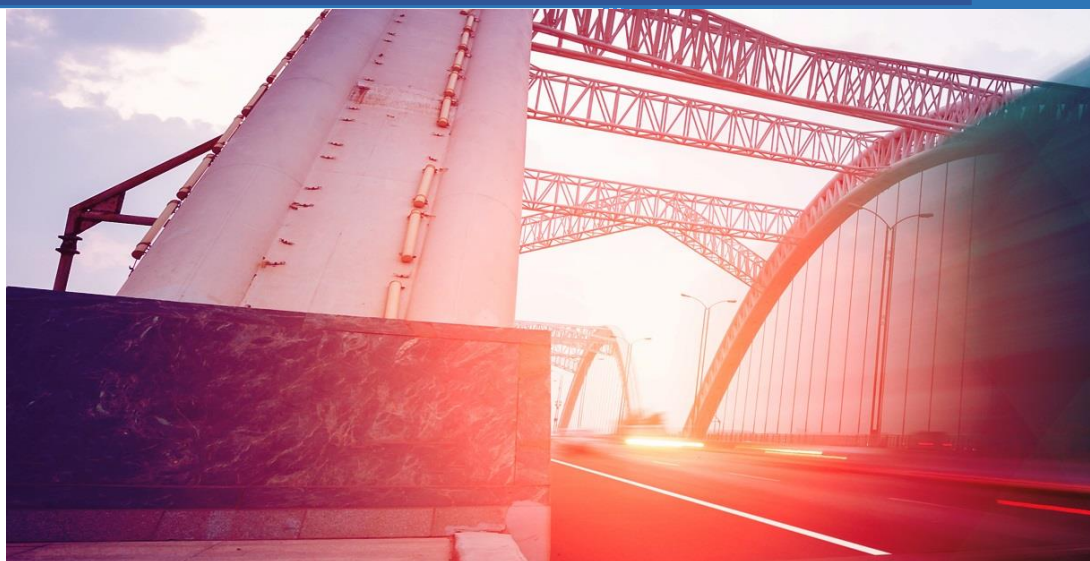# ZERODOWN
SOFTWARE

HA for Azure Stack PoC Quick Start

Version 1.0

Proof of Concept Quick Start Guide

How to set up an App Migration PoC using ZeroDown® Software HA for Azure Stack

Contents

Introduction

This guide outlines how to build your Azure Stack sales and consumption pipeline by implementing a Proof of Concept (PoC) with ZeroDown® Software's high availability solution, **HA for Azure Stack**.

Benefits of this approach include:

- Demonstrate how to transform legacy apps to cloud-enabled apps on Azure Stack
- Accelerate Azure Stack adoption by offering full business assurance
- Improve efficiencies of Azure Stack EAIs deployment process using a quick-fire PoC
- Drive increased consumption for Azure Stack implementations
- Show how to deploy multiple Stamps to deliver business continuity
- Develop a Managed Services practice to help build out repeat business opportunities

The net benefit overall is the ability to deliver a powerful one-two punch that packs your pipeline and wins more sales:

1. **Implement a HA for Azure Stack PoC** to establish customer confidence quickly in the resiliency of their applications and data on Azure Stack
2. Use this solution a foundation piece **to offer your customers true cloud-enabled capabilities** for their workloads right out of the box.

Background

Before we dive into the solution, let's first consider the customer context. For many customers, especially large-scale enterprises, their business-critical applications will have evolved and grown over time into a complex mix of operations that has linkages to other data assets and services. The challenge with moving such a massive type of application to the cloud is that (i) it is not easy to do a straightforward 'lift and shift' and (ii), even if it were simple, this would not automatically deliver the advantages of cloud-enabled features and functions. In summary, there may be a need for extensive modifications to prepare a legacy application for operating in the new environment.
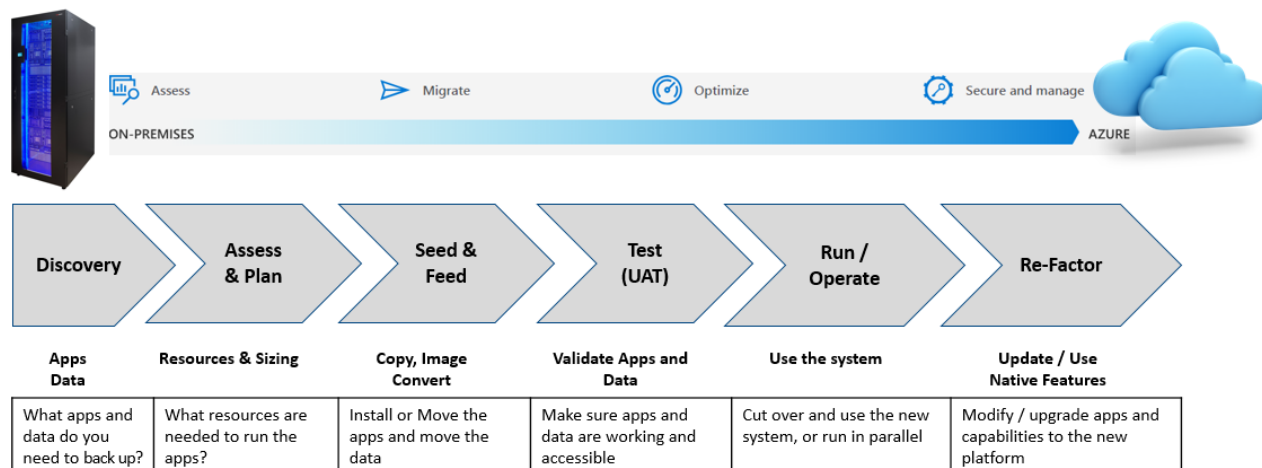
This document is NOT about how to refactor a monolithic app into a set of microservices to turn it into a cloud-native app. The focus here is to understand how to get the customers' apps up and running 'as is' quickly and safely in the new Azure Stack environment. The Quick Start POC is, therefore, the vehicle to opening up a larger conversation of how to manage and optimize the applications once they get to the cloud. By getting to the cloud first, the client will not get bogged down discussing the problems of tackling an immovable object and can quickly move into the next step of envisioning their workloads as part of a cloud-enabled future.

It also should be noted that to get a customer moving on their cloud journey it is not necessary to begin with the most challenging apps and use cases. The good news is that not all the customers' applications will need re-architecting to operate effectively, and not all need to be set up to use a Platform as a Service (PaaS) model. To borrow some essential advice from Microsoft's own playbook:

<div align="center">

START WITH A PILOT: PICK LOWER COMPLEXITY, LESS RISKY WORKLOADS.

</div>

Migration Overview

Starting a POC using ZeroDown® Software's solution will allow you to bypass an important step that is typically required when moving from a legacy environment to a new platform. To mitigate the risks of migrating data on a live application it is often necessary to write code that allows you to move forward to the new environment or, in the case of unanticipated problems, enables you to failback to the old environment and start again. Additionally, it may be required to build in safeguards against overwriting older data with newer data. With ZeroDown® Software in place, you can quickly skip stop-gap coding solutions and dive right into the migration itself. The process for deploying the customer app from a legacy environment to the cloud is relatively simple, involving a few simple steps and questions.

Discovery	Assess & Plan	Seed & Feed	Test (UAT)	Run / Operate	Re-Factor
Apps Data	**Resources & Sizing**	**Copy, Image Convert**	**Validate Apps and Data**	**Use the system**	**Update / Use Native Features**
What apps and data do you need to back up?	What resources are needed to run the apps?	Install or Move the apps and move the data	Make sure apps and data are working and accessible	Cut over and use the new system, or run in parallel	Modify / upgrade apps and capabilities to the new platform

About ZeroDown® Software

ZeroDown® Software comes in an easy-to-deploy package that provides genuine active-active real-time operations across multiple sites or zones. Some key features of the ZeroDown® Software architecture that makes it uniquely qualified to support high availability application migration include:

- ZeroDown® Software installs in Azure as a Virtual Machine image
- ZeroDown® Software replicates the simultaneous processing of all transactions between the two application deployments
- Each deployment is a replicated image of the application and supporting backend infrastructure
- Transactions are independently processed at all locations providing an active-active infrastructure
- ZeroDown® Software is agentless, focused on application transactions as opposed to block replication
- ZeroDown® Software's Business Continuity as a Service (BCaaS™) solution (also known as HA for Azure Stack) can be uploaded directly from the Azure marketplace.
- With HA for Azure Stack in place it includes the option to run the application in parallel on both source and target platforms for as long as necessary before migrating fully to the new system.

To take a message from the ZeroDown® Software playbook:

NO TRANSACTIONS, NO DATA LOSS, NO SYNCH-UP ISSUES, AND NO DOWNTIME.

ZeroDown® Software Deployment

A typical application deployment provides infrastructure to the users behind the corporate firewall. The infrastructure could be physical or virtual servers, and now with Azure Stack, a private Cloud. The ZeroDown® Software hybrid-enabled HA solution enables companies to run their applications in an active/active configuration from their environment to a Cloud Service Provider (CSP), and even between clouds such as AWS, Azure Stack, and Azure.

For the POC, we will show how HA for Azure Stack allows the customer to deploy their application in an active/active configuration across two separately located Azure Stack Stamps. Below is a snapshot of the application environment before and after migration is complete.
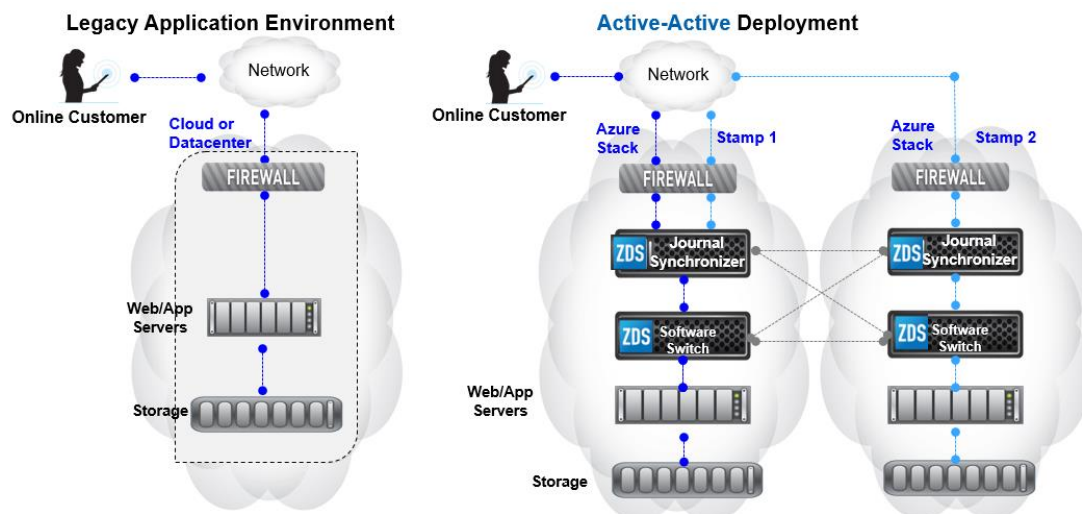
Setting Up a Proof of Concept

The rest of this guide covers the detailed steps for setting up a proof of concept to demonstrate to your customers their own application(s) running in Azure Stack with high availability protection. Please also see the *ZeroDown® Software Quick Start Video* for a guided walkthrough.

Notes:
- In this guide, we use **ZenVault Medical**, an online Personal Health Records service, as the example of a customer app that you can use for your POC. For instructions on how to download a demo image of the ZenVault Medical application, see Appendix B.
- For instructions on how to use a **Contoso VM image** (the fictional company used by Microsoft as an example company and domain), see Appendix A.
- The same steps documented here apply to *any of your customer's web-based applications* that you may choose to set up for an Azure Stack PoC.

Setting up the Proof of Concept itself is a straightforward six-stage process:

1. Gather information on the customer application, source site, and target site locations

2. Deploy ZeroDown® Software to Azure Stack

3. Configure ZeroDown® Software

4. Migrate customer application and data to Azure Stack

5. Acceptance Testing

6. Run/Operate Application

Stage 1: Gather Information

1. Determine the Revive URLs.

Notes
- The Revive URLs are hyperlinks in a website that trigger the login and logout processes
- The Revive URLs are used to track session IDs with the user's browser at the two application sites
- ZeroDown® session to manage (a) cookies/tokens, and (b) session IDs between the two application sites
- These entries are used to manage the transaction replication between the two sites

a. Determine Login URL.

Login URL = /j_spring_security_check

b. Determine Logout URL

ZenVault Medical logout is /logout
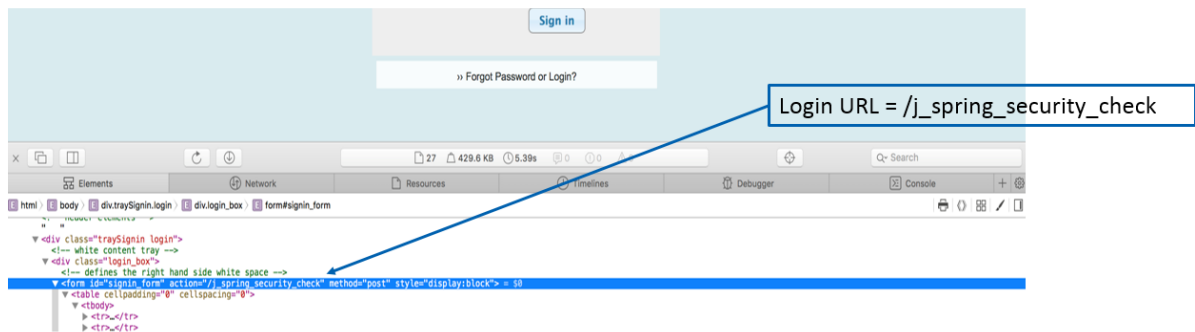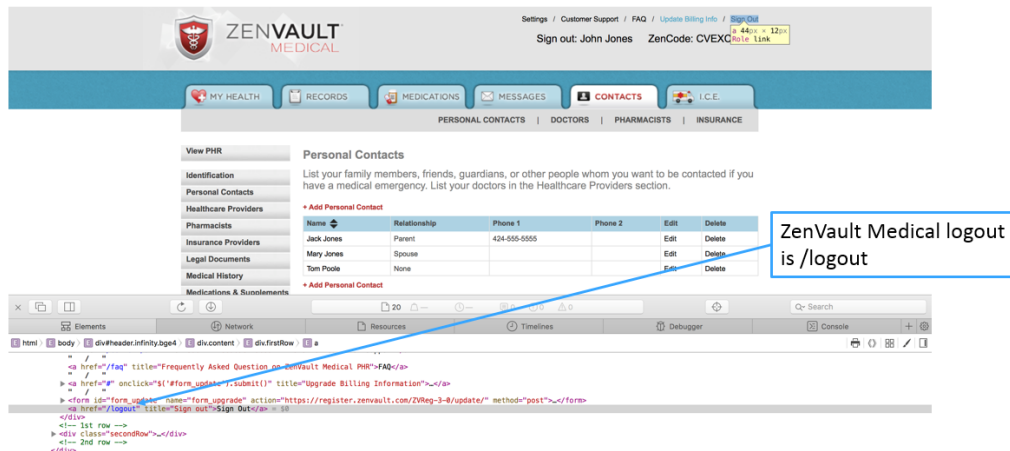
2. Record Revive URL details. The following worksheet can be used to capture the necessary configuration information for each site.

Item	Input	Description
Domain Name		Domain URL for the site being replicated
Site 1 Address		Enter IP / URL address for Site 1
Site 1 Port		Enter Port number for Site 1
Site 2 Address		Enter IP / URL address for Site 2
Site 2 Port		Enter Port number for Site 2
Revive Login URI		Enter the Authentication Page / Login link for the site, used to initiate the Session ID tracking
Revive Logout URI		Enter the Logout link to close the Session ID tracking

Notes

This is all the information that is needed to deploy the application to Azure:

- Domain Name
- Site 1 (source) IP Address / DNS Entry
- Site 1 (source) Port Number (socket id)
- Revive Login URL
- Revive Logout URL

3. Assess and plan deployment to the Azure Stack target environment.

a. Size the VMs required

b. Identify any Cloud Services to be implemented

c. Identify Region to target Software and Data
> For example: Deploy the application and data to US West 2 region

d. Plan for Public DNS entry of endpoint server/VM
> For example: my_new_server.uswest2.cloudapp.net
> Alternatively: my_new_server.my_domain.com

e. Record the Site 2 (target) Address and Port

Notes
- The DNS entry points to the IP address or Public DNS of the new instance in Azure
- Use the Configuration Worksheet to record the Site 2 (target) Address and Port entries for later use.

Stage 2: Deploy ZeroDown® Software

ZeroDown® Software can be deployed by creating an instance directly from the Azure Marketplace. Please see the *ZeroDown® Software Quick Start Video* for details of each of the following steps.

1. Configure basic settings.

2. Choose virtual machine size.

3. Configure optional features.

4. Complete review.

5. Purchase the ZeroDown® Software license.

    Notes
    - Recommended configuration is 4 vCPUs, and 7+ GB RAM. For POC, 2 CPUs may be sufficient.
        - Similar deployments have been benchmarked to support 1,000 active connections
        - Larger instances are also available to support larger user communities
        - The final configuration may depend on the deployment region and availability
    - For storage and network configurations from within the **Network Security Group** option, the ZeroDown® template is pre-configured to accept incoming traffic only on ports 22, 80, 443, and 9001 (SSH, HTTP, HTTPS, and ZeroDown® Management Console, respectively)
    - For purchase we recommend the BYOL option that is available for a 30-day free trial period so that you can complete your POC. Contact your ZeroDown® Software Partner or Distributor directly to obtain a longer term license.

6. When all fields are completed, click Create to create the ZeroDown® Software instance in Azure.

Stage 3: Configure ZeroDown® Software

Once the ZeroDown® Software has been deployed, you can configure it via the Management Console accessed via port 9001 in your browser.

1. To access the Management Console, enter the ":9001" designator at the end of the IP Address or Public DNS endpoint.
> For example: *192.168.86.141*:9001

2. Upon initial startup enter the following Admin Credentials:
> Default settings: admin / 0down

The Management Console page appears. See the following diagram and refer to the key below for details of each service.
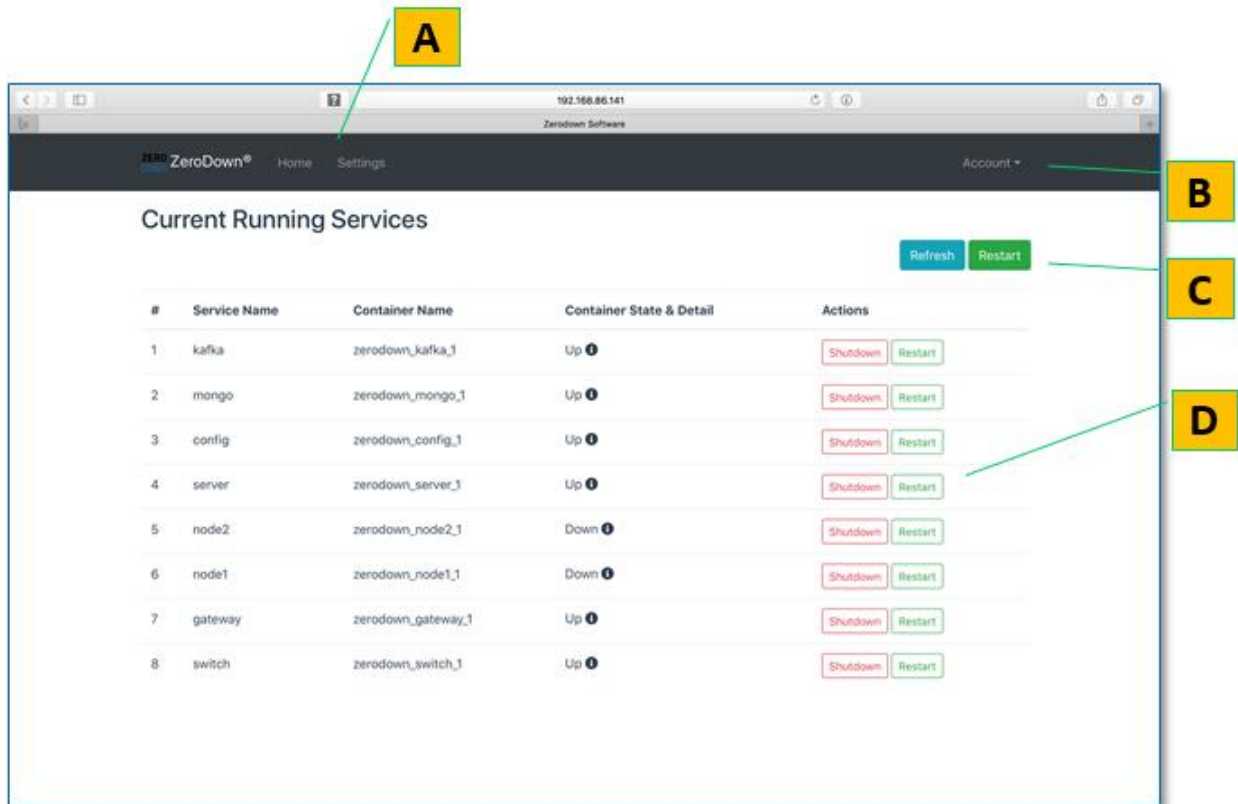
Management Console Key:

[A] Page Navigation Links
- Home (page displayed)
- Settings – ZeroDown Configuration Page

[B] Account Management Link
- Change Passwords, Generate REST API Tokens, Logout

[C] System Buttons
- Refresh the status of the Home Page
- Restart All Services

[D] Circuit Breaker Buttons
- Stop or restart individual services

Note that all that is required for basic configuration are the following fields on the Settings page:
- Security URL (Login URL)
- Logout URL
- Node 1 – Server Address and Port
- Server Address could be Public DNS entry or IP Address
- Node 2 – Server Address and Port

For further details on how to configure the ZeroDown® Software, such as how to install SSL certificates, refer to the *ZeroDown® Software Management and Configuration Guide*.

Stage 4: Migrate the Customer Applications and Data to Azure

A System Administrator is able to install and deploy the ZeroDown® Software and then migrate the customer application in less than an hour. For a detailed step-by-step guide on how to deploy and configure the software in Azure Stack, refer to the ZeroDown® Software Configuration and Setup documentation. Application migration is a six step semi-automated process to move the data and get the workload up and running in the new environment.
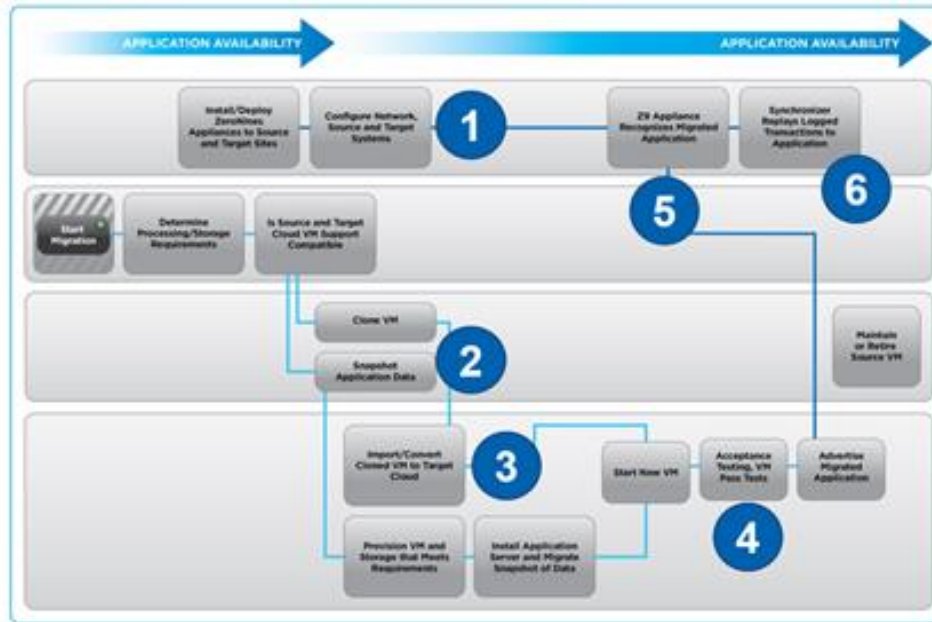
Here are the steps involved:
1. Install/Deploy ZeroDown® Software, then configure the Source Host and Target Host Addresses and Ports
2. Create a Snapshot of your application and data or Clone your Virtual Images
3. Build or Convert your Virtual Images to the Target Cloud
4. Validate that Source site Data and Apps were successfully transferred to Target Site
5. ZeroDown® Software automatically recognizes the migrated application
6. ZeroDown® Software Synchronizer replays all logged transactions to the migrated application mitigating risk of lost transactions during the process.

Migration Notes
- The Snapshot (**Step 2**) can be any method of copying/cloning an image of the application and data. This could be part of your standard backup processes.
- While the business application and its data are being migrated (**Steps 3 to 4**), ZeroDown® Software allows the source location (VM, container, or server) to continue operations
- The migration and synch up of data is fully automated (**Steps 5 and 6**): ZeroDown® Software completes the migration for you.
- Once the app has been migrated (**Step 5**), ZeroDown® recognizes the availability of services and automatically begins to replay transactions processed at the Source site to the Target site
- This activity fully synchronizes the source and target environments (**Step 6**).

Stage 5: Acceptance Testing

Recap

- At this point, users are online
- Accessing Source Site (site 1) via ZeroDown® Software Deployment
- The snapshot of the application and data has been migrated or converted into Azure
- The application and data in Azure has been successfully tested
- ZeroDown® Software is integrated with the deployed application in Azure

Test the Application and Data replicated into the Cloud

- Validate that previous transactions have replicated from Site 1 to Site 2
- Validate that transactions are processing to both locations – replication

Business Continuity Testing

- Validate Continuity between two locations by disconnecting one site
- Reconnect the site and validate that transactions are recovered

Stage 6: Run/Operate Application

Note the following points for ongoing operations of the customer application in its current state.

- After completing testing, link the customer's migrated application to ZeroDown® Software by:

  1. Configuring DNS resolve to Application Endpoint, or
  2. Establishing Public DNS address to Application Endpoint

  Note: These were established and configured during ZeroDown® Software deployment.

- Each site contains a replicated image of the app and its supporting backend infrastructure

- All transactions are independently processed at each location

- This combination is the Active/Active infrastructure which provides the full business continuity for the users

Notes on Migrating Monolithic Applications and Using Native Cloud Services

When re-factoring monolithic apps to take advantage of native cloud services, before or after migration, consider deploying the following technology choices:

- Use of microservices and container-based technologies
- Use of database services
- Deployment of serverless computing infrastructures
- Use of ZeroDown® Software as a fallback technology
  - As applications are refactored, ZeroDown maintains production environment
  - Incorporate into your Continuous Integration/Continuous Deployment (CI/CD) process

Note: Native Cloud Services are application services provided by the Cloud provider, such as Microsoft Azure, on a subscription basis. For example, instead of installing and maintaining a database server, you could subscribe to a database service provided by Azure. Some new services include Artificial Intelligence (AI) services, security services, and more.

Conclusions

Azure Stack engagements with your customers will probably require a live demo to uncover further opportunities. Setting up a PoC using HA for Azure Stack on your customers applications is a fast and effective way to show how to migrate and run workloads in the new environment with zero downtime. This provides a powerful proof point of the platform's resilience even in the event of outages and serves to build customer confidence. This can be essential for customers who are running mission-critical applications, and want to allay the risks of the Azure Stack patch and upgrade process or adjustments in capacity planning, to take two examples of common concerns customers may come up with.

Here is a summary of some other advantages of adopting this approach to your Azure Stack deployments:

- Provides a strong demonstration of a two x Azure Stack Stamp implementation and offers a powerful alternative when meeting a customers' backup and disaster recovery needs.
- ZeroDown® Software comes in an easy-to-deploy package that provides genuine active-active real-time operations in multiple sites or zones.
- It makes migration to the cloud a far safer proposition because one or more cloud instances can be rapidly brought online while legacy systems continue to process transactions as usual.
- Downtime risks due to systems failures or unplanned outages that would typically disrupt applications and lead to data loss are virtually eliminated.
- Cloud migration tends to compound downtime risks, introducing additional hazards such as outdated system state snapshots, loss of in-flight transactions, human errors, inadequate planning, and other unforeseen outcomes when transitioning to a new IT infrastructure.
- ZeroDown® Software acts as the safety net to prevent disruptions from happening.
- When the customer's application is being migrated to a target system, ZeroDown® Software allows you to run and then synchronize both the source and target environments.
- The HA process is transparent to any online customers who may continue to use the application during migration and after for run/operate when one of the Azure Stack Stamps may be out of service.

In short, ZeroDown® Software's HA solution provides added value to customers by ensuring that, when their platform of choice is Microsoft Azure Stack, high availability of their data and applications will remain an integral part of their cloud journey.

Next Steps

The next steps will be to repeat the process demonstrated in the PoC for other projects, moving more and more of your customer's workloads to Azure Stack. Contact us today to help setup your own PoC at a customer site and experience the positive impacts of our HA solutions to help them drive their digital transformation journey.

To get started on a Proof of Concept for your customers using ZeroDown® Software HA for Azure Stack, call or email us to discuss your needs:

- 844-ZRO-DOWN
- sales@zerodownsoftware.com

Appendix A: Using a Contoso VM Image for your PoC

To install a Contoso VM Image for your PoC, following the steps below:

Note: For Azure Stack, we recommend using the [smalldisk]Windows Server 2016 Datacenter image.

1. Create a resource group or do this when provisioning the VM.
2. For Azure Stack, we recommend that you deploy the [smalldisk] Windows Server 2016 Datacenter image as follows.

   a. B2s instance size

   b. Open HTTP and HTTPS ports if the Azure Stack interface will allow this. If not, open HTTP after the fact. HTTPS isn't currently necessary for the Contoso University code.

3. Once the instance is available, log in and Add the IIS Server Role w/ ASP.NET 4.6 option under Development

4. Clone the github repository (https://github.com/SeanTMill/contosou_files) or download the files in the files subdirectory (contosou.zip, ContosoUniversity.bak, contosorestore.sql)

   a. Expand the contosou.zip file to c:\inetpub – It should create a contosou sub-directory

   b. Place the ContosoUniversity.bak on the desktop, we will move it to another directory after SQL Server Express is installed below

5. Open Internet Information Services (IIS) Manager

   a. Delete the default website

   b. Create a new website, for example, contosou

   c. Set the path for the website to c:\inetpub\contosou

   d. Set the Host name to *

   e. Press OK to save the settings

   f. Select Applications Pools – Then the newly created contosou apppool, click on Advanced Settings on the right

   g. Change the Identity from ApplicaitonPoolIdentity to Custom Account and set it to the same account used when provisioning the server in step 2 above.

6. Download SQL Server Express 2017 from here: https://www.microsoft.com/en-us/sql-server/sql-server-editions-express

7. Run the install and select Express Install (the far left option)

8. After the install you should have a C:\Users\MSSQL$SQLEXPRESS directory—move the file ContosoUniversity.bak to this directory

9. Open a command shell and restore the database with the following command:

   ```
   "c:\Program Files\Microsoft SQL Server\Client SDK\ODBC\130\Tools\Binn\SQLCMD.EXE" -S
   .\SQLEXPRESS -I <path to contosorestore.sql>
   ```

10. At this point, you should be able to browse to http://localhost and see the contoso university application. Make sure it can connect to the database by clicking on Students, and so on.

    Congratulations! You are good to go.

Appendix B: Using a ZenVault Demo for your PoC

To install a ZenVault Medical Demo Image for your PoC:

1. Download the latest read.me file from GitHub at the following location:
   https://github.com/zeronines/zvsample/blob/master/README.md

2. Follow the instructions in the read.me file per the example shown below.

zvsample

Demonstration Web Application for ZeroDown Software / ZeroNines Technology Partners for Azure Stack

Environment:

- Ubnuntu 16.04 LTS Operating System
- Internet Access

The tar file is too big for GitHub. To download the package, issue the following command from the Ubuntu Server

wget http://downloads.zerodownsoftware.com/zvsampled/zvsample-ASDK-build.tar.gz

Unpack the file:

tar xvzf zvsample-ASDK-build.tar.gz

Run the Installation Script from elevated permissions

sudo ./install.sh

The Installation Script installs the zvsample application into the Ubuntu Server. To start and stop the services, the command:

sudo zvsample {start | stop | restart | status}

Application is accessed via port 8080, therefore, port 8080 needs to be opened to this deployment.

Restarting the software resets all data to the initial state of the image. All data and changes will be lost.