Microsoft Dynamics NAV 2013 R2 on Windows Azure

White Paper

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Small and midsized businesses worldwide are increasingly looking to the cloud as the preferred method of deploying and consuming software. Within the US market, for example, more than 80% of midsized businesses are expected to employ some form of cloud computing by the end of 2014[1]. As small and midsized businesses (SMBs) become more comfortable with hybrid and cloud-only deployments, the depth and breadth of workloads that SMBs are asking for in the cloud continue to expand – and ERP is no exception.

Based on this demand, Microsoft Dynamics® NAV 2013 R2 fully supports deployment in the cloud, including deployment on Windows Azure, so Microsoft Dynamics NAV partners can offer high-value cloud solutions to their customers.

This whitepaper offers comprehensive guidance for Microsoft Dynamics NAV partners who are interested in offering Microsoft Dynamics NAV solutions in the cloud. The guidance includes messaging, licensing, sizing, and deployment. For the latest version of this document, see
https://mbs.microsoft.com/partnersource/training/news/MSDNAV7GettingReady.htm

Understanding the offering

Microsoft Dynamics NAV 2013 R2 is a business management solution from Microsoft that is quick to implement, easy to use, and with the power to support your business ambitions. Microsoft Dynamics NAV is designed specifically for small and midsized businesses, and is supported by a global network of Microsoft Certified Partners offering industry-specific solutions.

Windows Azure is an open and flexible cloud platform that enables you to quickly build, deploy and manage applications across a global network of Microsoft-managed datacenters. You can build applications using any language, tool or framework. And, you can integrate your public cloud applications with your existing IT environment. Windows Azure provides on-demand infrastructure that scales and adapts to your changing business needs. Whether you are creating new applications or running existing applications, Windows Azure provides best-in-class price-performance and end-to-end support.

Microsoft Dynamics NAV 2013 R2 hosted in the cloud on *Windows Azure* offers customers an easy-to-use, quick-to-implement business solution from Microsoft with the added benefit of knowing their solution is hosted on secure, enterprise-class cloud infrastructure from a trusted provider.

The opportunity for Microsoft Dynamics NAV partners

Microsoft Dynamics NAV partners can enjoy significant benefits by offering Microsoft Dynamics NAV 2013 R2 hosted in the cloud on Windows Azure. These include:

- Meet the rapidly growing market demand for cloud-based ERP solutions.
- Lower the cost of your solution offerings and increase speed of implementation by securely serving multiple customers on the same infrastructure.
- Efficiently manage your Microsoft Dynamics NAV instances on Windows Azure with System Center, Windows PowerShell cmdlets and the Microsoft Dynamics NAV 2013 R2 sample scripts.
- Lower training costs for bringing solutions to the cloud by using a familiar virtual machine technology and Microsoft infrastructure.
- Reduce barriers to entry and build deep customer relationships by offering a monthly subscription model for your solutions in the cloud.

[1] IDC Top 10 predictions for the Global SMB IT Market, December 2013

- Sell cloud offerings that combine a business solution from Microsoft with your industry expertise, together with great collaboration and productivity tools like Office 365.
- Exceed customer requirements around reliability, security, and scalability by offering your cloud solutions hosted in Microsoft's state-of-the-art data centers. Windows Azure offers all the benefits of the full Microsoft stack in a cloud solution[2].
- Scale your cloud infrastructure as needed to meet your customer demands. With Windows Azure you no longer need to invest in new hardware as your customer base grows. Windows Azure offers a pay-as-you-go approach where you only pay for what you use. Additionally, there are never any penalties for changing configurations.

Hear what Microsoft Dynamics NAV partners are saying about the Microsoft Dynamics NAV 2013 R2 on Windows Azure opportunity by reading the "Microsoft Dynamics Partner Abakion Expect to Gain 25% in Revenue Through Hosting on Windows Azure" blog post:
http://community.dynamics.com/dynamicbusiness/b/theedge/archive/2013/06/18/microsoft-dynamics-partner-abakion-expect-to-gain-25-in-revenue-through-hosting-on-windows-azure.aspx

Cloud deployment options for Microsoft Dynamics NAV

You can deploy Microsoft Dynamics NAV solutions in the cloud in different ways. In this document, we will focus on deploying on Windows Azure.

Collaborate with a hosting partner that offers Windows Azure services

Good reasons to collaborate with a hosting partner that provides Windows Azure Services include the following:

- At this point in time, you don't want to invest in building up the cloud skill sets, tools and processes within your organization.
- You want to collaborate with a subject matter expert in your first Windows Azure deals while building the skill set and provisioning tools internally.
- You are implementing Microsoft Dynamics NAV 2013 R2 based on individual opportunities and do not plan to optimize your offerings towards a repeatable cloud service. In this case, it's beneficial and cost effective to collaborate with a hosting partner.
- You don't want to provide the 24x7 support on cloud infrastructure that customers often demand, so you prefer to work with a business partner that shares the responsibility.
- You are in a startup situation with limited ability to take on new costs.

Deploy Microsoft Dynamics NAV on Windows Azure yourself

Good reasons to deploy Microsoft Dynamics NAV 2013 R2 on Windows Azure with your own team include:

- You have optimized your business to offer Microsoft Dynamics NAV cloud services, and have invested in your own provisioning tools.
- You have established a repeatable cloud model and do not want to be dependent on another business partner.
- You are a hosting company and would like to extend your services by providing the Windows Azure infrastructure as a service option to your business partners.
- You already have experience hosting solutions on your own hardware but want to move customers to the Windows Azure platform.

Requirements for selling and deploying Microsoft Dynamics NAV on Windows Azure

To sell and deploy Microsoft Dynamics NAV on Windows Azure, the following is required:

- *Partner* - Any Microsoft Dynamics NAV partner with a valid Service Provider Agreement can sell Microsoft Dynamics NAV on Windows Azure.
- *Product* - Microsoft Dynamics NAV 2013 FP1 or Microsoft Dynamics NAV 2013 R2, which is built for the cloud.

[2] Deployments that follow the recommended guidelines are supported by a 99.95% up-time SLA

- *Infrastructure* - Windows Azure Infrastructure as a Service. There are no specific agreements you need to sign to deploy solutions to your customers. Sign up at http://www.windowsazure.com.

Value of Microsoft Dynamics NAV 2013 R2 on Windows Azure

Microsoft Dynamics NAV is a business solution from Microsoft that is easy to use, quick to deploy, and with the power to support your business ambitions.

When Microsoft Dynamics NAV 2013 R2 is deployed in the cloud on Windows Azure, customers get the following additional benefits:

Increased flexibility and lower total cost of ownership

- Easily scale infrastructure up or down as needed to meet business needs. Never worry about running out of resources, or paying for overcapacity. Examples of peak usage times include holiday shopping season, month/year end close, and so on.
- Replace infrastructure, hardware, and IT management costs with highly efficient automated processes in Windows Azure.
- Receive detailed usage reports and only pay for the computing resources you use each month.
- Refocus IT resources from managing infrastructure to working on strategic projects.

Accelerated deployment

- Get up and running in hours instead of weeks by removing the need to scope, purchase, deploy, and test infrastructure.

Anywhere access

- Securely access your business data in the cloud from anywhere at any time using the Microsoft Dynamics NAV Web client on virtually any device.

Enterprise-grade infrastructure and support

- 99.95% availability guarantee when working with two or more instances in an availability set. For more information, see http://www.windowsazure.com/en-us/support/legal/sla/.
- 24x7 global support from Microsoft experts
- Robust security, backup and privacy controls enabled by Windows Azure running in geographically dispersed datacenters that comply with key industry standards, such as ISO/IEC 27001:2005. For more information, see http://www.windowsazure.com/en-us/support/trust-center/security/.

Customer evidence

- *Nilfisk-Advance Asia Pacific Chooses Microsoft Dynamics NAV 2013 R2 on Windows Azure* (Abakion) - The global Nilfisk-Advance Group reduces hosting costs by 70 to 80 percent with a core group solution in Asia based on Microsoft Dynamics NAV 2013 R2 on Windows Azure. The solution facilitates the further rollout of the solution in the group. Migration to Windows Azure took two days.
  http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?CaseStudyID=710000003756
- *Graphics Industry Solution Increases Order-Handling Efficiency by 40 Percent* (PrintVis) - For Graphical Production Facilities to manage the hardware and software of an industry-specific business solution for the graphics industry, it knew it would have to increase staff, ramp up new skills, and commit plenty of financial resources. Instead, the small print broker company chose a cloud-based business solution based on Microsoft Dynamics NAV 2013 R2.
  http://www.microsoft.com/casestudies/Microsoft-Dynamics-NAV-2013/Graphical-Production-Facilities/Graphics-Industry-Solution-Increases-Order-Handling-Efficiency-by-40-Percent/710000003291
- *Distributor* Improves *Efficiency and Drives Growth with Industry-Specific ERP Solution* (Cooper Parry) - P2P Logistics (P2P) is a medium-sized distribution company based in Stoke-on-Trent, with over 20 years' experience in the sector. A specialist in contract logistics and pallet deliveries, P2P manages a fleet of 17 vehicles, delivering around 50,000 consignments across the United Kingdom per year. With Microsoft Dynamics NAV 2013 R2 hosted on

Windows Azure, the business is enjoying strong growth.
http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?CaseStudyID=710000003340

For more examples, visit the following location: http://www.microsoft.com/casestudies.

Licensing Microsoft Dynamics NAV 2013 R2 on Windows Azure

This section illustrates general considerations for partners when offering Microsoft Dynamics NAV 2013 R2 on Windows Azure. For more information on licensing Microsoft Dynamics NAV 2013 R2 on Windows Azure, see the following locations:

- http://www.windowsazure.com/en-us/pricing/licensing-faq/
- https://mbs.microsoft.com/partnersource/northamerica/partner-essentials/guides-handbooks/MSDYERP_LicencingGuide

Licensing the various components of a Microsoft Dynamics NAV 2013 R2 solution that is deployed on Windows Azure is an important consideration in all deployment types. For deployments on Windows Azure, you should evaluate the licensing terms specific to Windows Azure, and the impact these may have on the overall cost of providing the hosted solution.

All Microsoft software installed in the Windows Azure Virtual Machine (VM) environment must be properly licensed. Windows Azure virtual machines include by default a license for the use of Windows Server in the Windows Azure environment. Certain Windows Azure virtual machine offerings may also include additional Microsoft software on a per-hour or evaluation basis.

The following components must be properly licensed when offering Microsoft Dynamics NAV 2013 R2 on the Windows Azure platform:

- Infrastructure - Windows Azure Infrastructure Services
- Database - Microsoft SQL Server
- Application - Microsoft Dynamics NAV 2013 R2

Next section explores the licensing requirements for each of these three components. Remember that licensing is subject to the most restrictive component of the stack.

Windows Azure Subscription

When you sign up for a Windows Azure subscription at http://windows.azure.com, you get access to the Windows Azure account management portal.
You can create one or more subscriptions to the Windows Azure account. A subscription is a grouping of Windows Azure services and applications, including virtual machines.
The subscription provides a way to control the access to and the use of Windows Azure. On the account billing, the resource usage of Windows Azure services for each subscription is reported separately.
You should decide how to separate subscriptions for each Microsoft Dynamics NAV 2013 R2 deployment.
The following Windows Azure components charge per billing cycle when you use Windows Azure infrastructure as a service.

- Virtual machines – compute hours
  You choose a Windows Azure virtual machine (VM) size based on your deployment needs and level of solution optimization. Windows Azure offers a range of VM sizes with multiple options on memory and cores. Each VM size will come with a dedicated cost per billing cycle. Windows Azure charges for virtual machines by the minute. Prices are listed as hourly rates, but are charged by number of minutes used. For more information, see Virtual Machines

Pricing Details at this location: http://www.windowsazure.com/en-us/pricing/details/virtual-machines/

- Data management – storage
  Storage in Windows Azure is charged based on volume (the amount of data in the Binary Large Object (BLOB)) and how many times that BLOB information is accessed (transactions).

  - Storage (GB/Month)
    Your Windows Azure virtual machine will be stored in one of the Windows Azure datacenters around the globe. Microsoft offers two options for storage: locally redundant and geographically redundant.
    With the *locally redundant storage* option, Microsoft maintains multiple replicas of the data within a single geographical region to provide high durability.
    With the *geographically redundant storage* option, Microsoft provides additional data durability by replicating between two regions hundreds of miles apart within the same geography. In both regions, Microsoft maintains multiple replicas of the data.

  - Storage transactions (in #10,000s)
    Storage transactions include both read and write operations to the storage blob. For more information, see: http://www.windowsazure.com/en-us/pricing/details/storage/

- Data transfer out - bandwidth
  All inbound communication towards the Windows Azure datacenter is free of charge. Outbound communication from the Windows Azure datacenter to the customer is charged based on the total amount of data moving out of the datacenter via the internet in a given billing cycle. Data transfer within a datacenter is not subject to any charge. The first 5 GB of outbound data is also free.
  For more information, see: http://www.windowsazure.com/en-us/pricing/details/data-transfers

Windows Azure cost savings plans

- Pay-as-you-go: This plan offers flexibility with no upfront costs and no-long-term commitment.

- Pay as you go with Ramp Program benefits: If a Microsoft Dynamics NAV partner completes the required R2R RAMP training requirements with a local Partner Development Center (PDC), they are able to receive a 35% discount on Azure pay-as-you-go pricing. Find Ramp Program details here: https://www.windowsazure.com/en-us/offers/ms-azr-0033p/ . Interested partners can contact their local Partner Development Center (PDC) for details. Please find an updated list of the PDCs here: https://mbs.microsoft.com/partnersource/northamerica/readiness-training/partner-academy/trainingcenters.

- Prepaid plans: Alternately, you can make a monthly commitment to Windows Azure for 6 or 12 months and receive a discount of 20-32%. The discount is determined by the monthly monetary amount you commit. Microsoft offers two options:
  - Pay Monthly: Minimum commitment €350/month billed monthly
  - Pre-Pay: Pre-pay for the entire term and get an additional discount

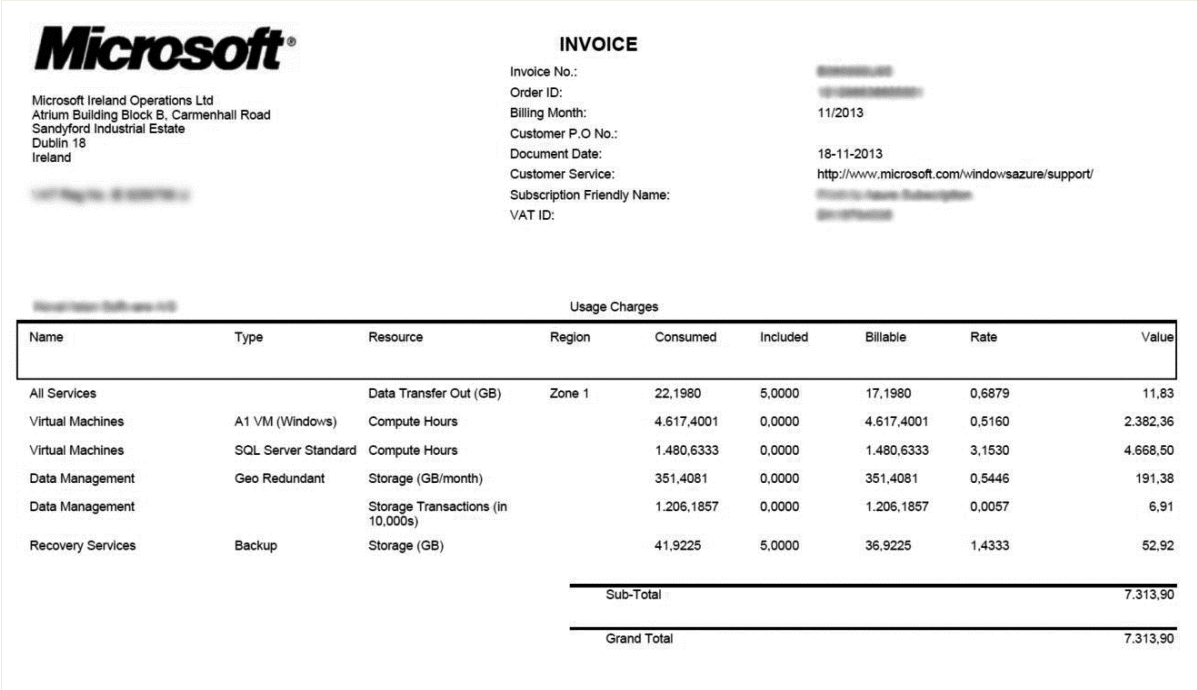
- Any unused commitment balance at the end of a billing month is rolled over as a credit to future billing months until the end of your offer term. For more information see: http://www.windowsazure.com/en-us/offers/commitment-plans/

- Enterprise agreement: The Enterprise Agreement (EA) offers additional discounts and terms as part of a deeper commitment to the platform. For more information see: http://www.windowsazure.com/en-us/pricing/enterprise-

agreement

An example of a monthly Windows Azure bill

The following screenshot shows an actual monthly bill from a Microsoft Dynamics NAV partner who uses Windows Azure.



Microsoft

Microsoft Ireland Operations Ltd
Atrium Building Block B, Carmenhall Road
Sandyford Industrial Estate
Dublin 18
Ireland

INVOICE

Invoice No.:	[redacted]
Order ID:	[redacted]
Billing Month:	11/2013
Customer P.O No.:	
Document Date:	18-11-2013
Customer Service:	http://www.microsoft.com/windowsazure/support/
Subscription Friendly Name:	[redacted]
VAT ID:	[redacted]

[redacted]

Usage Charges

Name	Type	Resource	Region	Consumed	Included	Billable	Rate	Value
All Services		Data Transfer Out (GB)	Zone 1	22,1980	5,0000	17,1980	0,6879	11,83
Virtual Machines	A1 VM (Windows)	Compute Hours		4.617,4001	0,0000	4.617,4001	0,5160	2.382,36
Virtual Machines	SQL Server Standard	Compute Hours		1.480,6333	0,0000	1.480,6333	3,1530	4.668,50
Data Management	Geo Redundant	Storage (GB/month)		351,4081	0,0000	351,4081	0,5446	191,38
Data Management		Storage Transactions (in 10,000s)		1.206,1857	0,0000	1.206,1857	0,0057	6,91
Recovery Services	Backup	Storage (GB)		41,9225	5,0000	36,9225	1,4333	52,92
			Sub-Total					7.313,90
			Grand Total					7.313,90

Please note that all currency in this invoice is in Danish Kroner (DKK).

This bill illustrates the components that you will find on your Windows Azure bill when you deploy your Microsoft Dynamics NAV solution on Windows Azure.

This partner chose to use Windows Azure for multiple reasons:

- They use it as the infrastructure of running multiple customers.
- They use Windows Azure as a development platform.
- They offer trial software towards prospects on their vertical solution.

For all these services, they use a combination of different Windows Azure virtual machine instances such as a combination of small VMs and several medium-sized VMs that include Microsoft SQL Server Standard edition. You may encounter some variable cost when implementing Microsoft Dynamics NAV 2013 R2 on the Windows Azure platform. In the following example, the variable cost is 0,0026%.

Variable Cost	Fixed Cost
Data Transfer Out = 11,83	Compute Hours = 2.382,36+4.668,5
Storage Transactions = 6,91	Storage GB = 191,38
TOTAL Variable Cost = 18,74 (0,0026%)	TOTAL Fixed Cost = 7.050,86 (99,9974%)

In general, we have not seen a bill where the variable costs in a Microsoft Dynamics NAV 2013 R2 deployment on Windows Azure are higher than 5% of the overall Windows Azure bill.

Licensing Microsoft SQL Server

The Microsoft Dynamics NAV 2013 R2 database components run on the following versions and editions of SQL Server:

- Microsoft SQL Server 2012 Express, Standard, or Enterprise (64-bit editions only).
- Microsoft SQL Server 2008 R2 Express, Workgroup, Standard, or Enterprise (64-bit editions only).

For more information, see Features Supported by the Editions of SQL Server 2012 at the following location: http://msdn.microsoft.com/en-us/library/cc645993(v=SQL.110).aspx.

There are 4 licensing options to consider when licensing Microsoft SQL Server:

- A virtual machine from the Windows Azure Application Gallery including SQL Server

  Windows Azure charges for SQL Server running inside virtual machines by the minute. Prices are listed as hourly rates and we bill based on total number of minutes when your VMs run for a partial hour. These rates already include the hourly rates for Windows Server®.

  You can choose to use Standard or Enterprise editions of Microsoft SQL Server subject to their specific usage rights. For more information, see http://www.windowsazure.com/en-us/pricing/details/virtual-machines/#service-sql-server.

  Recommended use: This option can be more cost-effective when you plan for or scale and volume. We recommend that you calculate what the cost efficiency breakpoint is between this option and any other SQL Server licensing option.

- Microsoft SQL SPLA per core or per named user

  The Microsoft Services Provider License Agreement (SPLA) is for service providers and independent software vendors (ISVs) who want to license the latest eligible Microsoft software products to provide software services and hosted applications to end customers. Only the Microsoft SQL Server Standard Edition using the SAL model can be licensed for deployment on Windows Azure. For more information, see your local SPLA Reseller.

  Recommended use: This option is more suited for deployments with fewer users.

- License Mobility through Software Assurance

  License Mobility through Software Assurance gives Microsoft Volume Licensing customers the flexibility to deploy eligible server applications with active Software Assurance on Windows Azure. With this software assurance benefit, there is no need to purchase new licenses and no associated mobility fees, so you can easily deploy existing licenses on the Windows Azure cloud platform. This option requires VMs dedicated to the customer.

  For more information, please visit the following location: http://www.windowsazure.com/en-us/pricing/license-mobility/.

  Recommended use: When your customer already has a volume licensing agreement.

- SQL Server Express

  Take advantage of the same powerful database engine as the other versions of SQL Server. SQL Server Express includes 10GB of storage per database, easy backup-and-restore functionality and compatibility with all editions of Microsoft SQL Server and Windows Azure SQL Database. This edition is free of charge.

  Microsoft SQL Server Express provides limitations on compute capacity, memory utilization and database size.

  More information on Microsoft SQL Server Express: https://www.microsoft.com/en-us/sqlserver/editions/2012-editions/express.aspx

  Recommended use: Microsoft SQL Express is only recommended for development scenarios. It is not recommended for customer production environments because of scalability limitations.

Licensing Microsoft Dynamics NAV

Microsoft Dynamics NAV supports different license models. For more information, see the Microsoft Dynamics NAV 2013 and Microsoft Dynamics GP 2013 Licensing Guide, which you can download from the following location: https://mbs.microsoft.com/partnersource/northamerica/partner-essentials/guides-handbooks/MSDYERP_LicencingGuide.

- License Mobility via Enhancement Plan

  License Mobility through Software Assurance gives Microsoft Volume Licensing customers the flexibility to deploy eligible server applications with active Software Assurance on Windows Azure. With this software assurance benefit, there is no need to purchase new licenses and no associated mobility fees. You can easily deploy existing licenses on the Windows Azure platform.

  Microsoft Dynamic NAV 2013 R2 can be licensed via Order Central by Microsoft Dynamics NAV certified partners under the Perpetual Licensing model.

  For more information, see the following locations:

  - https://mbs.microsoft.com/partnersource/northamerica/partner-essentials/guides-handbooks/MSDYERP_LicencingGuide
  - http://www.windowsazure.com/en-us/pricing/license-mobility/
  - http://www.microsoft.com/licensing/software-assurance/license-mobility.aspx

  Recommended use: The Microsoft Dynamics Perpetual Licensing model deployed on Windows Azure could be beneficial for customers that have little variability in number of users and who prefer an upfront investment

- SPLA

  The Microsoft Services Provider License Agreement (SPLA) is for service providers and independent software vendors (ISVs) who want to license the latest eligible Microsoft software products to provide software services and hosted applications to end customers.

  For more information, see the Microsoft Dynamics NAV 2013 R2 SPLA Licensing Guide.

- Subscription Licensing

  Authorized subscription licensing partners can license Microsoft Dynamic NAV 2013 R2 via Order Central using the Subscription Licensing model.

  If you are an authorized subscription licensing partner, more information is available in the Microsoft Dynamics NAV 2013 R2 Subscription Licensing Guide.

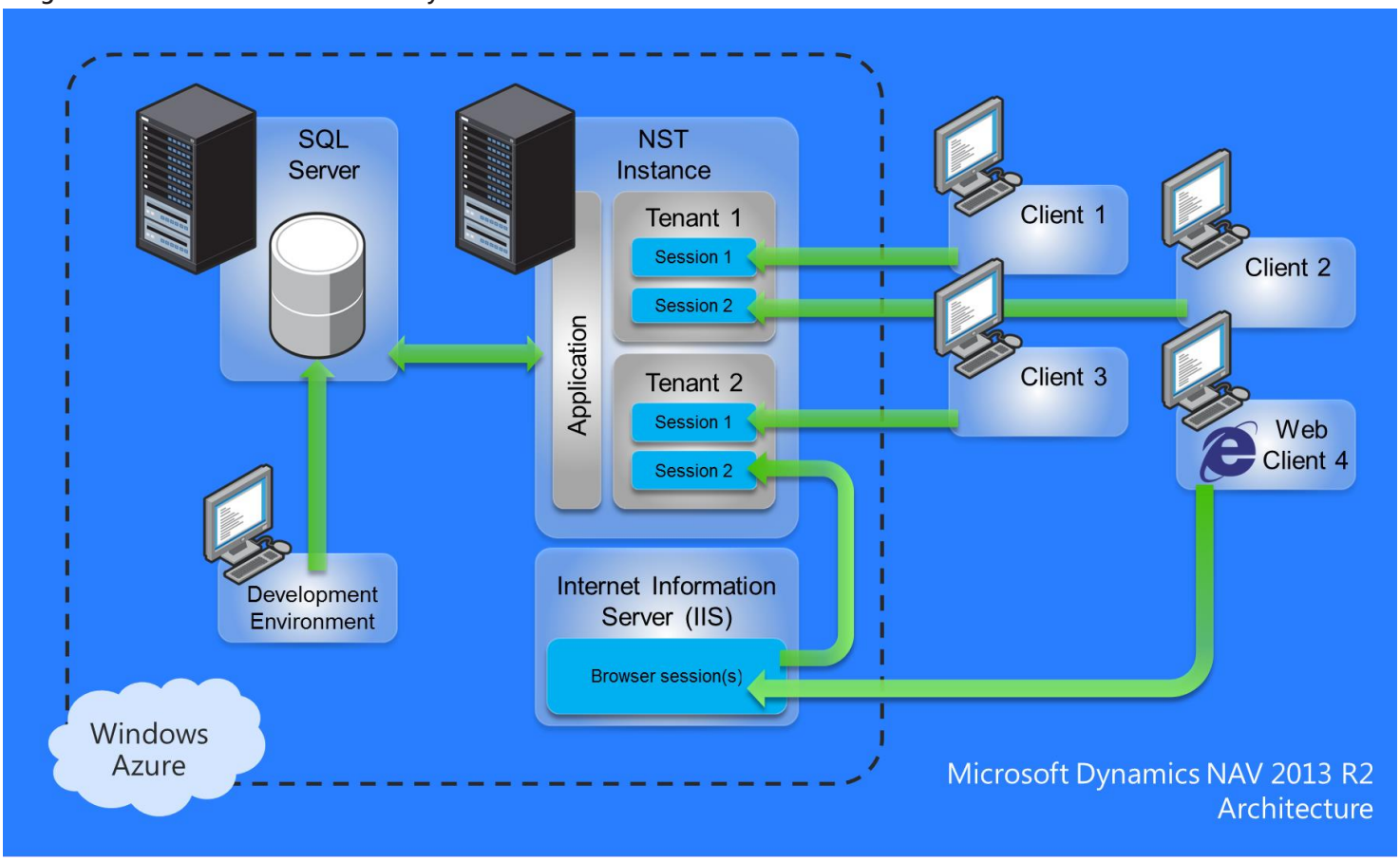
  If you are interested in subscription licensing, but are not an authorized subscription licensing partner, contact your local Microsoft Dynamics representative for details on the program.

Technical guidance

General system requirements for Microsoft Dynamics NAV 2013 R2

Please see the following location: http://msdn.microsoft.com/en-us/library/dd301054(v=nav.71).aspx

High level architecture of Microsoft Dynamics NAV on Windows Azure



The end-user has multiple options to connect to Microsoft Dynamics NAV 2013 R2:

- The Microsoft Dynamics NAV Windows client

  This client is recommended for users who perform heavy input and who rely on the flexibility and productivity of the WinClient. The Microsoft Dynamics NAV Windows Client can be automatically deployed using ClickOnce deployment technology. For more information on deploying Microsoft Dynamics NAV using ClickOnce, see the following location: http://msdn.microsoft.com/en-us/library/hh997056(v=nav.71).aspx.

- The Microsoft Dynamics NAV Web client

  The Microsoft Dynamics NAV Web client has a zero footprint installation and is recommended for occasional users. Microsoft Dynamics NAV 2013 R2 supports several browsers. To deploy the Microsoft Dynamics NAV Web client, you install and configure the Microsoft Dynamics NAV Web Server components on a virtual machine that is running Internet Information Services (IIS) and has a connection to the Microsoft Dynamics NAV Server. Microsoft Dynamics NAV users can access the Microsoft Dynamics NAV Web client from any supported device that has a connection to the internet. For a list of supported devices and browsers, see the following location: System Requirements for Microsoft Dynamics NAV 2013 R2. There are some Microsoft Dynamics NAV features that are not supported by all browsers. For more information see the following location: http://go.microsoft.com/fwlink/?LinkID=396648

- Microsoft Dynamics NAV 2013 R2 information surfaced towards Office 365 SharePoint team sites.
  With Microsoft Dynamics NAV 2013 R2, you can open and run the Microsoft Dynamics NAV Web client from within Office 365. By clicking on the Microsoft Dynamics NAV icon in Office 365, users open Microsoft Dynamics NAV 2013 R2 and can access and drill into charts, as well as share lists and Microsoft Dynamics NAV data and information with others. Microsoft Dynamics NAV 2013 R2 provides single sign on so when you sign in to Office 365 you are signed in to Microsoft Dynamics. For more information on Office 365 integration and how to bring Microsoft Dynamics NAV 2013 R2 in Office 365, please see the how-to videos in this document.

Microsoft Dynamics NAV 2013 R2 is built for cloud deployments

Running a solution from the cloud requires different components to be in place to provide a good end-user experience. Microsoft Dynamics NAV 2013 R2 is built for the cloud because we focused on:

Distance

The further the Microsoft Dynamics NAV WinClient is away from the Microsoft Dynamics NAV Server, the bigger the latency will be. This is the nature of physics. We reduced the communication between Microsoft Dynamics NAV 2013 R2 server and its client to ensure as few roundtrips as possible.

Authentication

In a typical cloud implementation, the Microsoft Dynamics NAV Server will not be placed inside the end user domain. Although it is possible to authenticate users thru the Active Directory within the end users domain, to do so is challenging and uncommon. To handle authentication, we introduced multiple options inside Microsoft Dynamics NAV 2013 R2:

- User name and password for simplicity
- ACS for flexibility: Windows Azure Access Control Service (ACS) is a cloud service that provides user authentication and authorization for web applications and services. By using ACS, you do not have to factor authentication and authorization into your application code. Instead of implementing an authentication system with user accounts that are specific to your application, you can let ACS orchestrate the authentication and much of the authorization of your users. ACS integrates with standards-based identity providers, including enterprise directories such as Active Directory, and web identities such as Windows Live ID, Google, Yahoo!, and Facebook.
- The Office 365 authentication mechanism, which uses Windows Azure Active Directory when enabling single sign-on users, can automatically switch between Office 365 Apps and Microsoft Dynamics NAV 2013 R2. You can also federate your AD with AAD.

For more information on ACS and authentication, please see the videos listed under the How Do I Bring Microsoft Dynamics NAV 2013 R2 "in" Office 365 section of this document.

Resource consumption cost

As a Microsoft Dynamics NAV partner with a volume business approach in mind, you want to optimize your cloud deployments by centralizing implementations on as few machines and tenants as possible. Therefore, we have rewritten our complete data stack to optimize resources. We introduced the multitenant deployment capabilities in Microsoft Dynamics NAV 2013 R2.

Everywhere and anywhere

When implementing in the cloud, you also want to enable end users to access your data on any device at any location. Therefore, we optimized the Web Client on usability. For example, you can:

- Implement the Microsoft Dynamics NAV WinClient thru Click Once deployment.
- Host Microsoft Dynamics NAV WebClient functionality 'on' Office 365.

- Deploy Microsoft Dynamics NAV Web parts in SharePoint online to surface important ERP data.

Scalability

The provisioning tools automate the deployment of Microsoft Dynamics NAV 2013 R2 on Windows Azure Virtual Machines. They are designed to fully automate the deployment; however, with some modifications, the tools can be used to provision any virtual machine that is on premise or in the cloud. The provisioning tools include a set of Windows PowerShell cmdlets and sample scripts that can install, configure and manage all required Microsoft Dynamics NAV components.

The Microsoft Dynamics NAV 2013 R2 Management Pack for System Center allows you to discover and monitor servers that are running Microsoft Dynamics NAV 2013 and Microsoft Dynamics NAV 2013 R2 components and services on premise and in the cloud. http://www.microsoft.com/en-us/download/details.aspx?id=36388

For more information on Microsoft Dynamics NAV Performance Counters, please see the following location: http://msdn.microsoft.com/en-us/library/jj672857(v=nav.71).aspx

Configuration

You can set up a new implementation in Microsoft Dynamics NAV 2013 R2 with RapidStart Services for Microsoft Dynamics NAV. RapidStart Services is a tool designed to shorten deployment times, improve quality of implementation, introduce a repeatable approach to implementations, and enhance productivity by automating and simplifying recurring tasks.

For more information on RapidStart please see the following location: https://mbs.microsoft.com/partnersource/northamerica/sales-marketing/campaigns-demand-generation/advertising-awareness/MSDNAVRapidStart

For more information on how to setup a company in Microsoft Dynamics NAV with Rapidstart Services, start here: http://msdn.microsoft.com/en-us/library/hh179428(v=nav.71).aspx

What's in the box

With the release of Microsoft Dynamics NAV 2013 R2, we enable partners to automate provisioning of Microsoft Dynamics NAV 2013 on Windows Azure virtual machines.

Provisioning on Windows Azure includes creating virtual machines, uploading and installing Microsoft Dynamics NAV 2013 R2, and setting up web and Windows clients using ClickOnce.

You can deploy Microsoft Dynamics NAV 2013 R2 in different network topologies. You can deploy Microsoft Dynamics NAV 2013 R2 on a single virtual machine, where all Microsoft Dynamics NAV 2013 R2 components are installed, or you can install on multiple virtual machines where Microsoft Dynamics NAV server is separated from the Microsoft SQL Server database.

The release of Microsoft Dynamics NAV 2013 R2 delivers:

- A set of Windows PowerShell cmdlets for Microsoft Dynamics NAV 2013 R2 which helps you automate on premise and cloud implementations.
- End-to-end sample scripts which deploy a fully functional Microsoft Dynamics NAV 2013 R2 environment on different network topologies. The scripts illustrate the operations that are required for full deployment of Microsoft Dynamics NAV 2013 R2 and can be modified to match the specific requirements for your specific situation.

How to deploy Microsoft Dynamics NAV 2013 R2 on Windows Azure

This section and the chart that follows provide some specific scenarios for how to deploy Microsoft Dynamics NAV 2013 R2 on Windows Azure based on existing documentation and training videos in 'How Do I' format. For a general introduction and information on deploying and managing Microsoft Dynamics NAV 2013 R2 on Windows Azure, please see the following location: http://msdn.microsoft.com/en-us/library/dn271710(v=nav.71).aspx

Required steps for implementing Microsoft Dynamics on Windows Azure
Prepare your Windows Azure provisioning environment How Do I: Get Started with Provisioning Tools for Windows Azure
Provision your first Microsoft Dynamics NAV 2013 R2 implementation with PowerShell Scripts How Do I: Automate Provisioning of Dynamics NAV 2013 on a Windows Azure Virtual Machine
More advanced steps for implementing Microsoft Dynamics NAV on Windows Azure
Provisioning in a high availability scenario How Do I: Automate Provisioning of Microsoft Dynamics NAV 2013 across two Windows Azure Virtual Machines
Provision Windows Azure virtual machines and users through a ASP.NET website which invokes cmdlets How Do I: Create an ASP.NET Website and Invoke Automated Azure Virtual Machine Provisioning
Bring Microsoft Dynamics NAV 2013 R2 "in" Office 365
Enable Single Sign On so users only need to login once to their business solution How Do I: Enable Single sign-on with Office 365 in Microsoft Dynamics NAV 2013 R2
Bring in Microsoft Dynamics NAV 2013 R2 as an APP into Office 365 and bring Microsoft Dynamics NAV pages in Office 365 parts How Do I: Embed Microsoft Dynamics NAV 2013 R2 pages in a SharePoint Portal
Best Practice Analyzer helps you to set up the integration between Microsoft Dynamics NAV 2013 R2 and Office 365 How Do I: Enable and Verify Single Sign-on with Office 365 in Microsoft Dynamics NAV 2013 R2 using Best Practice Analyzer and Windows PowerShell
Managing a Microsoft Dynamics NAV implementation
Windows PowerShell and scripting basics How Do I: Get started with PowerShell for Microsoft Dynamics NAV 2013 R2 How Do I: Create PowerShell scripts for Microsoft Dynamics NAV 2013 R2
Multi tenancy management How Do I: Migrate from Multiple Companies to a Multi-tenant Architecture in Microsoft Dynamics NAV 2013 R2 How Do I: Migrate from a single-tenant Microsoft Dynamics NAV 2013 database to NAV 2013 R2 with How Do I: Manage Tenants in Microsoft Dynamics NAV 2013 R2 How Do I: Set Up and Monitor Database Synchronization in Microsoft Dynamics NAV 2013 R2
Backup and restore databases How Do I: Backup and Restore in a Multitenant Environment in Microsoft Dynamics NAV 2013 R2
Deployment of the Microsoft Dynamics NAV Client using ClickOnce
Setup ClickOnce deployment How Do I: Deploy the Microsoft Dynamics NAV Windows Client with ClickOnce How Do I: Sign a ClickOnce Deployment for the Microsoft Dynamics NAV Windows Client How Do I: Deploy the Microsoft Dynamics NAV Windows Client to a Web Server with ClickOnce How Do I: Deploy the Microsoft Dynamics NAV Windows Client to Azure Blob Storage with ClickOnce
Configure Microsoft Dynamics NAV using Microsoft Dynamics NAV RapidStart service
RapidStart How Do I: Implement a Microsoft Dynamics NAV Solution using RapidStart Services How Do I: Migrate Data Using RapidStart Services for Microsoft Dynamics NAV 2013 R2
Configure the Microsoft Dynamics NAV 2013 R2 endpoints on several tiers
How Do I: Set up Web Client, Windows Client, NAS and Web Services in Microsoft Dynamics NAV 2013 R2

More Microsoft Dynamics NAV training scenarios are documented and available at the following locations:

- http://msdn.microsoft.com/en-us/dynamics/nav/ff518990
- https://mbs.microsoft.com/partnersource/training/news/MSDNAV7GettingReady.htm

Sizing and performance results for Microsoft Dynamics NAV 2013 R2 on Windows Azure

This section provides general information about the results of a series of simulations we performed to test sizing and performance of Microsoft Dynamics NAV 2013 R2 on Windows Azure.

For detailed information, guidance and recommendations on how to size Microsoft Dynamics NAV 2013 R2, please read the white paper, Microsoft Dynamics NAV 2013 R2 Sizing Guidelines. You will also find the detailed results of the sizing and performance tests we carried out.
https://mbs.microsoft.com/partnersource/training/news/MSDNAV7GettingReady.htm

The performance results you find in this document will differ from the results you have during customer implementations. If you need exact sizing and performance information, then we suggest that you do an in-depth proof of concept to answer specific questions.

Sizing recommendations and application performance are influenced by many factors such as the following:

- How the application is customized from the standard Microsoft Dynamics NAV out-of-the-box solution
- The amount of data in the Microsoft SQL Server database and how the underlying Microsoft SQL Server database is tuned for performance
- Use patterns and how many users running the same business logic simultaneously
- The underlying architecture
- Other performance-influencing applications running in the same environment

For these tests we tried to simulate how people actually work rather than setting up scripts that overload the server with processes.

We performed a series of sizing scenarios on different Windows Azure virtual machine setups all running the out of the box Microsoft Dynamics NAV 2013 R2 demo environment.
The specification of the Windows Azure virtual machines might change over time.
When our sizing tests were performed, these were the specifications of the virtual machines used.

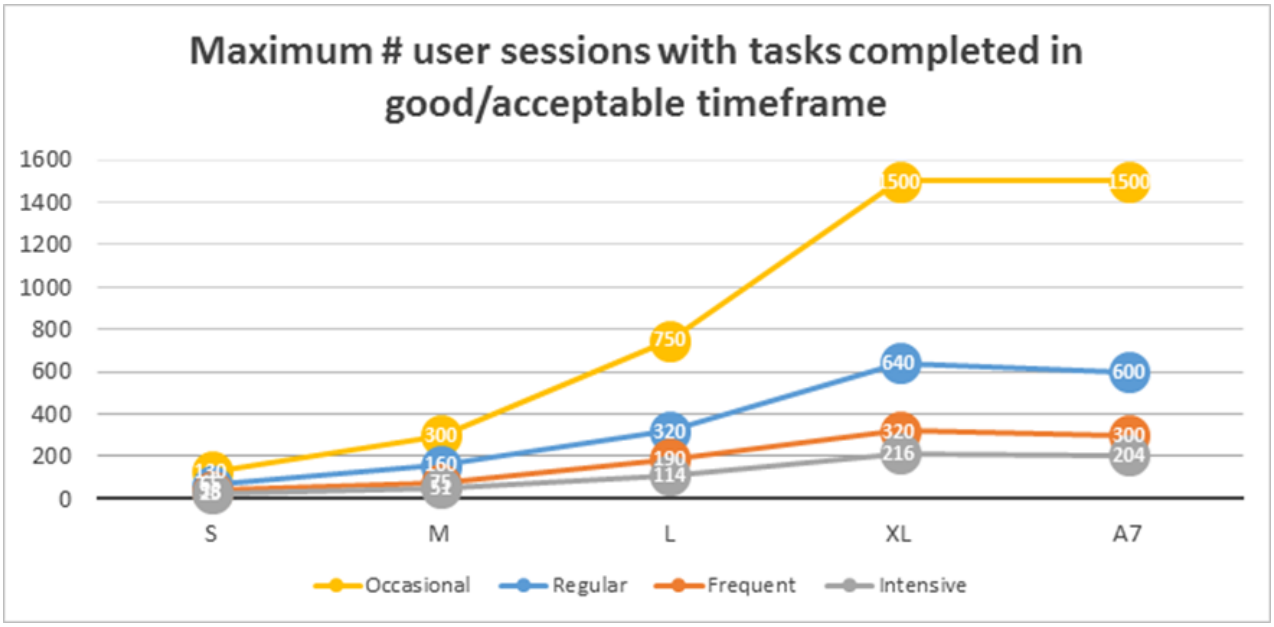
SIZE	CORES	MEMORY	PRICE
SMALL (A1)	1	1.75 GB	$0.09/hour (~$67/month)
MEDIUM (A2)	2	3.5 GB	$0.18 (~$134/month)
LARGE (A3)	4	7 GB	$0.36 (~$268/month)
EXTRA LARGE (A4)	8	14 GB	$0.72 (~$536/month)
A7	8	56 GB	1,60 (~$1,191/month)

We simulated the execution of several transactional and consulting scenarios performed by 4 different types of user profiles on different Windows Azure virtual machine sizes.
Please see the white paper, Microsoft Dynamics NAV 2013 R2 Sizing Guidelines for more information on user profiles.

Microsoft Dynamics NAV sizing conclusions

The following chart illustrates the results of our tests. The chart shows the number of user sessions that completed tasks successfully within the timeframes that were set as either good or acceptable.
You can use this chart as an indication to help you decide on the deployment infrastructure of your own solution.

However, tests are based on multitenant deployments. These results do not map directly on premise single tenant deployments.



In this chart, each line illustrates the number of sessions for a specific user profile across the Windows Azure Virtual Machine sizes that we tested.

The impact of Microsoft Dynamics NAV multitenant mode

Configuring the Microsoft Dynamics NAV Server instance to be multitenant mode has no direct negative performance impact. With multitenant support, partners can more easily add new customers to their solution, and roll out updates quickly with limited downtime for customers. In multitenant deployments, the application is shared across tenants, and so are memory, cache and CPU. As a result, the expense for each customer is reduced.

The impact of setting up several Microsoft Dynamics NAV instances

The tests show that the impact of running multiple Microsoft Dynamics NAV Server instances in one environment is resource intense – every Microsoft Dynamics NAV server instance requires approx. 512 MB of memory and sufficient CPU power.

The need of cores versus memory

In the scenarios we tested with the Windows Azure A7 instance, we have seen that only adding RAM is not sufficient to scale out; however, other scenarios might benefit.

In our scenarios, the limiting factor on this machine size is not RAM, but the amount of available cores. In our tests, each core is capable of handling approximately 80 users.

When not being limited by cores, every connected user session towards the Microsoft Dynamics NAV server approximately 10 MB of RAM can be calculated (depending on user activity).

Please remember to take into account the minimum server requirements of additional implemented components on your topology.

Adding additional Microsoft Dynamics NAV Server instances to the topology

Throughout this sizing chapter, we have discussed the sizing based on multiple tenants and described how many users you can fit on the various models of Windows Azure virtual machines. Increasing the size of the virtual machine is called scaling up.

Scaling out is adding more virtual machines to the pool behind a load balancer.

We did a series of tests on scaling out and in general we've seen very promising results.

With scaling out the environment with one extra server instance we could double the capacity. One large instance is able to handle approximately 320 user sessions, 2 large instances are able to handle the double, i.e. around 640 users. Windows Azure supports scaling out by adding multiple virtual machines to the same hosted service (http://www.windowsazure.com/en-us/documentation/articles/load-balance-virtual-machines/), adding them into one availability group and setting up the necessary load balanced ports.
Scaling out gives you a number of benefits, including:

- High availability: Having two or more servers in one availability group ensures that Windows Azure won't do scheduled maintenance of your virtual machines at the same time, thus giving you a higher availability. For a complete high availability setup you need to consider a setup with the Microsoft Dynamics NAV servers and the Microsoft SQL servers doubled. This requires at least two Microsoft Dynamics NAV servers and two Microsoft SQL servers. Keep in mind this is considered as a more secure setup but has a significant impact on Windows Azure infrastructure costs. For more information, see High Availability and Disaster Recovery for Microsoft SQL Server in Windows Azure Virtual Machines. http://msdn.microsoft.com/en-us/library/jj870962.aspx. Please note that Microsoft SQL Mirroring is not supported with Microsoft Dynamics NAV 2013 R2.

- Elasticity: Scaling out allows you to run more servers during peak periods and less servers during nights and weekends. Adding servers to a hosted service does not incur downtime.

- Cost: On Windows Azure you only pay compute hours for the servers that are actually running. Having servers standing by is only charged by the storage they take up.

- Disaster recovery: If a server fails and for some reason is unable to boot, you can have other servers standing by to take over and then simply delete the failing server.

- Flexibility in database maintenance: You can take servers offline for maintenance without users losing connection.

Setting up servers in a scale out environment adds some complexity, since all servers need to be identical and autonomous. Below is a non-exhaustive list of topics to consider when installing multiple Microsoft Dynamics NAV Server instances in one hosted service:

- Load balancing the Windows Client: The Windows Client requires a sticky connection to a Service Tier. The Windows Azure load balancer will close the connection after 4 minutes if no communication has happened. Once a connection has been established, the Windows Client will send keep-alive packages to the Service Tier to keep the connection open.

- Load balancing the Web Client: Web Client is stateful as well and once connected to a specific Web Client instance, the user needs to stay on this Web Client instance. This can be done by simple redirection.

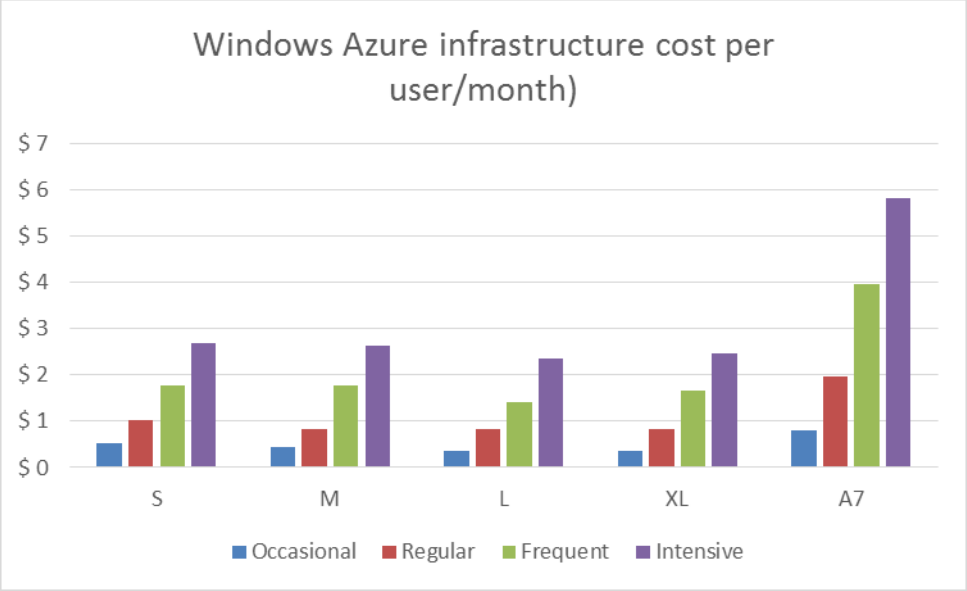
- Mounting and dismounting tenants: When you have multiple service tiers and need to mount or dismount tenants, you need to make sure that all service tiers are informed about the configuration change. You need to consider that not all service tiers are running. We recommend installing the virtual machines in a way, which allows them to discover these things automatically.

For more information on planning and preparation, please see the How to deploy Microsoft Dynamics NAV 2013 R2 on Windows Azure section in this document and http://msdn.microsoft.com/en-us/library/dn271710(v=nav.71).aspx

Fixed Windows Azure infrastructure costs when planning for scale

When focusing only on the infrastructure cost for the Microsoft Dynamics NAV Server, and not taking into account the infrastructure cost for the Microsoft SQL Server or other necessary components, you will see that the more users you add to the system the more the costs decrease as the costs are shared over more users.
At maximum occupation and utilization of the Windows Azure infrastructure, the average cost per connected user is similar to each topology choice we calculated. For example:

- The cost for an occasional user profile could go down to. 0,5 dollars.
- The cost for a regular user profile could go down to approximately 1 dollar.
- The cost for an intense user profile could go down to approximately 2 dollars.



The average cost per user decreases for every connected user added to the system.

Windows Azure in your customer lifecycle processes

Microsoft Dynamics NAV 2013 R2 on Windows Azure provides multiple ways to optimize resources by implementing cloud services into internal processes. Here is a list of some of the customer-life cycle processes and a suggestion for when Windows Azure can be an opportunity for your own business:

Presales

Product demos during presales activities are typically resource-intensive.
A business solution from Microsoft consists of several components and the prospect needs to have a good impression of the whole package he is buying. Installing and managing those different components and preparing the correct demo data demands time and resources.
In addition, traditionally demo environments are implemented on expensive equipment, which is hardly scalable to more people. The Windows Azure platform provides you the platform to build complete demo environments which can be deployed automatically within minutes. They can scale out to multiple resources and you have the capability to restore the demo environment after your demo to the point before your demo.

Offering trial software

When you are considering offering trial software to prospects, the Windows Azure platform provides you opportunities. The Microsoft Dynamics NAV 2013 R2 cmdlets and sample scripts provide you the building blocks to automate provisioning trial solutions completely automatic on Windows Azure.
Think carefully about offering trials in your business. When offering automated trials it is important to combine that with correct automated guidance as well.

Unguided prospects working with your cloud solutions may not work in your favor. Prospects need to understand your functionality in the right context and should be able to find answers to their questions and concerns. Without that guidance, the prospect may build an incorrect perception of the trial experience and that may affect the sales process length and decision.

Developing and testing your vertical solution

When going to market it is important to offer industry knowledge on top of Microsoft Dynamics NAV. Building that knowledge requires your product development team to collaborate in complex development and test environments. Windows Azure infrastructure as a service offers opportunities for your product development team to collaborate on a cloud environment without the need of procuring and managing local servers for development and testing.

The ordering and implementation process of a customer

The implementation process of a Windows Azure deal will be a lot faster, mainly because the procurement and infrastructure setup process for hardware is non-existent with cloud deployments.
In addition, The Windows Azure platform and Microsoft Dynamics NAV 2013 R2 cloud tools provide great capabilities to create an automatic ordering and provisioning platform thru web applications and automatic scripting.
When the ordering and provisioning platform is completely automated by you – the Microsoft Dynamics partner – implementation times can be decreased from month to minutes. Also, the provisioning tools can be used internally and externally.

Configuration

For information on configuration, please see the section entitled Technical Guidance in this document.

Support

With Windows Azure you will manage and monitor your customer environments using familiar tools, like System Center. System Center 2012 R2 delivers unified management across on-premises, service provider, and Windows Azure environments, thereby enabling the Microsoft Cloud OS. System Center 2012 R2 offers exciting new features and enhancements across infrastructure provisioning, infrastructure monitoring, and application performance monitoring, automation and self-service, and IT service management.

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- Effective February 2014, all competency partners will have access to Microsoft cloud services including Office 365, Microsoft Dynamics CRM online, Windows Azure and Windows Intune as a part of their core benefits. For more information, see the following location: https://mspartner.microsoft.com/en/us/pages/membership/downloads/microsoft-partner-network-competency-roadmap.aspx

Windows Azure benefit for MSDN subscribers

If you are a Visual Studio Professional, Test Professional, Premium or Ultimate with MSDN or MSDN Platforms subscriber, you can activate your MSDN benefit now to start development and test on Windows Azure.

Take advantage of instant provisioning to develop and test applications faster. Use elastic scale to test real world scenarios. Eliminate the cost of buying hardware for testing purposes. Build native cloud applications, test existing applications in virtual machines, and create hybrid applications that span your datacenter and Windows Azure.
For team development and test scenarios, the MSDN development and test pay-as-you-go offer is the most affordable way to accelerate time to solution. Account owners can open multiple subscriptions and enable access for co-administrators working together on each separate project. Learn more at the following location:
http://www.windowsazure.com/en-us/pricing/member-offers/msdn-benefits-details/

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