

## Azure application architecture technical assessment form

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### Application overview

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Assess the following items at high-level:

- Why does your customer need to migrate to a public cloud, such as Azure? Document their known pain points and reasons for expanding into a global cloud-based application.
- What is the overall migration approach which will be followed? Refer to my blog article <https://stefanos.cloud/blog/cloud-migration-options-for-software-applications/>. Does the customer need to achieve a cloud-native application or will they follow a lift-and-shift or other intermediate solution for the Azure application migration?
- Global performance. What is the expected performance at a global region level?
- Investigate presence into the Azure China market (operated via Vianet separately from the other Azure regions)
- Investigate presence into the Azure US Government market (operated separately from the other Azure regions)
- What does your customer need to change in their existing application platform to be ready to be migrated?
- What are the high level data residency and data compliance requirements? Does the application belong to a specific knowledge domain with special compliance requirements, such as HIPAA in the health sector or PCI-DSS in the payment or retail industries?
- What are the application components at a high level? Ask the customer to describe the application's physical and logical architecture and application components and software development technologies used.
- Does the application make use of any integration points (bridges) or external software dependencies with other on-premise or cloud-based applications and services?
- Does the customer have a devops architecture for developing and delivering new application releases and for source code version control, e.g. Github?
- Does the application contain executables which must be run in its execution context during application runtime (e.g. .exe or .bat files)?
- Perform a quick code analysis using best practice code analyzers and ensure that is is written in a software development stack version supported by Azure App Service.
- Does the application have support for App Service Web Jobs SDK, Azure File Mount and App Service Application Insights?
- Can the application be re-written to become cloud-native? Is the end customer aware of Azure application modernization techniques?

### Physical tiering

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Assess the following items:

- What is the customer's current application physical architecture (In detail)? What are the physical tiers used at both infrastructure level (servers, containers, virtual machines) and application level (software development tiers, front end security, http/web, application, data)?
- What are the detailed physical infrastructure components and services currently in use (compute, storage, networking, applications, virtual machines and hosts, containers, backup, disaster recovery, remote access technologies)
- Can the application be run inside a container, besides inside a Virtual Machine? Is the application software stack version supported by Azure App Service or do you need to consider Azure Cloud Services (extended

support)?

## **Logical tiering**

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Assess the following items:

- What are the software development technologies (software development stacks for front end and back end) and software components which comprise the application solution?
- What is the type of the application (Web, Windows, Linux bash, Linux GUI, Web service, container, etc)?
- Does the application come with an installer? What is the application deployment procedure?
- Ask the customer to provide a detailed demo for you with all application use cases, from both an administrator and end-user perspective. List all possible application operations for any roles applicable (RBAC). This will give you an insight into how the application currently operates and what requirements and challenges this might result in, when moving to Azure.
- Does the application provide Application Programming Interfaces (API)? If so, list the APIs and relevant API documentation.
- What software application bindings does the application use (NET TCP, HTTP, WCF, MSMQ, etc)?
- Does the application use any Commercial Off-the-shelf (COTS) components? Or is it completely custom?
- Describe the application's traffic from/to the Internet and from/to other on-premise networks and locations. Create a table/list of all traffic with designations (from network/IP/FQDN, to network/IP/FQDN, from port/protocol, to port/protocol)
- Document the application component versions.
- Document the application software component dependencies and software pre-requisites.
- Document the number of users (total maximum, concurrent minimum, concurrent average, concurrent maximum).
- Document the types of application clients and how the application is accessed (from Internet, from private IP space with VPN, from MPLS private network, etc). What networking security requirements must be in place for the application to operate properly?
- Document any potential software integration points (bridges) with external systems via API (REST, SOAP, etc).
- What is the data tier design and data requirements? Does the application make use of a SQL vs a non-SQL data store? What is the application's overall data architecture and storage components (file-based storage, block-based storage, SQL tables, message queuing technology)?

## **Application non-functional analysis**

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### **Remote access**

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Assess the following items:

- Does the application make use of VPN vs ZTNA vs VDI?
- Does the application make use of Site-to-site (S2S) vs Point-to-site (P2S) VPN? Does it require a NAT Gateway for outbound access?
- Will you enable public RDP/SSH access to virtual machines?
- Will you enable public access to PaaS services, e.g. Azure SQL?
- Do any of the following Azure networking technologies make sense in the scope of the new migrated application for remote access (Private Link, Virtual Network Service Endpoint, Service Connectors)?=

## **Licensing and cost management of the software application**

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Assess the following items:

- Does the customer have an existing Windows Server or SQL Server license keys with Software Assurance (SA) which are applicable for use in the Azure environment with Hybrid Benefit?
- Make use of other cost management tips while moving to Azure, for example utilize Reserved Instances (RI). Consult article <https://stefanos.cloud/kb/how-to-minimize-your-azure-cloud-costs/> for minimizing Azure costs.

### **Scalability - Redundancy/resiliency/high availability**

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Assess the following items:

- What are the Azure regions where the application will initially be deployed and will it need to expand to a multi-region design soon?
- What is the required Azure storage redundancy for each applicable Azure infrastructure service (LRS vs ZRS vs GRS vs RA-GRS)?
- How many Azure fault domains and update domains are needed?
- Which Azure service swill require local (datacenter), zonal and regional redundancy?

### **Network bandwidth**

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Assess the following items:

- What is the total data capacity expected to be generated outbound from the new Azure infrastructure to the Internet or other private networks as well as among Azure regions? Each Azure service has its own bandwidth calculations.
- Run various reports in the existing network infrastructure and network traces (e.g. tcpdump, Wireshark) to have a good estimation of the expected outbound bandwidth for all application usage scenarios.

### **Security**

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Assess the following items:

- Are there any specific security specifications and standards which must be complied with in the Azure infrastructure and catered for in the Azure Security Center? These include PCI-DSS, ISO 27001 and HIPAA.
- What is the applications identity design (Identity Provides IDP, Service Providers SP, Federation, Hybrid Identities, SQL authentication, Managed Identities, etc)?
- What security components are needed in the Azure solution? For example WAF, DDOS, CDN, Azure Firewall, Application Gateway, Front Door.
- Which Azure services will require Azure Private Link and Virtual Network Service Endpoints for non-public access?
- What is the desired VNET design (Subnets, VNET Peering, DNS, IP address space, etc)?
- What are the NSG, ASG, UDR and Azure Firewall required rules?
- Is there any requirement for a Microsoft Security Score minimum achieved value?
- Are there any reverse proxies required, for example for the HTTP(S) and SSH protocols?
- Will Azure AD advanced security features (such as external identities, Azure AD B2B, Azure AD B2C) be required?
- Will Azure AD application proxy be required for an on-premises application?
- Consult with all application software vendors to determine the security best practices after the migration of the application components to the Internet (e.g. FTPS server, SSH server, Citrix ICA server, Remote Desktop

- services server, ERP/CRM server, etc).
- Does the customer make use of a TLS private CA, in which case they must install manually the root CA certificate to trust the certificate on each client? Or do they make use of a public CA?
- What is the minimum and maximum TLS version which the application supports?

## **Compliance for security and privacy**

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Assess the following items:

- HIPAA required?
- GDPR required?
- ISO required?
- Data at rest security requirements?
- Data in transit security requirements?
- Data in use security requirements?

## **Governance**

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Assess the following items:

- Understand and document Azure Policy
- Understand and document Azure Blueprints and Landing Zones, based on Azure Well-Architected Framework (WAF) and Cloud Adoption Framework (CAF)

## **Performance**

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Assess the following items:

- What are the maximum network latency requirements for the different parts of the application?
- Are there any specific QoS requirements?
- What are the minimum storage IOPS requirements of each application tier / layer?

## **Integration points**

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Assess the following items:

- Application integration points (bridges)
- Application exposed APIs (REST, SOAP, etc)

## **Migration requirements**

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Assess the following items:

- Assess migration procedures for both application data (e.g. SQL database data and SQL database schema) and application configuration (e.g. application configuration files) migration. A good practice is to separate the control plane from the data plane.

## **Backup requirements**

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Assess the following items:

- Types of data to be backed up (What)
- Data retention window, growth rate and total size of file data and block data (e.g. sql databases and virtual machine disks) (How long)
- What type of Azure storage account will the data be backed up at. This will determine the overall performance and recovery procedure (Where)
- Document and explain to the customer the desired Point In Time restoration procedures

- Understand the customers Recovery Point Objective (RPO) and Recovery Time Objective (RTO).

### **DR requirements**

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Assess the following items:

- Does the customer really need an Azure Recovery Services plan? If so, inform them about an estimation of the overall DR procedures and costs. Due to increased complexity, designing a DR solution should always be treated as a separate project.
- Understand the customers Recovery Point Objective (RPO) and Recovery Time Objective (RTO).

### **Monitoring and alerting**

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Assess the following items:

- What types of Azure monitoring services fit into the application monitoring and alerting requirements? See my blog article on Azure baseline monitoring for more details.
- Azure Application Insights
- Document the Azure monitoring/alerting/diagnostic settings/log analytics/Network Watcher/Application Insights/VM OS logging

### **Analytics**

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Assess the following items:

- Does the customer need to analyze application logs and create Business Intelligence Reports using PowerBI?
- Where will the data for analysis come from (e.g. application server logs, application client logs)
- What kind of data analysis is required? Research the usage of an appropriate Azure service for data analysis, such as Azure Data Factory, in combination with a reporting mechanism.

### **Automation requirements**

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Assess the following items:

- Which tasks need to be automated?
- Are there any custom scripts to be executed in Azure services, such as in Azure App Service or Azure Vms? Consider the usage of Azure Automation, Azure Web Jobs, Azure Functions and Azure ARM or Bicep templates or other serverless service for achieving further automations.

### **Technical assessment scripts to be run for capacity planning**

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To choose appropriate Azure SKUs/plans for all Azure applicable services, a series of technical assessment scripts must be run in the customer's existing application environment.

You need to run capacity planning scripts to size the following:

- Application server plan based on capacity (storage, compute)
- Azure data service plan based on capacity (storage, compute)
- Azure Application Delivery Controller (Front Door / App Gateway) plan based on capacity
- Azure storage SKU based on capacity and functional requirements
- Azure VM SKU based on capacity (OS disk, data disks, encryption, availability, VM scale set, VM availability set). Also determine which VM extensions or application extensions may be needed in the Azure VMs

In the scope of a capacity metrics audit, assess the following items:

- Concurrent network connections and maximum required bandwidth
- Storage types, storage size and IOPS
- Hours of operation of workloads to be placed to Azure Vms.
- Number of users and number of concurrent and max connections
- How many Azure regions

### **Capacity assessment tools for physical and virtual servers**

- HWINFO for all Vms and physical servers and also make use of all available management consoles of on-premises hypervisors or public cloud consoles with metrics and exported files
- Speedtest run via Web browser on all servers
- Windows performance monitor on existing cloud servers and client endpoints. Also use Perfmon and Wireshark throughput when all endpoints concurrent run in maximum performance, to measure network throughput.
- Storage IOPS benchmarking tools
  - <https://github.com/microsoft/diskspd>
  - <http://woshub.com/how-to-measure-disk-iops-using-powershell/>
  - <https://crystalmark.info/en/download/>.

### **Capacity assessment tools for IIS server and .NET applications**

- Microsoft IIS server and .NET software dependencies powershell scripts
  - <https://github.com/Azure/App-Service-Migration-Assistant/wiki/PowerShell-Scripts>
  - <https://azure.microsoft.com/en-us/services/app-service/migration-tools/>
  - <https://github.com/Azure/App-Service-Migration-Assistant/tree/master/MigrationDocs>

### **Capacity assessment tools for SQL Server**

- SQL Server - SQL DMA: <https://docs.microsoft.com/en-us/sql/dma/dma-assesssqlonprem?view=sql-server-ver15>
- DMA assessment report and SKU recommendations as per <https://docs.microsoft.com/en-us/sql/dma/dma-sku-recommend-sql-db?view=sql-server-ver15>

### **Capacity assessment tools for SSH Server**

- <https://www.cyberciti.biz/tips/how-to-audit-ssh-server-and-client-config-on-linux-unix.html>
- <https://github.com/jtesta/ssh-audit>

### **Migration checklist for Azure App Services**

When it comes to Azure App Service migration, consult the following checklist. igration checklist: <https://azure.microsoft.com/en-us/blog/migration-checklist-when-moving-to-azure-app-service/>

### **Project management**

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Last but not least, you need to assess the following items:

- Is there a budget for a Proof of Concept (PoC) prior to running the production implementation (high recommended)?
- Is there any hard deadline for the PoC and for the production migration? Which human resources can be dedicated to the project? A Subject Matter Expert (SME) of the application (architect, lead developer) is required throughout the project with access to the source code and deep understanding of the application architecture. This is important in order to implement any refactor or redesign/rebuild actions prior to the cloud migration.

- Is there any maximum budget?



## **Azure Docs References**

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<https://azure.microsoft.com/en-gb/migration/cloud-migration/checklist/>  
<https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/migrate/azure-best-practices/contoso-migration-sql-server-db-to-azure>  
<https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/migrate/azure-best-practices/tailwind-migration-assess-servers>  
<https://docs.microsoft.com/en-us/azure/migrate/how-to-discover-sql-existing-project>  
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<https://techcommunity.microsoft.com/t5/office-365/calculating-bandwidth/m-p/72059>  
<https://docs.microsoft.com/en-us/azure/migrate/concepts-azure-webapps-assessment-calculation>

### **Azure SQL assessment**

<https://docs.microsoft.com/en-us/sql/dma/dma-overview?view=sql-server-ver15>  
<https://docs.microsoft.com/en-us/sql/dma/dma-sku-recommend-sql-db?view=sql-server-ver15>  
<https://docs.microsoft.com/en-us/sql/dma/dma-assesssqlonprem?view=sql-server-ver15>  
<https://docs.microsoft.com/en-us/sql/dma/dma-assess-sql-data-estate-to-sqldb?view=sql-server-ver15>

### **Azure App Service IIS assessment**

<https://techcommunity.microsoft.com/t5/apps-on-azure-blog/zero-to-hero-with-app-service-part-4-migrate-applications-to/ba-p/1533914>  
<https://azure.microsoft.com/en-in/blog/introducing-the-app-service-migration-assistant-for-asp-net-applications/>  
<https://azure.microsoft.com/en-us/services/app-service/migration-tools/>  
<https://github.com/Azure/App-Service-Migration-Assistant/wiki/PowerShell-Scripts>  
<https://github.com/Azure/App-Service-Migration-Assistant/wiki>  
<https://azure.microsoft.com/en-us/blog/migration-checklist-when-moving-to-azure-app-service/>