Project

Name

Institution

Date

1. Analyze the scenario and stated problem based on your analysis propose an appropriate messaging system is suitable for this project clearly justifying your choice.

ABC Star does not have any communication and collaborations systems that force users to spend valuable time travelling across the building. By lacking the communication and collaboration systems, user's satisfaction as well as their performance have been impacted and that has on the other hand had an impact on the revenues of the company.

For the best users experience and productivity, the company requires not only messaging systems but also other systems such as instant messaging, and document change control among others. All of these systems can be deployed on-premises or delivered from the cloud. Software such as Services Systems (SaaS) provides the same user experience as on-premises systems while the total cost of ownership is reduced as hardware order, hardware support, installation, patching, updates, support, maintenance and others are avoided. Indeed, one only pays per user license, thus making it ideal for PoC.

Based on current description and features that was discussed on IT CAB and assumption that it is not possible to fully utilize cloud solutions due to legal requirements, I have chosen Microsoft Exchange 2016 products as the ideal choice that will suit the requirements.

Microsoft Exchange 2016 as explained in this paper entails the enterprise messaging systems that provides:

-Reach client and Browser support

-Document collaboration

-Integration with other system like Skype for Business, SharePoint and etc.

-External email services

-Integration with Active Directory Domain Services, Federation services and Right Management Services.

-High Availability off the shelf

-Messaging policy and compliance

- Data loss prevention

-In-place Archiving, retention, and eDiscovery

-Unified messaging

-Integration with telephony

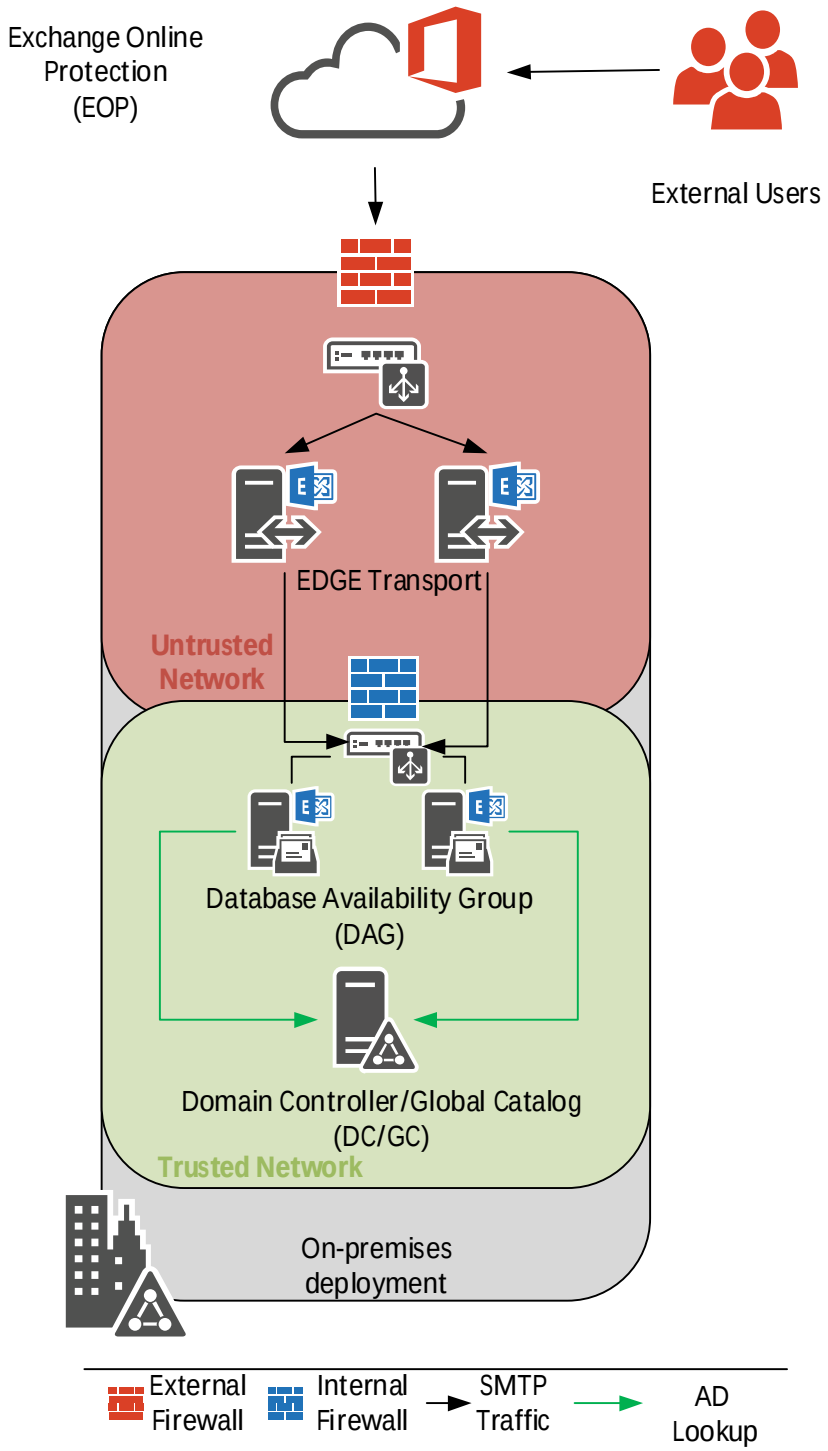
-and many other valuable features

I have chosen that product because it fully suits all of the current requirements and provides reach possibility of future integration and extensions. It provides excellent high availability off the shell without additional cost. In addition, you can utilize Data Loss Prevention technology to avoid data leak and it is off the shelf. Integration with Active Directory Domain Services provides you possibility to implement granular Role Based Access as per current best practices for Just in time (JIT) administration and Just

Enough Administration (JEA). Integration with Active Directory Right Management Services and Active Directory Certificate Services will help you to protect your sensitive data and intellectual property. It provides easy integration with the cloud SaaS systems (Office365). In addition, Microsoft Exchange platform is leader of Magic Quadrant and it is used as core services for Office365 which is the largest SaaS messaging system in the world.

In additional to Microsoft Exchange 2016, I suggest implementing cloud based Anti-spam and anti-malware systems. Exchange Online Protection (EOP) will be used for that purpose. EOP has three antivirus agents and Artificial Intelligence with machine learning algorithms that dramatically decreases amount of SPAM and Malware as all cloud services remove unnecessary administration overhead that requires specific knowledge and hardware/software systems on-prem.

The diagram below provides an overview of the solution:



It is a recommended solution with two EDGE servers that are located within untrusted network segment. They are recommended for deployment due to security reasons since

placement of DAG in untrusted network will open many ports toward Domain Controllers that will provide security breach. In case of budget limitation, it is possible to configure direct connection between DAG and EOP by restriction destination IP address on the External Firewall.

MX records on public DNS will be pointed to EOP services. All mail traffic will then be inspected by EOP and sent to EDGE transport servers in DMZ and only thereafter that it will send to DAG members.

2. List down features that offered by off the shell system that clearly meets project requirements.

Below is a list of features from project requirements and how they will be met off the shell

1) A system that can help users/staff member to efficiently communicate/collaborate and increase their productivity.

Exchange server provides communication and collaboration platform based on emails where users can easily send and receive emails and share documents between each other. Additionally, it can be integrated with other services to provide better user experience. To share (send) documents for review, users will no longer be required to go to other office since it will be possible to send it by email and ask for review or book a meeting. In future, it can be integrated with the instant messaging system for chatting and phone calls.

2) Supports virtualization infrastructure

Exchange server 2016 can be deployed on virtualized environment but as all systems has some requirements for virtualization system, the most important is that hardware virtualization software is running one of the following:

Any version of Hyper-V or any third-party hypervisor that has been validated under the Windows Server Virtualization Validation Program.

3) Adherers to IT strategy for business continuity

Exchange provides the following feature off the shelf for High Availability:

-Database High Availability Group

The Exchange DAG is a group of mailbox servers, which together form a high availability cluster.

Auto-Reseed

Auto-Reseed is a feature for quickly restoring database redundancy after a disk failure. If a disk fails, the database copies stored on that disk are automatically reseeded to a preconfigured spare disk on the Mailbox server.

lagged copy

A lagged copy of the database is available; this will enable point in time recovery up to 1 day prior, in the event of a database corruption (or can be set up to 14 days maximum lag

Single item recovery

Single item recovery for up to 30 days. Users who delete items can recover these items within 30 days. After 30 days the item is not recoverable in normal circumstances, unless the mailbox is under “in place hold”

Shadow Redundancy

Shadow redundancy keeps a redundant copy of the message while the message is in transit.

Safety Net

Safety Net keeps a redundant copy of a message after the message is successfully processed.

4) Complies with Single sign on strategy

Exchange server 2016 support ADFS Claim-Based authentication for Outlook Web Access (OWA) and Exchange Admin Center (EAC). In addition, it also supports traditional authentication method like:

-Active Directory client certificate authentication

-Basic authentication

-Digest authentication

-Forms authentication

-Windows authentication

5) Support Hybrid Deployment

Exchange 2016 fully support Hybrid configuration for Office 365 with the reach user experience like one GAL and Free/Busy sharing across users on-premises and in the

cloud. Additionally, it makes it easy for user migration towards cloud and back (Remote move migration).

6) To support enterprise security. Can be integrated with AD Domain infrastructure

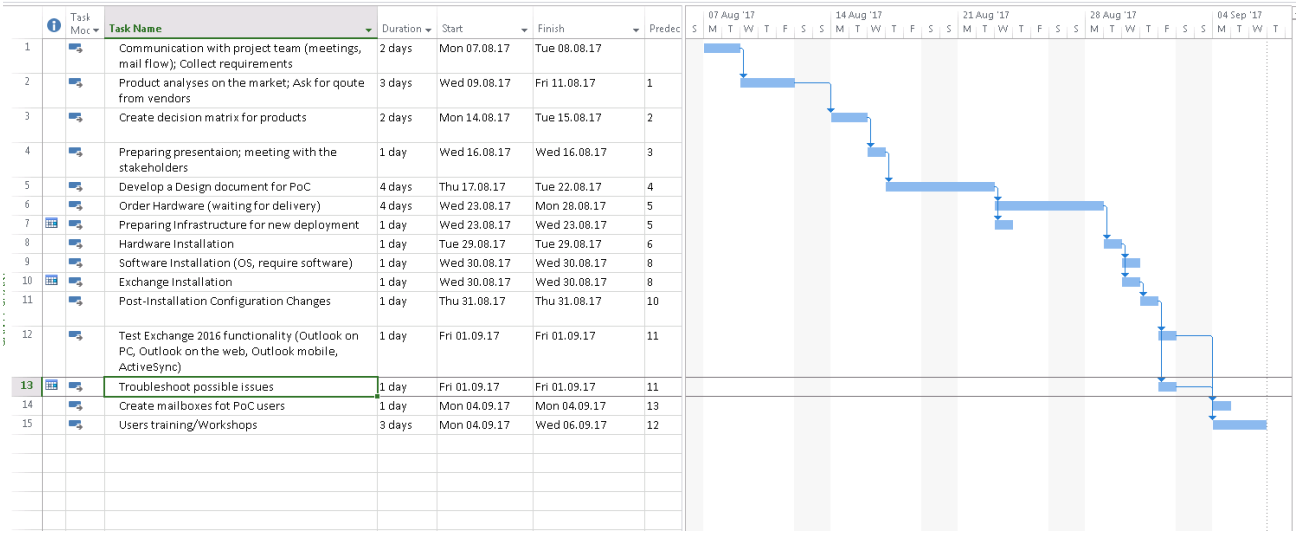
Exchange 2016 is fully integrated with AD DS. Moreover, it depends on AD DS. Additionally, it provides integration possibility with AD RMS and AD CS that can improve security for documents and message dramatically.

7) Support collaboration for the mobile users on mobile devices of the enterprise

Exchange 2016 provides limited MDM compatibilities and support ActiveSync protocol. Exchange ActiveSync is the client protocol that enables synchronization of mobile devices with Exchange mailboxes, and is optimized to work with high-latency and low-bandwidth networks. The protocol, based on HTTP and XML (and secured with SSL encryption), enables mobile phone users to access their email, calendar, contacts, and tasks, and to continue to access this information while they are working offline.

For reach MDM experience, you need to consider Microsoft Intune product.

3. Using MS project, illustrate a timeframe needed to complete your research and POC implementation based on the organization requirements from scenario.



	Task Mode	Task Name	Duration	Start	Finish	Predec
1		Communication with project team (meetings, mail flow); Collect requirements	2 days	Mon 07.08.17	Tue 08.08.17	
2		Product analyses on the market; Ask for qoute from vendors	3 days	Wed 09.08.17	Fri 11.08.17	1
3		Create decision matrix for products	2 days	Mon 14.08.17	Tue 15.08.17	2
4		Preparing presentaion; meeting with the stakeholders	1 day	Wed 16.08.17	Wed 16.08.17	3
5		Develop a Design document for PoC	4 days	Thu 17.08.17	Tue 22.08.17	4
6		Order Hardware (waiting for delivery)	4 days	Wed 23.08.17	Mon 28.08.17	5
7		Preparing Infrastructure for new deployment	1 day	Wed 23.08.17	Wed 23.08.17	5
8		Hardware Installation	1 day	Tue 29.08.17	Tue 29.08.17	6
9		Software Installation (OS, require software)	1 day	Wed 30.08.17	Wed 30.08.17	8
10		Exchange Installation	1 day	Wed 30.08.17	Wed 30.08.17	8
11		Post-Installation Configuration Changes	1 day	Thu 31.08.17	Thu 31.08.17	10
12		Test Exchange 2016 functionality (Outlook on PC, Outlook on the web, Outlook mobile, ActiveSync)	1 day	Fri 01.09.17	Fri 01.09.17	11
13		Troubleshoot possible issues	1 day	Fri 01.09.17	Fri 01.09.17	11
14		Create mailboxes fot PoC users	1 day	Mon 04.09.17	Mon 04.09.17	13
15		Users training/Workshops	3 days	Mon 04.09.17	Wed 06.09.17	12

4 – 5. Gather and propose software and hardware requirements for the messaging system and based on 100 users and keeping in mind the expansion do the sizing of the CPU, RAM and storage for you messaging system.

The following requirements are mandatory for Exchange 2016

Software requirements for Exchange 2016:

Component	Requirement
Mailbox and Edge Transport server roles	• Windows Server 2016 Standard or Datacenter • Windows Server 2012 R2 Standard or Datacenter • Windows Server 2012 Standard or Datacenter
Management tools	One of the following: • Windows Server 2016 Standard or Datacenter* • Windows Server 2012 R2 Standard or Datacenter • Windows Server 2012 Standard or Datacenter • 64-bit edition of Windows 10 • 64-bit edition of Windows 8.1

Domain controllers	All domain controllers in the forest need to be running one of the following: • Windows Server 2016 Standard or Datacenter • Windows Server 2012 R2 Standard or Datacenter • Windows Server 2012 Standard or Datacenter • Windows Server 2008 R2 Standard or Enterprise • Windows Server 2008 R2 Datacenter RTM or later • Windows Server 2008 Standard, Enterprise, or Datacenter
Active Directory forest	The Active Directory forest functionality level needs to be at Windows Server 2008 or higher.

.NET Framework requirements

Exchange version	.NET Framework 4.6.2	.NET Framework 4.6.1	.NET Framework 4.5.2
Exchange 2016 CU5 or later	X		
Exchange 2016 CU4	X	X[3]	X[3]
Exchange 2016 CU3	X	X	X
Exchange 2016 CU2		X[1,2]	X
Exchange 2016 RTM or CU1			X

Hardware requirements for Exchange 2016:

Component	Requirement
Processor	• x64 architecture-based computer with Intel processor that supports Intel 64 architecture (formerly known as Intel EM64T) • AMD processor that supports the AMD64 platform
Memory	Varies depending on Exchange roles that are installed: • **Mailbox** 8GB minimum • **Edge Transport** 4GB minimum

Paging file size	The page file size minimum and maximum must be set to physical RAM plus 10MB, to a maximum size of 32,778MB (32GB) if you are using more than 32GB of RAM.
Disk space	• At least 30 GB on the drive on which you install Exchange • An additional 500 MB of available disk space for each Unified Messaging (UM) language pack that you plan to install • 200 MB of available disk space on the system drive • A hard disk that stores the message queue database on with at least 500 MB of free space.
Drive	DVD-ROM drive, local or network accessible
File format	Disk partitions formatted as NTFS file systems, which applies to the following partitions: • System partition • Partitions that store Exchange binary files or files generated by Exchange diagnostic logging • Database files, such as mailbox and transport databases Disk partitions containing only the following types of files can optionally be formatted as ReFS: • Partitions containing transaction log files • Partitions containing mailbox database files • Partitions containing content indexing files

The following assumption were taken for exchange sizing:

Maximum amount of users: 300

Mailbox Size limit: 5120 GB

Single Item Recovery: Enabled

Total message per day: 200

Exchange Native Protection: Enabled

Based on requirements and assumption above the following Exchange Server configuration is proposed:

1) User configuration

User Mailbox Configuration	Value
Total Number of User Mailboxes	300
Total Send/Receive Capability / Mailbox / Day	100 messages
Average Message Size (KB)	75
Initial Mailbox Size (MB)	100
Mailbox Size Limit (MB)	5120
Deleted Item Retention Window (Days)	30
Single Item Recovery	Enabled
Calendar Version Storage	Enabled

2) Server Configuration

All servers will be configured identically; it is vital that the servers do not exceed 96GB of RAM as this will have adverse performance issues when running Exchange Server.

Two Exchange servers in DAG with the following configuration:

-Virtual

Component	Description
Server	Virtual
CPU	4 x vCPU, 2 GHz and higher
RAM	32 GB
OS DISC	120 GB SAS 15K RPM
DATA DISC	6 X 1TB SAS 7200K RPM
Operating System	Windows Server 2012 R2

-Physical

Component	Description
Server	PowerEdge T330 Tower Server
CPU	2 x Intel® Xeon® E3-1240 v5 3.5GHz, 8M cache, 4C/8T, turbo (80W)
RAM	96GB 2400MT/s DDR4 ECC UDIMM
OS DISC	2 x 600GB SAS 15K RPM
DATA DISC	10 x 4TB SAS 7200K RPM
Operating System	Windows Server 2012 R2

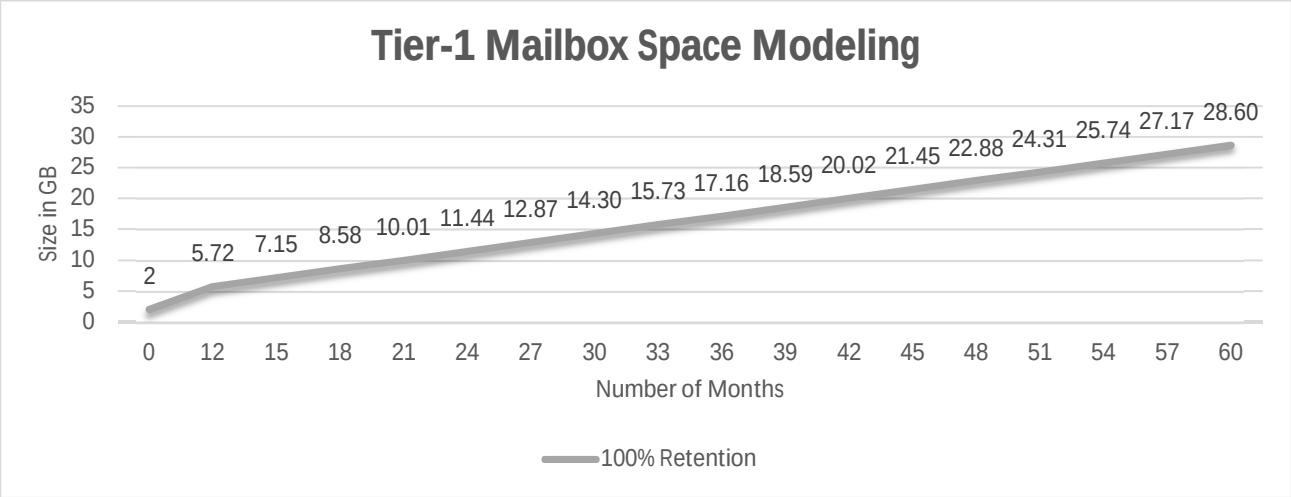
Price for physical serve will be around 5300 $ for each.

3) Server Disk Configuration

Server Disk Configuration	Disk Capacity	Disk Type
System	120 GB	15k
(Database + Log) x 4	1024 GB	7.2k
Auto reseed Volume	1024 GB	7.2k
Restore Volume	1024 GB	7.2k

4) Mailbox Space Modeling

The below graph provides space modeling that provides forecast for mailboxes.



Tier-1 Mailbox Space Modeling	Value
Maximum Mailbox Size	5,42 GB
Number of Months to reach Maximum Mailbox Size	11,38

5) Database Distribution

Two database will be created in DAG with one passive copy for each. Database distribution is provided below:

Database Name	Active Server	Server1	Server2
DAG1-DB1	Server1	1	2
DAG1-DB2	Server2	2	1
DAG1-DB3	Server1	1	2
DAG1-DB4	Server2	2	1

On the estimation above price for PoC on Physical server will cost 10600 $ for servers and 2$ per user for EOP.

Total cost per 6 six month PoC = 10600 + 1200 = 11800$.

For virtual servers, it will be 1200$ for 6 months of PoC with the assumption that there is enough capacity on the virtual environment.

NOTE: Edge servers (optimally) can be deployed to improve security. EDGE server should have the following specification and deployed on virtual machines

EDGE server specifications

Component	Description
Server	Virtual
CPU	1 x vCPU, 2 GHz and higher
RAM	4 GB
OS DISC	120 GB SAS 15K RPM
DATA DISC	1 X 100GB SAS 7200K RPM
Operating System	Windows Server 2012 R2

Task 2

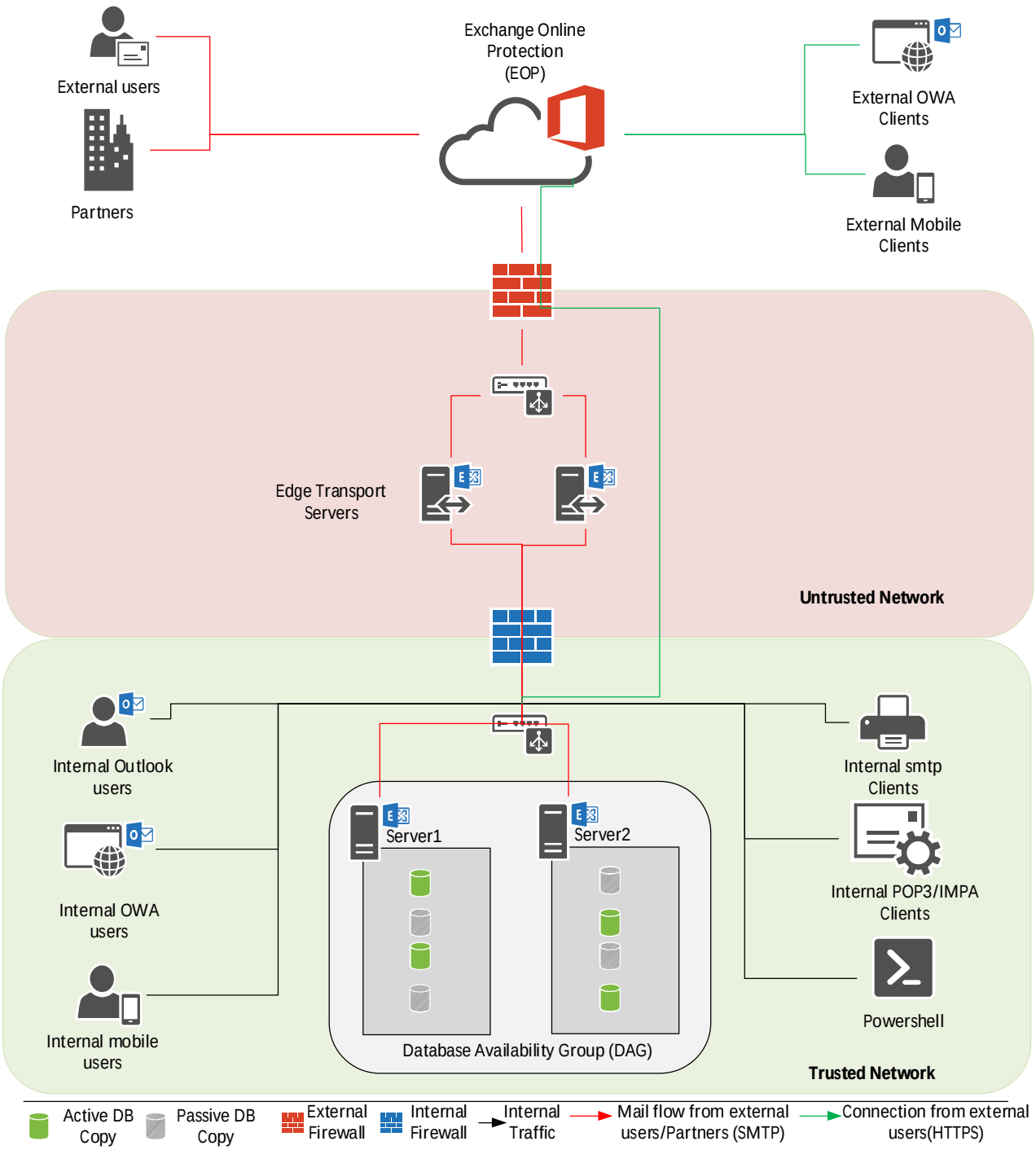
1.ABC star has budgetary constraints for this project, what solution you propose describe with cogent reasons?

There are a few ways to proceed in current situation:

1) Deploy one Exchange server for PoC without high availability and resilience requirements. Decrease SLA and RPO/RTO for this service. In that circumstance, one server can be deployed for limited set of users (executives) to test a new system. Later it can be extended and improved before moving to production.
2) Perform Pilot on cloud SaaS solution Office365. SaaS solution can be deployed without heavily investment for hardware and configuration. Only needed amount of license can be bought. SaaS will save money and time.

2.Draw a diagram to demonstrate the architecture of proposed messaging systems, to explain to stakeholders' interactions within the system.

The diagram below provides High level overview of the proposed solutions



The pictures below provides detailed view of Exchange server 2016 under the hood.