, the monitoring dashboard serves as a launchpad for common responses to service alerts.

With personalized notifications and 24/7 access, the modern monitoring capabilities of NGDI enable customers to stay informed, respond effectively, and maintain peace of mind for any cloud resources at any time.

- » Configurable performance and congestion alerting with customizable charts and trend analysis
- » Uptime reporting based on SNMP, host ping, and service status queries to the operating system
- » Server, application and authentication event auditing through centralized logging with advanced filters
- » Easy data replication and protection status for primary storage and backup jobs

# Make This About You



## **NGDI Support Services**

With flexible support options for any private cloud workload, you are at the center of the experience. Designed to accommodate the first time adopter desiring white-glove service, to independent do-it-yourself users, NGDI support options don't lock you in and enable escalation to the next tier at any time.

# Support Services Highlights

- » No limit on the number of support requests
- » Easy access to support resources through web, email and phone options
- » Online access to documentation and technical resources such as reference architectures, deployment guidance, subscriber forums
- » All support tiers include automatic infrastructure updates and patching for hosted workloads

# Support Tiers

## Gold Support

The Gold Support tier provides 24x7 live accessibility to technical staff with strict response time requirements. For non-emergency events, support at this level includes access to subject matter experts during normal business hours for design assistance and deployment planning across any layer of the private cloud.

Support Request Limit	Unlimited
Target Response Time	30 Minutes
Hours of Operation	24 Hours per Day, 7 Days per Week, 365 Days per Year

## Silver Support

Silver support ensures timely, proactive access to security updates and software patches across the stack. This support level is the minimum required for all NGDI workloads servicing production users and is designed for those who need occasional assistance from time to time for both non-disruptive and critical issues.

Support Request Limit	Unlimited
Target Response Time	2 Hours
Hours of Operation	Monday-Friday, Non-Holidays





# A Lighted Path

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## **NGDI Professional Services**

NGDI Professional Services help you simplify migration and quickly realize the benefits of the cloud. We offer onboarding services to help you manage costs, avoid common roadblocks and fit your unique needs to the right deployment approach, ensuring implementation success in the cloud.

# Professional Services

- With a focus on enablement and knowledge transfer, onboarding and migration support services ensure your success in the cloud through:

- » Mitigating cloud adoption and migration risks
- » Guidance in leveraging technology cost effectively
- » Improved time-to-production for applications and services
- » Protecting the value of existing IT investments and skill sets

No matter where you're at on the journey, NGDI professional services accommodate any customer at any stage. Every customer has different missions, needs, and risks. We can help you accelerate time-to-production and realize value in many ways, from matching your workloads to cloud services and a business case and supporting your migration to the cloud.

With simple, flat-rate pricing and customizable deliverables for each project, this temporary support tier is designed to help agencies leverage trusted experience to derive value through fast time-to production without compromising security, uptime, or performance.

Regardless of where customers are at in their journey to the cloud, NGDI maintains a team of subject matter experts across all facets of infrastructure and platforms. These professionals operate with one goal, to make the journey as effortless as possible for customers.

- » Speed time to production with experienced support in assessing requirements, validating designs, and planning deployments
- » Offload the burden of migration with DTMB's fully managed provisioning and server migration service to ease onboarding
- » Augment regular operations with a single point of contact for change management planning or escalation of technical support



# Solution Design Team

## We Speak Your Language

When it comes to the cloud, we know the options can be daunting and the questions overwhelming. The Solution Design Team is a dedicated group of architects and technology experts that walk alongside you every step of the way to guide and map out your requirements, model costs, and plan a seamless and successful transition to the NGDI private cloud.

# Meet Our Design Process

A look at how we engage with you

## Identify & Define

Through identification and definition of your goals, our solution design team can build an efficient design that meets your objectives.



## Understand

We begin with a focus on you. By understanding your current environment and challenges, we can help you map out the blueprint for moving forward.

## Prototype

We outline preliminary design options for you and model costs, packages, and services. This helps each customer make an informed decision and choose the deployment model that suits them best.



## Build

We build a specifications document and support accelerated review of your provisioning plan with key subject matter experts to ensure no item is overlooked.





## Solution

Upon completion of the design specifications review and customer acceptance of the service agreement, provisioning begins and users are granted access.



# Solution Design Team Engagement Steps



## Step One

Initial conversations to enable NGDI staff engineers to understand your use case and business objectives to ensure an efficient design is produced.



## Step Two

The information identified in step one is used to provide preliminary design options, enabling each customer to make well-informed decisions about how to deploy resources in the cloud and migrate applications.




## Step Three

The specifications document is created through review with subject matter experts across a range of competencies. This comprehensive but accelerated step ensures each customer's specific requirements are satisfied without risk.



## Step Four

The creation of a Service Agreement provides the foundation for the initial request. Once this request is initiated, environment provisioning begins.



## Getting On Board: Simple. Fast. Painless.

The NGDI on-boarding (customer intake) process is designed to be simple, fast, and painless. Our teams work closely with you every step of the way, from the initial project planning phase all the way to final delivery of services, to make on-boarding seamless.

With the NGDI on-boarding process, more detailed information will be gathered up front and the team will identify the proper forms and application requirement to guide your organization through the entire approval process.





## Learn More.

To get started, customers can learn how to reinvent their approach to IT with guided hands-on walkthroughs, interactive sessions with the Solution Design Team, and tours of hosting facilities by reaching out to the NGDI Customer Experience team.

From exploratory discussions to detailed requirements modeling and trial access to the environment, the Customer Experience team is equipped to help agencies envision their potential with NGDI.



# Get in Touch

Contact the [Customer Experience team](#) via email or the website

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