WHITEPAPER

Maximizing the Value of IBM i (AS400) Environments on Premises and in the Cloud

How to drive the most value from your system and leverage all that the cloud has to offer

- The state of IBM i (AS400) and future considerations
- On-premises and cloud solutions to drive value
- Best practices in IBM i (AS400) cloud hosting
- Checklist for evaluating a cloud solution

SYNTAX

Introduction

As the backbone of numerous core business systems, IBM i (AS400) has proven its value over decades as a reliable and secure data processing and workload-optimized application system that is central to many organizations.

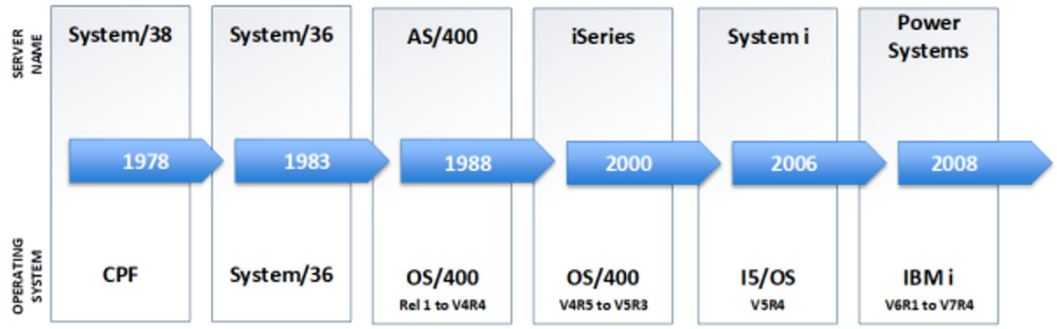
The IBM i (AS400) retains widespread global usage as a system with a low total cost of ownership (TCO). However, as next-generation operating systems, applications, and integrations become more prevalent, the historic nature of this midrange system reduces the available talent pool and thus becomes more challenging to maintain.

As IBM continues to modernize this system, the thousands of companies running IBM i (AS400) are looking for opportunities to maximize the value of on-premises systems and take advantage of all that the cloud has to offer.

In this whitepaper we will look at the current state of IBM i (AS400) and implications for the future of your system, including some of the challenges that companies are facing. We will highlight different approaches available to optimize on-premises systems and clarify the pathway to cloud hosting. Finally, we spotlight best practices in the cloud and what to look for in a trusted cloud partner to translate current challenges into future opportunities.

The State of IBM i (AS400)

Over the 45+ year evolution of the trusted IBM i Power Systems (often still referred to as the AS400), the consistent thread has been a system made with business applications in mind—enabling the hardware to evolve. In contrast, business applications ran, with little or no interruption. It remains one of the world's most widely used core business systems, designed for data processing and workload-optimized applications. The system's proven reliability and security has made it central to many organizations' operations.

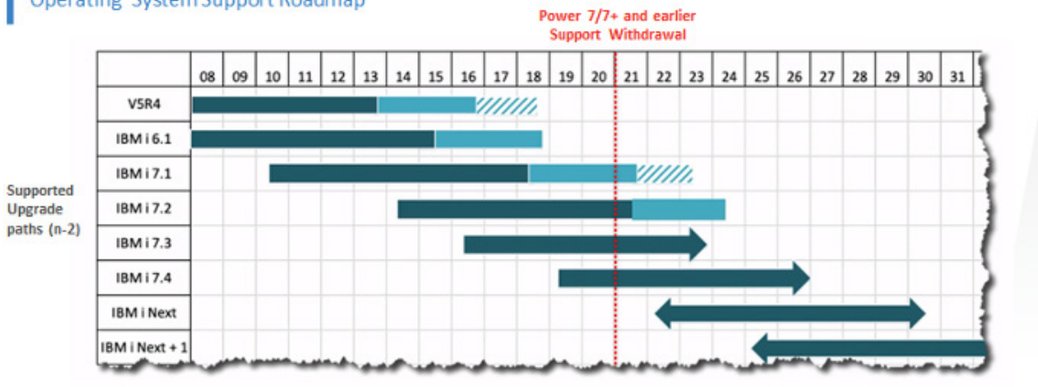


What's in a name? IBM i is the current operating system (O/S), which runs on Power Systems, the latest hardware. Power Systems evolved from two different platforms—System i and System p—that merged in 2008. But old hardware names die hard, with customers still referring to their system by the old AS400 name to this day.

So, what is the current state of the IBM i (AS400) and what does the future hold? If we look at the Support Roadmap, the support of the IBM i O/S continues well beyond 2032, so there is a lot of longevity here. IBM i 7.4 is the most current version and release to date. If you are still running version 6.1, 7.1 or 7.2, note that they are all off support now. A word to the wise: stay on top of O/S updates, so that you don't find yourself in a predicament where you cannot upgrade to the latest system. Keep in mind that IBM also has desupport dates for the infrastructure, so if you are still using Power 7 or 7+ hardware, there is no direct path to an updated system.

IBM i (AS400) Support Roadmap

Operating System Support Roadmap



The roadmap for IBM i continues into 2032 and beyond

News that IBM has released a **Power10** processor, which is significantly faster than anything Intel makes, has created excitement as well as a new sense of urgency around getting the most from your IBM i (AS400) investment. Let's say that you have a Power8 and want to expand it, but you learn that IBM does not make those chips anymore. Now you're faced with a choice of turning to the used market (but give up IBM support in the process), buying a brand-new machine, or engaging a partner to host it for you. More broadly, an all-too-common scenario causing IBM i (AS400) customers to take notice is that much of the knowledge around their systems resides in one one internal IT person who is nearing retirement, inviting the question of how to best manage the system to support the business going forward.

IBM i (AS400) Challenges and Considerations

Organizations face many challenges and considerations related to their IBM i (AS400). To assess the current state of your own IBM i (AS400) environment, consider some of the most common realities observed in other organizations:

- **Aging Infrastructure** is more prone to failure and limits your future ability to upgrade as older hardware models are desupported and removed from the upgrade path
- **Operational Challenges** of staying on top of ongoing maintenance, evolving best practices, and performing the necessary tasks for top performance and security
- **Older Operating Systems** no longer receive security and other patches and can limit your upgrade and migration pathway, as well as limit your interoperability and adoption of newer and faster technology
- **Push to Exit the "Data Center Business"** which is increasingly considered a distraction vs. activities that create business value
- **Limited Human Resources | Internal Knowledge** as companies face challenges with talent acquisition/retention/retirement and the pressure to provide 24X7 support
- **Older Strategies** for high availability (HA) and disaster recovery (DR) are inadequate; shortening maintenance windows requires redundant, high performing infrastructure
- **Application Modernization Initiatives** require features of the latest IBM i (AS400) or involve solutions that require more rapid access to data
- **Move from CapEx to OpEx** as organizations seek to replace large IT capital expenditures (CapEx) with predictable monthly operating expenditures (OpEx) to better align IT with Finance
- **Limited Agility and Scalability** of on-premises servers, forcing over-buying and reduced efficiency and utilization
- **High Costs** associated with running and maintaining an older system, having to purchase infrastructure every "x" years and the guesswork that can lead to overprovisioning, as well as the cost of supporting 24x7
- **Performance Issues** of older systems and internal hard drive disks not providing the performance and latency demanded by users
- **Hybrid Cloud Enablement** options can be limited for older infrastructure and O/Ss; connecting on-premises IBM i (AS400) systems to public cloud can incur additional challenges and costs

While organizations may pinpoint different challenges, they share a common goal: to drive the most value from their system and to leverage cloud capabilities as appropriate.

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Approaches to Maximize Value

Whether you're seeking to optimize your on-premises IBM i (AS400) environment or build a business case for cloud hosting, there are concrete steps that you can take, as well as knowledge that can be garnered to better inform your decisions.

On-Premises Systems

If you have all the necessary resources on staff and are comfortable with (and mature in) the day-to-day operation and maintenance of your IBM i (AS400) system, you may choose to remain on premises in the near term. This is especially true if you recently purchased a new system and haven't fully sweated the asset.

Outsourcing **Development Services** for your on-premises system is one way you can bridge an identified skills gap in your own organization. From O/S start-up automation to command-line scripting to COBOL (Common Business-Oriented Language) programming. And from programming and optimizing SQL (structured query language) to assessing and documenting what's actually running on your machine.

To address both operational challenges and human resource constraints, you can leverage a trusted partner to remotely manage your on-premises IBM i (AS400) system. Typical **Remote Management Services** include installations, patching, continuous daily management through alerting and reporting, troubleshooting, looking at the security and vulnerability of the system, coming up with high availability (HA) and disaster recovery (DR) solutions, and monitoring daily backups.

Similarly, if you have an on-premises system with a DR strategy in place, you can adopt a **Disaster Recovery as a Service (DRaaS)** model and have an outside party manage that for you, allowing you to continue leveraging your investment in DR infrastructure. To address deficiencies in older disaster recovery (DR) strategies or if you do not have a solid DR strategy in place, **DRaaS in the cloud** can provide continuous data protection for your on-premises environment.

IBM i Pathway to Cloud

Alternatively, suppose you're coming up against the limitations of your older system, facing a loss of infrastructure or O/S support, or need to better align with the priorities of the organization. In that case, you may be looking at your hosting options, including a pathway to the cloud.

Cloud is the foundation for business agility and responsiveness that is increasingly demanded by the business. From the C-Suite on down, organizations are looking to move away from operational silos and a process-driven data center that is seen as overhead, towards becoming an agile and data-driven digital enterprise in which IT embraces the cloud and drives new revenue. But what is a viable pathway to the cloud?

For an IBM i (AS400) environment, the private cloud is the destination of choice. Because public cloud options are limited in terms of supporting an IBM i (AS400) platform, private cloud has emerged as the prevailing trend. A move to private cloud enables you to embrace a hybrid cloud model as well, having some of your operations within a private cloud and other resources elsewhere (including the public cloud), accessing that data remotely through high-speed links.

The same development services and remote management services that can benefit on-premises IBM i (AS400) customers are available in a private cloud solution. So you can launch your application modernization initiatives, taking your green screen applications and making them run in a Web-based format. And you can confidently exit the data center business, freeing up IT resources to drive new revenue.

A private cloud solution allows you to update aging infrastructure and O/Ss without a CapEx spend, as you move to an OpEx model that better aligns IT with Finance and delivers a predictable monthly cost with lower total cost of ownership (TCO). And in the age of talent shortages and knowledge/skills gaps, a private cloud solution gives you access to specialized expertise 24x7 to stay on top of best practices, improve operational efficiency and availability, strengthen your security posture and resilience, and improve regulatory compliance—all while achieving a level of agility, flexibility, and scalability that an on-premises solution simply cannot match.

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Best Practices in Private Cloud

Rapid Storage

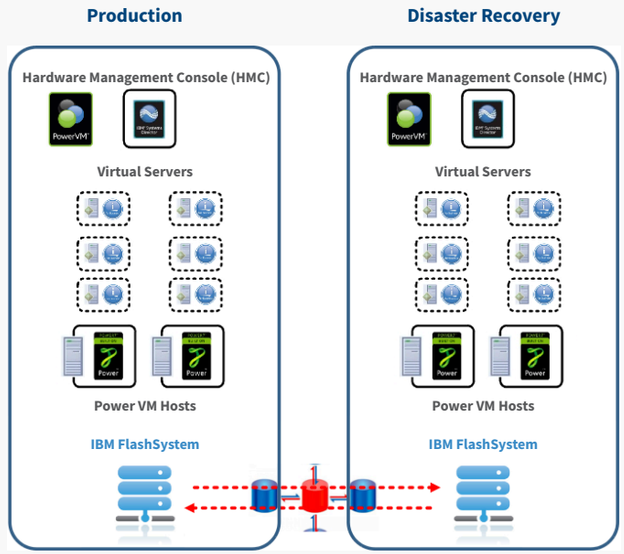
Storage is a critical piece of the performance puzzle. While the biggest user performance issue is always around disc latency, a close second is reducing backup times. Particularly if you have an older system, realize that rapid storage is what ultimately drives performance. It's not about adding more memory or adding faster CPUs. In addition to improving performance, rapid storage capabilities improve or facilitate data at rest encryption (DaRE), HA and DR, and flexibility (point in time copy, flash copy, etc.).

Storage Replication for DR

Specific to disaster recovery, when replicating data from the IBM SAN or between the private cloud provider's data centers, storage-based replication offers several advantages over traditional logical replication using software. At the same time, both can achieve HA and DR with aggressive recovery point and recovery time objectives (RPO ~0 and RTO<2 hours), storage replication requires no downtime to implement and only minimal configuration. Ongoing administration is simplified as there is no need to identify what to replicate or flag new objects. And no third-party application licensing is required.

Syntax Disaster Recovery - Storage Replication

- Rapid storage replication
  - » Between Syntax Data Centers or
  - » From customers existing IBM SAN
- Minimal configuration and no downtime required to implement
- Simplified ongoing administration
  - » No need to identify what to replicate or flag new object
- Achieves both HA and DR
- Aggressive RPO (~0 hours) and RTO (<2 hours)
- Minimizes 3rd Party Application licensing
- Yearly non-disruptive DR test Included



Syntax Disaster Recovery - Option Comparison

Feature / Functionality	Storage Replication SAN to SAN	Logical Replication Software
Recovery Point Objective (RPO)	Near Zero (real-time)	Close to real-time
Recovery Time Objective (RTO)	<30 min	<30 min
Target State	Warm	Hot
Target Host Name	Identical	Different
Implementation Time	Immediate	Several Days
Implementation Downtime	None	2 – 8 hours per LPAR
Data Capture Scope	All Data	Only Selected Data
Data Capture Scope – Changed Data & Changed Objects	Yes	Yes
Data Capture Scope – New Data & New Objects	Yes	No
Administration & Management	Minimal & Onetime	Moderate & Ongoing
3rd Party Software Licensing Impact	No Licensing Required	Licensing Typically Required
Replication Software Licensing	Included	Required

Live Partition Mobility and Simplified Remote Restart

Live Partition Mobility (LPM) and Simplified Remote Restart (SRR) go hand-in-hand with creating a true IBM cloud, rather than just a server, making it possible to:

- Move live partitions from one IBM I (AS400) to another, just as you would with VMware and VMotion
- Restart on another IBM i (AS400) if there is a failed partition

The upside of LPM and SRR is better availability and minimal interruption during maintenance.

Other Stand-Out Best Practices

The most rigorous private cloud providers will offer operating support and patching for all currently supported IBM i (AS400) releases, as well as one or two off-maintenance O/Ss; multiple backup options (virtual tape, off-site tape storage, flash copy) to shorten maintenance windows; and legacy tape support, should the need arise to restore an old tape.

Additional best practice components of a private cloud solution include fast storage area networks (SSD storage using FibreChannel Modules or FCM), DB2 symmetric multi-processing—which means that the database can do multiple things at a time, and IBM High Availability (HA) Journaling, which refers to doing things in memory (as opposed to in disk) to speed up the system.

> The upside of LPM and SRR is better availability and minimal interruption during maintenance.

Choosing a Private Cloud Provider

Partnering with the right managed services provider helps you maintain and manage your IBM i AS400, modernize your infrastructure to improve performance, and position your infrastructure for a future in the cloud.

Seek a provider that can offer a breadth of services—not just a hosting provider, but a provider immersed in the technology that can provide development and other technical and application services—supported by a strong bench of talented and dedicated programmers skilled in legacy and modern languages. Consider the provider's depth of experience, including a long and strong partnership with IBM, continued investment in the platform, and proficiency in managing 24x7 mission-critical workloads with a business-focused approach.

A partner with a demonstrated track record of managing IBM i (AS400) and migrating them to the cloud and hosting Power Systems will be critical. Consider providers that offer multiple approaches to migrating customers to the cloud and provide related ancillary services, including:

- Previous to Current O/S Migration—options to upgrade to the latest O/S while moving to the cloud (without touching your existing system)
- Staged Migration Approach to include an initial, mock and final go-live and phasing of non-production and production go-live waves
- Options for real-time data replication
- Support for legacy tape devices
- Third-party software upgrade and license assistance
- Custom development assessment
- Performance analysis and right sizing
- Dedicated project management

Ensure that your managed services provider brings the rigor of best-in-class data centers, namely Tier III data centers with multiple redundancies. And confirm that your provider of choice has relevant industry certifications, such as PCI certification if you have credit card processing; and meets applicable compliance standards, such as SOC-1 Type II and SOC-2 Type II compliance for service organizations. The Private Cloud Solution Checklist offers specific questions to further inform your selection process.

Private Cloud Solution Checklist

- ✓ **Can I benefit from a Power Systems upgrade without incurring an upgrade cost?**
- ✓ **Do you offer the option of providing "true" high availability?**
- ✓ **Is any spare capacity exclusively ours, rather than having to share with your other customers?**
- ✓ **Can my production environment borrow resources from my non-production environment?**
- ✓ **Are both the network and infrastructure redundant?**
- ✓ **Are you able to move live partitions from one IBM i to another for a true IBM i cloud environment?**
- ✓ **Do you have a global support team and 24/7 operations, including an automated alerting and monitoring system?**
- ✓ **Do you have safe and secure connections to public cloud hyperscalers like Amazon Web Services (AWS), Azure, and Oracle Cloud Infrastructure (OCI) to enable a hybrid cloud solution?**
- ✓ **Do you offer a multi-cloud portal to bring in my resources from multiple cloud environments?**
- ✓ **Can I maintain my current IPs?**

Challenges Present Opportunities

There is no denying that IBM i (AS400) has stood the test of time because it works. Given its current state, what are the implications to your organization, and how will you move forward?

Start by identifying the key considerations from this discussion that are most relevant to the business: are you already unsupported, does leadership have a stated cloud-first imperative, are you facing a talent gap, etc. A trusted partner can provide a health check of your current IBM i (AS400) system and bring an informed outside perspective to the assessment process.

The flipside of every challenge is an opportunity. We covered a variety of ways that managed services can support and strengthen an on-premises environment, in addition to defining a viable path to cloud hosting. Using the best practices and checklists provided to inform your decisions, together you can work to shape and implement a plan to maximize your IBM i (AS400) investment for years to come.

Why Syntax for IBM i (AS400) Hosting

Syntax has been providing business solutions built around the IBM i (AS400) for over 45 years.

Our IBM i (AS400) services extend beyond Cloud hosting to include Development, Assessments and other value-added services.

Syntax's IBM i (AS400) cloud services are purpose-built and fine tuned to enable you to securely run your mission-critical systems around the clock and around the world.

- Global Support Model
- Performance Optimized Platform
- Flexible and Scalable IBM i (AS400) Cloud
- Business Continuity and Data Protection Excellence
- Superior Customer Experience
- Breath and Depth of IBM i Expertise

SYNTAX

SYNTAX

Syntax provides comprehensive technology solutions to businesses of all sizes with over 800 customers trusting Syntax with their IT services and ERP needs. Today, Syntax is a leading Managed Cloud Provider for Mission Critical Enterprise Applications. Syntax has undisputed strength to implement and manage ERP deployments (Oracle, SAP) in a secure, resilient, private, public or hybrid cloud. With strong technical and functional consulting services, and world class monitoring and automation, Syntax serves corporations across a diverse range of industries and markets. Syntax has offices worldwide, and partners with SAP, Oracle, AWS, Microsoft, IBM, HPE, and other global technology leaders. Learn more about Syntax at www.syntax.com.

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