**PROJECT SUMMARY**

The goal of this project is to migrate Rowan University from their current DNS and DHCP infrastructure at Camden Campus and Stratford Campus to an existing Infoblox Grid managed solution, and to upgrade Rowan University’s current Infoblox Grid hardware and software.

The current Infoblox Grid deployment consists of (9) Grid Members, (9) appliances, as described in the table on page 6 of this document. The Grid is running -A hardware and NIOS 6.12.9. There will be (13) Grid Members, (13) total appliances, in the upgraded Grid and (11) new appliances are to be purchased, (1) Trinzic Virtual 1420, (8) Trinzic Virtual 820’s and DNS Firewall. Rowan University would like to upgrade to the latest NIOS release. The primary tasks are:

- **Grid Upgrade**
  - TASK 1 – Remote Upgrade Planning Session
  - TASK 2 – Remote Appliance Configuration
  - TASK 3 – Hardware/Software Upgrade
- **DDI Migration**
  - TASK 4 – Migrate Internal DNS from Microsoft AD to Infoblox
  - TASK 5 – Migrate External DNS from Infoblox (default view) to Infoblox (external view)
- **DDI Security**
  - TASK 7 – Configure DNS Firewall and RPZ feed
- **IPAM**
  - TASK 8 – Basic IPAM Data Assistance
- **Other Solutions**

Rowan University currently provides DNS, DHCP, and IPAM throughout its enterprise via Infoblox (Main Campuses), MSFT AD DNS.

**ROWAN UNIVERSITY REQUIREMENTS**

The tasks specifically stated below as being performed are based upon information gathered from Rowan University and are covered under the time and fee estimates. All estimates are based on the completeness of the requirements gathered as of the writing of this document.

- **Project Administration**
  - Project initiation
- **Grid Upgrade**
  - Upgrade Planning Session
    - Establish hardware/software upgrade plan
  - Cutover Support
    - Up to one (1) on-site cutover event(s) are planned
      - One (1) cutover event(s) supported after hours during the week only
    - Upgrade existing Infoblox hardware to new Infoblox hardware
    - Upgrade to mutually agreed version of Grid software
- **DDI Migration**
  - Grid Implementation
    - Provide assistance with initial Grid configuration
- Configure DHCP Failover Association(s)
- Configure Caching/Recursive DNS layer
- Configure DNS View(s)
- Configure Advanced DNS Protection (ADP) appliances in “monitor-only” mode for initial deployment
  - Provide assistance with Migration Planning
    - Data Preparation - each of (2) phase(s)
      - Validate the migration strategy
      - Perform a test migration/load/verification
    - Cutover Support
      - Up to (3) on-site cutover event(s) are planned
        - (#) cutover event(s) supported after hours during the week only
      - Up to (3) remote cutover event(s) are planned
        - (#) cutover event(s) supported after hours during the week only
  - Provide final Grid configuration
    - DHCP Failover configuration
    - Caching/Recursive DNS configuration
    - DNS View(s)
  - Provide a day of on-site post migration support and knowledge transfer
- DDI Security
  - Perform the initial set-up and configuration of DNS Firewall and RPZ feed
- IPAM
  - Basic IPAM Data Assistance
    - Assist with IPAM design
    - Show Rowan University how to leverage CSV Import Tool

Out of Scope Activities

Tasks not specifically stated as being performed are outside of the scope of this project and are not covered under the time and fee estimates. Specifically excluded, unless expressly stated in a section, are:

- Project Management
  - Project plan development
  - Project Manager tasks after kick-off call
- Custom work
  - Scripting
  - Documentation
  - Workshop

Current Rowan University Environment Inventory

*Grid Upgrade*

<table>
<thead>
<tr>
<th>Infoblox solution as deployed</th>
<th>Number of appliances (HA pairs count as 1)</th>
<th>HA Pair(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid Master</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>Grid Master Candidate</td>
<td>2</td>
<td>N</td>
</tr>
<tr>
<td>Members</td>
<td>10</td>
<td>N</td>
</tr>
</tbody>
</table>
Rowan University has chosen to migrate the following components of these legacy systems to the Infoblox Grid architecture:

<table>
<thead>
<tr>
<th>Internal DNS/DHCP Services to be Migrated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Legacy Servers</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

To meet the goals of this project, Rowan University has requested assistance with the planning, design, implementation, and a review of the Grid architecture and operational aspects of the Infoblox Grid. Provide architectural and technical leadership for this project. The remainder of this document describes the details of the statement of work for this project.

**DESCRIPTION OF WORK**

**Project Administration**

The Project Administrator will be the point of contact for all project related matters and liaise with the Rowan University Project Manager/Lead to provide the following assistance to start the project off:

- Project initiation
  - Facilitate a Rowan University led review of the current environment
    - Grid Upgrade
    - Hardware/Software upgrade
    - DDI Migration
      - Internal MS AD DNS
      - External Infoblox DNS – external view
    - DDI Security
      - DNS Firewall
    - IPAM
      - Basic IPAM Data Assistance
  - Review SOW and project objectives
  - Establish project timelines and document
  - Document contact information for key project personnel in technical roles

**Grid Upgrade**

*Remote Grid Upgrade Planning*
The objective of this review is to look at the existing Infoblox Grid configuration to determine that the proposed upgrade path is supported and current functionality is maintained. This will provide a basis for decision making throughout the project. Will work with Rowan University personnel to gather, analyze, and review with Rowan University the following information:

- Current Grid deployment.
  - Block level architecture diagrams.
  - Gather current Infoblox Grid Backup file.
- Proposed NIOS upgrade path.
  - Discuss and document desired upgrade functional requirements.
  - Define version of NIOS to upgrade.
  - Test NIOS upgrade on Rowan University Grid Backup.
- Proposed hardware upgrade path.
  - Discuss and document desired upgrade appliance requirements.
  - Finalize appliance upgrade process.

After the initial data gathering and meetings with Rowan University operational and design team is complete, the Infoblox consultant will review and analyze the configurations and upgrade path to verify the upgrade process.

The following upgrade strategies and will be developed:

- Grid hardware upgrade
- Grid software upgrade

*Remote Upgrade Preparation and Testing*

The tasks associated with the deployment, configuration, and implementation of the proposed Grid require testing to help determine their completeness and accuracy. Will work with Rowan University to define the tasks and processes that are required to support the Grid upgrade.

The pre-production upgrade tasks include:

- Remote upgrade testing.
- Remote data validation and verification.

Responsibilities and tasks that are to be performed by Rowan University include, but are not necessarily limited to:

- Grid backup per Infoblox provided instruction.
- Access to Rowan University technical team to review upgrade issues with Infoblox in a timely and responsive manner.
- Access to Rowan University technical team for review of upgrade issues to facilitate the lab testing in a timely and responsive manner.
- Physical installation of appliances:
  - Physical installation in racks.
  - Physical powering.
  - Physical connection to the network (connection of network cables).
- Base appliance configurations:
Setting of IP via console cable (detailed step by step instructions to be supplied by Infoblox).
- Setting of remote SSH access via console cable (detailed step by step instructions to be supplied by Infoblox).

- Network infrastructure changes:
  - Routing/Firewall changes.
  - Switch and VLAN configurations.

Will perform pre-deployment upgrade testing of the Rowan University supplied Grid to verify the upgrade methodologies within them are sound, repeatable, import data as expected, and provide for the Grid upgrade within acceptable Rowan University maintenance windows. The objective of the testing is to exercise the upgrade process such that all segments of the upgrade strategy are tested and validated.

To this end, Professional Services will remotely perform testing in the lab environment. During this testing, will verify that Rowan University’s Grid upgrades successfully, and configuration parameters are maintained. This testing also helps to determine the upgrade process itself is sound with regard to Rowan University’s data set.

**Production Upgrade Support**

Will work with Rowan University to configure the Grid, as well as perform the Grid upgrade. Prior to the upgrade, will work with Rowan University to verify Grid configurations are complete. During the upgrade, will provide an on-site resource as the lead engineering resource if required.

The following cutover event(s) are targeted for completion:

- On-site – up to (3) cutover event(s)
  - Upgrade hardware and upgrade software.

In its role as the lead engineering resource, will perform:

- Final Grid software recommendation.
- Pre upgrade Grid configuration review.
- Grid upgrade cutover support.
- Post upgrade testing and monitoring.

**DDI Migration**

**Remote Grid Implementation and DDI Migration Preparation**

The tasks associated with the deployment, configuration, and implementation of the proposed Grid require testing to help determine their completeness and accuracy. Will work with Rowan University to define the tasks and processes that are required to implement the Grid in a pre-production state.

Will perform pre-deployment conversion and testing of the Rowan University supplied legacy data to verify the data migration methodologies within them are sound, repeatable, import data as expected, and provide for the retirement of the legacy systems within acceptable Rowan University maintenance windows. The objective of the testing is to exercise the migration process such that all segments of the migration strategy are tested and validated.

To this end, Infoblox Professional Services will remotely perform testing in the Infoblox data migration lab environment. During this testing, Will verify that Rowan University’s data imports successfully into the Grid, and configuration parameters are maintained. This testing also helps to determine the data migration process itself is sound with regard to Rowan University’s data set.
The following migration strategies will be developed as a result of this work:

- **Internal MS AD DNS**
  - Commence DNS change freeze.
  - Define Internal DNS Name Server Group.
  - Import data and assign to Internal Name Server Group and default DNS View.
  - Perform Windows System State backup on one MS DNS server.
  - Additionally, backup DNS data to files on legacy servers using dnscmd:
    - Modify DNS server configuration. Configure the MS DNS server to forward all queries to Infoblox.
    - Delete the zones from the server, which will cause all queries to immediately forward and resolve all queries using the Infoblox DNS.
    - (Optional) Reconfigure MS DNS server to slave zones from the Infoblox Grid.
  - Notify personnel responsible for managing statically configured DNS clients that use the legacy servers (e.g. servers, desktops, other DNS servers, etc) of the change in IP address.
  - Enable DNS query logging on the legacy DNS servers and monitor the DNS logs to verify that all DNS clients and servers have switched over to using the Infoblox appliances.
  - If any zones being migrated need to be updated by Microsoft Active-Directory Domain Controllers, verify each DC can register its records in its respective DNS domain. Perform the following iteratively for each Domain Controller in each AD domain being migrated:
    - Use the Infoblox GUI to remove the DC’s records from DNS (optional).
    - From a command prompt on the MS Windows Domain Controller being registered run:
      - `ipconfig/registerdns`
      - `netstop netlogon`
      - `net start netlogon`
    - Verify that all DNS records are reinstated and that there are no errors reported in the Windows Event Viewer on the DC.
  - End DNS change freeze.
  - Decommission legacy servers when appropriate.

- **External DNS Infoblox**
  - Commence DNS change freeze.
  - Define External DNS Name Server Group and External DNS View.
  - Import data and assign to External Name Server Group and DNS View.
  - Execute the **Acceptance Plan for DNS**
  - End DNS change freeze.
  - Notify DNS registrar of the change in authoritative DNS server names/IPs.

**Infoblox Responsibilities**

- Initial Grid configuration preparation
  - Appliance deployment procedures.
  - Base Grid Configuration.
- Initial DHCP Failover configuration.
- Initial Caching/Recursive DNS configuration.
- Initial DNS View(s) configuration.
- Initial ADP configuration in “monitor-mode”.
  - Remote/WebEx support.
- Pre-production data preparation
  - Pre-production data testing and verification.
    - Remote data conversion & import (DNS).
    - Remote data validation and verification.
    - Iterate as required; expect (1-2) iterations on a typical project.
  - Provide pre-production dataset to Rowan University for verification/validation.
- Cutover window planning
  - Identify legacy system timers/settings/etc... to be modified to support the cutover.
  - Review cutover window process.
  - Review Rowan University created test plan with Rowan University.

Rowan University Responsibilities

- Initial Grid preparation
  - Physical installation of appliances:
    - Physical installation in racks.
    - Physical powering.
    - Physical connection to the network (connection of network cables).
  - Base appliance configurations:
    - Setting of IP via console cable (detailed step by step instructions to be supplied by Infoblox).
    - Setting of remote SSH access via console cable (detailed step by step instructions to be supplied by Infoblox).
    - Establish High Availability (HA) configuration as required.
    - Upgrade Grid software to an agreed upon version.
  - Network infrastructure changes for Infoblox Grid communication:
    - Routing/Firewall changes.
    - Switch and VLAN configurations.
  - Test/verify base Grid functionality to facilitate Grid functionality
    - Grid Master (GM)/Grid Master Candidate (GMC) failover/failback testing
    - High Availability (HA) failover/failback testing
- Data Gathering for legacy environment
  - Initial data export from legacy systems per Infoblox provided instruction.
  - External DNS
    - DNS data conversion requirements.
    - Current DNS configuration files.
    - DNS View(s) requirements.
  - Internal DNS
    - DNS data conversion requirements.
    - Current DNS configuration files.
    - DNS View(s) requirements.
  - Caching/Recursive DNS Layer
    - DNS caching requirements.
  - Internal DHCP
    - DHCP data conversion requirements.
    - DHCP Failover requirements.
    - Current DHCP configuration files.
- Pre-production data preparation
Access to the Rowan University technical team to review migration data issues with Infoblox in a timely and responsive manner.
Access to the Rowan University technical team for review of data migration issues to facilitate the lab testing in a timely and responsive manner.

- Cutover window planning
  - Identify legacy systems to be modified to support the cutover.
  - Identify cutover window change management process.
  - Create test plan to identify success criteria and support personnel required to facilitate success.

- Rowan University specific environment considerations
  - Network infrastructure configuration for DNS Anycast:
    - OSPF/BGP Routing changes.
    - Network allocation.

**Production Cutover Support**

Will work with Rowan University to configure the Grid, as well as perform the migration through which the legacy systems are replaced. Prior to the migration, Will work with Rowan University to configure all Infoblox appliances and verify Grid base configurations are complete. During the migration, will provide an on-site resource as the lead Infoblox migration engineering resource if required.

The following migration cutover event(s) are targeted for completion during as part of this SOW:

- On-site cutover event(s)
  - Internal DNS.
  - External DNS.
- Remote cutover event(s)
  - Enable ADP functionality after baseline.

**Infoblox Responsibilities**

- Final Grid configuration.
  - Final DHCP Failover Association configuration.
  - Final Caching/Recursive DNS configuration.
  - Final DNS View configuration.
  - Final ADP configuration in “monitor-mode”.
  - Final DNS Firewall configuration.
- Final data preparation.
  - Final data conversion and import.
  - Pre migration data validation testing.
- Cutover Support
  - Grid migration cutover support.
  - Post migration testing and monitoring.

**Rowan University Responsibilities**

- Final data preparation
  - Establish change freeze in preparation for production cutover event.
  - Final data export from legacy systems per Infoblox provided instruction.
  - Access to the Rowan University technical team for review of final data migration results to facilitate the production cutover in a timely and responsive manner.
- Cutover support considerations
o Execute Rowan University created test plan.
o Provide appropriate support personnel during production cutover to facilitate testing and remEDIATE issues.
  ▪ Networking.
  ▪ Security.
  ▪ Desktop.
  ▪ Application(s).
  ▪ Others as identified by the project team.
o Legacy system changes to support the production cutover (as required):
  ▪ Retirement of legacy servers/services.
  ▪ Configurations to legacy servers.
  ▪ Configurations to legacy services.
• Rowan University specific environment considerations
  o DNS
    ▪ Confirmed/tested network/routing changes to support new DNS server configuration.
  o DHCP
    ▪ Confirmed/tested network/routing changes to support new DHCP server configuration.
    ▪ Confirmed/verified DHCP Helper changes to support new DHCP configuration.
    ▪ Confirmed/verified Captive Portal DHCP Ranges to support configuration.
  o Anycast Routing Changes
    ▪ Confirmed/tested network/routing changes to support Anycast configuration.

DDI Security

DNS Firewall and RPZ Configuration

This section of the SOW describes work that will be undertaken to initially configure and integrate the DNS Firewall and RPZ feed into the Infoblox Grid.

As part of the implementation:

  • Perform initial DNS Firewall configuration and setup the RPZ feed licenses.
  • Review and configure the Grid Member DNS Firewall parameters.
  • Knowledge transfer on the DNS Firewall functionality.

IPAM

Basic IPAM Data Assistance

The tasks associated with the import of IPAM data into the proposed Grid require leveraging the Grid CSV Import function, data massaging and testing to help determine their completeness and accuracy. Will work with Rowan University to develop a process required to import IPAM data into the Grid. These procedures include:

  • Review IPAM data spreadsheets.
    o Assist Rowan University with IPAM design
- Determine Extensible Attribute requirements
- Assist with creating Extensible Attributes
- Assist with initial CSV Import header file export
  - Show Rowan University the CSV Import Tool schema for the final normalized format.
  - Rowan University will put their data into the CSV Import Tool schema in final normalized format.
  - Show Rowan University how to use the CSV Import Tool to bring IPAM data into the Grid.

The result of these tasks is IPAM data structure and Extensible Attribute design which can then be used by Rowan University to import their IPAM data into the Grid.

Knowledge Transfer

An integral component of this project is the collaborative nature of the interactions between Infoblox consultant(s) and Rowan University personnel. One of the objectives of this collaboration is for Rowan University to develop an understanding of the operational characteristics of the Infoblox Grid and Infoblox specific technologies. This knowledge transfer is intended to help Rowan University perform routine daily tasks such as:

- **Grid Management**
  - Managing basic Grid configurations:
    - Grid backup/restore.
    - Download Grid Member support bundle.
    - Grid software upgrade process.
  - Managing DNS configurations:
    - DNS properties.
    - Caching/Recursive management.
    - DNS View properties/management.
    - Name Server Groups.
    - Zones.
    - Resource Records.
  - Managing DHCP configurations:
    - DHCP properties.
    - Networks.
    - Ranges.
    - Options.
    - Failover Associations.

- **DDI Security**
  - DNS Firewall:
    - RPZ Feed.
    - White/Black lists.

- **IPAM Management**
  - IPAM Data:
    - Extensible Attributes.
    - Smart Folders.
    - CSV Import Tool.

This knowledge transfer is, neither intended to be a replacement for formal training, nor allotted dedicated
time during this project. Infoblox provides formal training programs for administrators.