

FINAL PROJECT
**CSCI362-662 M01- INFORMATION SYSTEM SECURITY ENGINEERING AND AD-
MINISTRATION**

Name: Priyanshu Tomar
Semester: SPRING 2023
Telephone: +15513301531
Email: ptomar@nyit.edu

Welcome to XYZ Inc., a fictional organization that operates in the technology industry. The company specializes in providing software solutions to small and medium-sized businesses. XYZ Inc. has been in operation for the past ten years, and it has established itself as a reputable provider of quality software solutions.

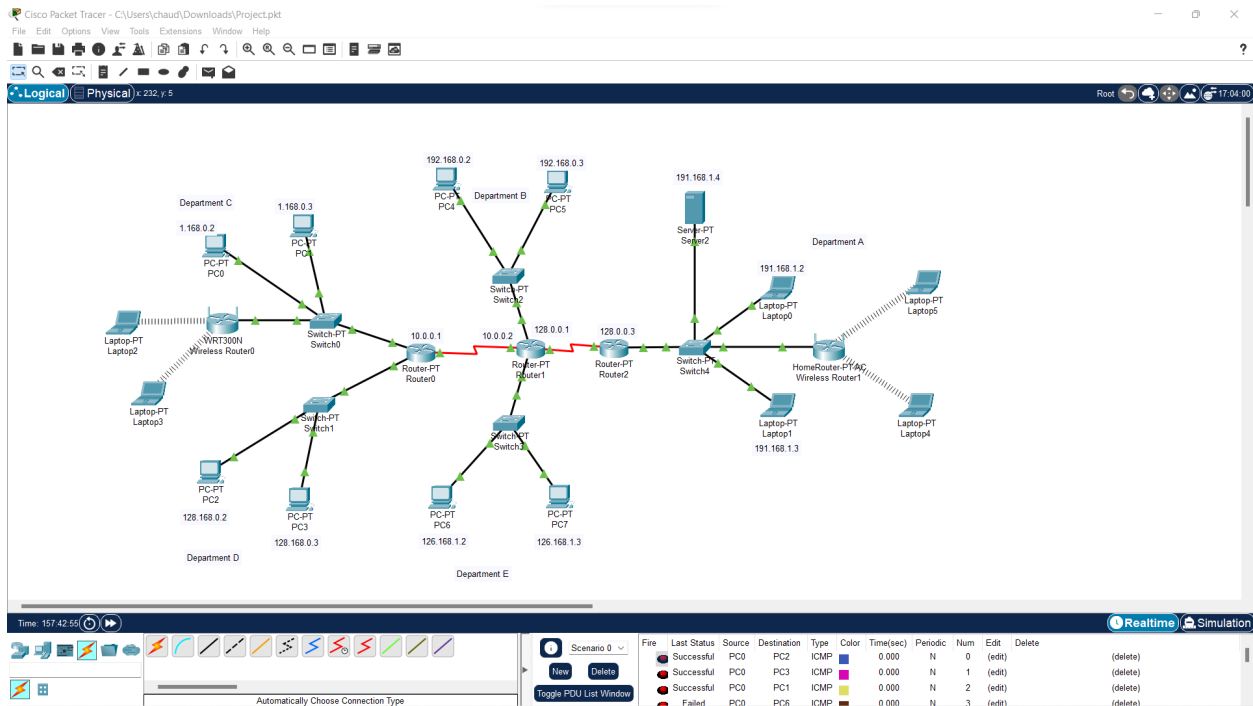
Network Design: The network design of XYZ Inc. consists of the following devices:

8 Desktop computers
6 Laptops
1 Servers
5 Routers
2 Firewalls
5 Switches

1. The desktop computers are used by employees in the company's administrative and development departments, while the laptops are used by sales representatives who travel frequently. The servers are used to host the company's software applications and store data. The network design is configured in a way that ensures that all devices are connected and can communicate with each other.
2. To ensure that the network is secure, XYZ Inc. has implemented multiple layers of security. The company has installed firewalls to prevent unauthorized access to the network, and all devices are protected by antivirus software. Additionally, the company has implemented strict password policies to prevent unauthorized access to sensitive information.
3. The routers are used to manage network traffic and ensure that all devices are connected to the internet. The network design includes redundant routers to ensure that the network remains operational in the event of a failure.
4. In conclusion, XYZ Inc. is a technology company that provides software solutions to small and medium-sized businesses. The company's network design consists of 8 desktop computers, 6 laptops, 1 servers, 5 routers, 2 firewalls, and 5 switches. The network design is configured to ensure that all devices can communicate with each other, and it includes multiple layers of security to prevent unauthorized access to the network and data.
5. The 8 desktop computers and 6 laptops are connected to a local area network (LAN) switch. The LAN switch is connected to a router, which serves as the gateway to the internet and pro-

vides access to external networks.

6. Server is a web server, which host the organization's website and provide access to web applications. These servers are connected to the LAN switch.
7. The two firewalls are configured in a high-availability (HA) pair to provide redundancy and load balancing. The firewalls are connected to the router and are responsible for filtering and securing traffic to and from the organization's network.
8. The three routers are configured in a redundant mesh topology to provide resilience and fail-over capabilities in case of a router failure.
9. Overall, this network topology is designed to provide high availability, scalability, and security for the fictional organization's IT infrastructure.



The Wireshark Network Analyzer interface showing a packet capture on the Wi-Fi interface. The packet list displays various network protocols including UDP, TCP, and TLS. The packet details pane shows the structure of a TLS record, including the TLS header and application data. The packet bytes pane displays the raw data in hexadecimal and ASCII.

Packet List:

No.	Time	Source	Destination	Protocol	Length	Info
90	10.829	192.168.1.216	142.250.176...	UDP	77	52198 → 443 Len=35
91	10.838	192.168.1.216	142.250.80.42	UDP	345	52177 → 443 Len=382
92	10.839	142.250.80.42	192.168.1.216	UDP	72	443 → 52177 Len=30
93	10.840	192.168.1.216	142.250.80.42	UDP	75	52177 → 443 Len=33
94	10.854	142.250.80.42	192.168.1.216	UDP	136	443 → 52177 Len=84
95	10.854	192.168.1.216	142.250.80.42	UDP	80	52177 → 443 Len=38
96	10.854	192.168.1.216	142.250.176...	UDP	75	52198 → 443 Len=33
97	10.857	142.250.176.202	192.168.1.216	UDP	66	443 → 52600 Len=24
98	10.861	142.250.80.42	192.168.1.216	UDP	67	443 → 52177 Len=25
99	12.382	192.168.1.216	13.88.31.235	TLSv1	112	Application Data
100	12.257	13.88.31.235	192.168.1.216	TLSv1	104	Application Data
101	12.386	192.168.1.216	13.88.31.235	TCP	54	50938 → 443 [ACK] Seq=59 Ack=48 Win=512 Len=0
102	12.411	Wireshark_06feb	Broadcast	ARP	42	Who has 192.168.1.170? Tell 192.168.1.1
103	12.411	192.168.1.170	224.0.0.251	MDNS	189	Standard query response 0x0000 PTR Saylee's iPhone..._rdlink..._tcp.local TXT OPT
104	12.411	f680:b6febba...	f682:fb	MDNS	209	Standard query response 0x0000 PTR Saylee's iPhone..._rdlink..._tcp.local TXT OPT
105	13.118	192.168.1.216	162.125.20.2	TLSv1	129	Application Data
106	13.118	192.168.1.216	162.125.20.2	TLSv1	129	Application Data
107	13.128	162.125.20.2	192.168.1.216	TCP	54	443 → 51878 [ACK] Seq=1 Ack=1590 Win=130 Len=0
108	13.132	162.125.20.2	192.168.1.216	TCP	54	443 → 51878 [ACK] Seq=1 Ack=1390 Win=130 Len=0
109	13.132	162.125.20.2	192.168.1.216	TLSv1	819	Application Data
110	13.188	192.168.1.216	162.125.20.2	TCP	54	51878 → 443 [ACK] Seq=1390 Ack=766 Win=514 Len=0

Packet Details:

Frame 105: 209 bytes on wire (1672 bits), 209 bytes captured (1672 bits) on interface Device\Wi-Fi

Section number: 1

Interface id: 0 (Device\Wi-Fi\{82D3EAC-88A2-4162-A628-0A6AEC68A03})

Interface name: Device\Wi-Fi\{82D3EAC-88A2-4162-A628-0A6AEC68A03}

Interface description: Wi-Fi

Encapsulation type: Ethernet (1)

Arrival Time: Mon 1 2023 02:52:13.01030000 Eastern Standard Time

[Time shift for this packet: 0.00000000 seconds]

Epoch Time: 1677057512.681310000 seconds

[Time delta from previous captured frame: 0.699073000 seconds]

[Time delta from previous displayed frame: 0.699073000 seconds]

[Time since reference or first frame: 13.118212000 seconds]

Frame Number: 105

Frame Length: 209 bytes (1672 bits)

Capture Length: 209 bytes (1672 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp:tls]

Packet Bytes:

0000 78 67 0e 00 40 8d 24 ec 3a 5d ab d8 00 00 05 00 xg...\$...E-
0010 00 c3 9c f9 40 00 00 00 00 00 c0 a8 01 d8 a2 7d ...@.....
0020 14 82 ca a6 01 bb 8c 05 37 a1 7f 77 6b 50 18Z...w@
0030 02 05 75 05 00 00 17 03 03 00 06 00 00 00 00
0040 00 00 18 8e 3c e8 61 d0 4e 94 de 11 01 7f 9e aecha..N.N....
0050 89 1e 4d 69 84 80 22 06 0e be c2 65 8b 8e 85 1c ...-1...-...@-...
0060 70 7c 45 cc 5d 20 43 21 61 ec cd 8e 53 98 c2 03 v[E-]C]C...S...
0070 61 ab b6 de 70 48 84 bd f4 62 cf 31 40 c0 cf 24 a...[E-...b-18-5
0080 0c 50 d8 d8 d1 fe 20 23 c1 13 7c 85 98 f4 7b a9 ...-...@-...11...
0090 ca 30 30 6e 1b 8d 11 67 97 a2 30 62 05 6f 6d b4 ...[0m...g...@m...
00a0 49 0d 3d 05 45 1a fe 20 7c 85 42 6c 5d b3 97 42 ...-...-...[0]-@
00b0 ed 15 3e ef 51 10 3d dc 80 e9 c1 7f 36 0e f0 01 ...->-@...-...6...
00c0 71 2f ff bc 36 01 af 78 09 90 9d 21 70 b4 19 37 q/...@...X...1p...?
00d0 49

```
Command Prompt
Microsoft Windows [Version 10.0.22000.1696]
(c) Microsoft Corporation. All rights reserved.

C:\Users\chaud>arp -a

Interface: 192.168.56.1 --- 0xa
    Internet Address      Physical Address      Type
    192.168.56.255        ff-ff-ff-ff-ff-ff    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251           01-00-5e-00-00-fb    static
    224.0.0.252           01-00-5e-00-00-fc    static
    239.255.255.250       01-00-5e-7f-ff-fa    static
    255.255.255.255       ff-ff-ff-ff-ff-ff    static

Interface: 192.168.1.216 --- 0xc
    Internet Address      Physical Address      Type
    192.168.1.1           78-67-0e-06-b0-0d    dynamic
    192.168.1.224         38-c8-04-9a-ab-1e    dynamic
    192.168.1.255         ff-ff-ff-ff-ff-ff    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251           01-00-5e-00-00-fb    static
    224.0.0.252           01-00-5e-00-00-fc    static
    239.255.255.250       01-00-5e-7f-ff-fa    static
    255.255.255.255       ff-ff-ff-ff-ff-ff    static
```

```
Command Prompt

C:\Users\chaud>nmap -sS [192.168.1.1]
Starting Nmap 7.93 ( https://nmap.org ) at 2023-04-04 13:24 Eastern Daylight Time
Failed to resolve "[192.168.1.1]".
WARNING: No targets were specified, so 0 hosts scanned.
Nmap done: 0 IP addresses (0 hosts up) scanned in 0.32 seconds

C:\Users\chaud>nmap -sS 192.168.1.1
Starting Nmap 7.93 ( https://nmap.org ) at 2023-04-04 13:24 Eastern Daylight Time
Nmap scan report for CR1000A.mynetworksettings.com (192.168.1.1)
Host is up (0.015s latency).
Not shown: 997 closed tcp ports (reset)
PORT      STATE SERVICE
53/tcp    open  domain
80/tcp    open  http
443/tcp    open  https
MAC Address: 78:67:0E:06:B0:0D (Wistron Neweb)

Nmap done: 1 IP address (1 host up) scanned in 4.29 seconds
```

```
Command Prompt

C:\Users\chaud>nmap -sP 192.168.0.0/24
Starting Nmap 7.93 ( https://nmap.org ) at 2023-04-04 13:53 Eastern Daylight Time
Nmap done: 256 IP addresses (0 hosts up) scanned in 207.61 seconds

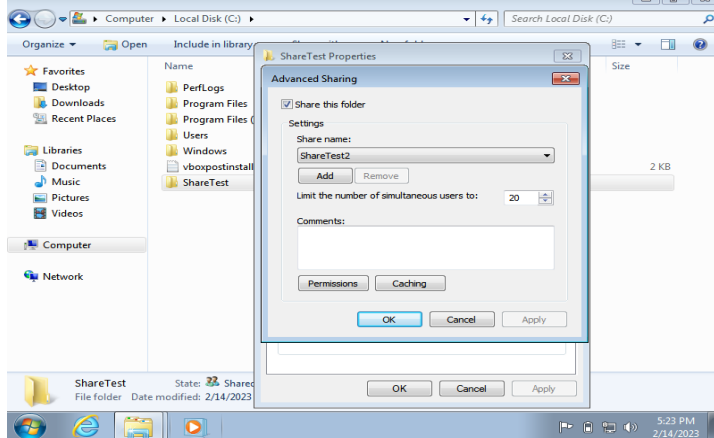
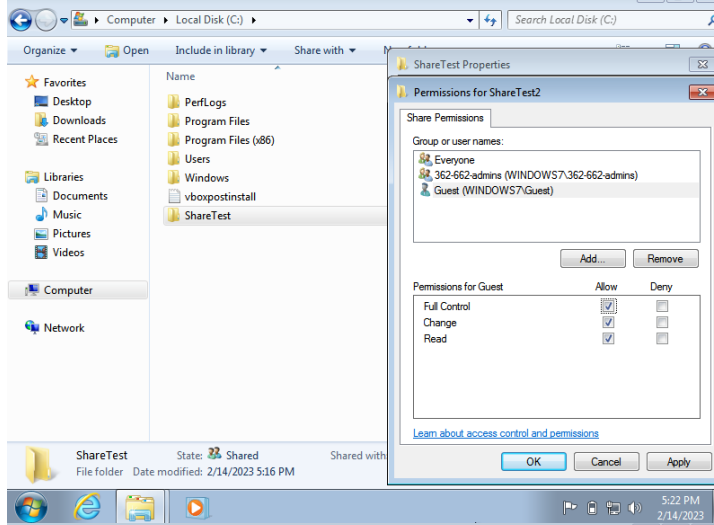
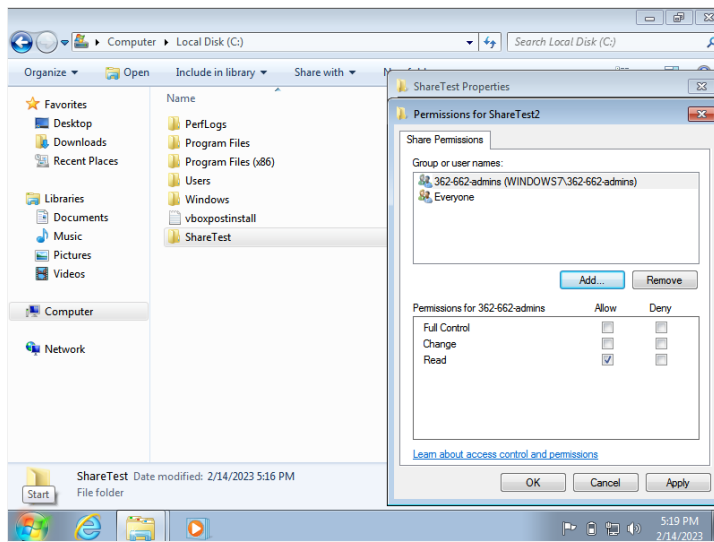
C:\Users\chaud>nmap 192.168.1.1
Starting Nmap 7.93 ( https://nmap.org ) at 2023-04-04 13:57 Eastern Daylight Time
Nmap scan report for CR1000A.mynetworksettings.com (192.168.1.1)
Host is up (0.011s latency).
Not shown: 997 closed tcp ports (reset)
PORT      STATE SERVICE
53/tcp    open  domain
80/tcp    open  http
443/tcp    open  https
MAC Address: 78:67:0E:06:B0:0D (Wistron Neweb)

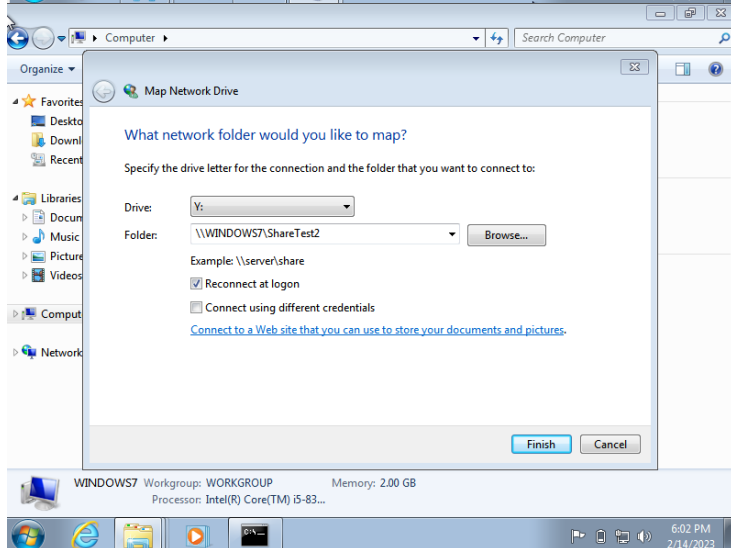
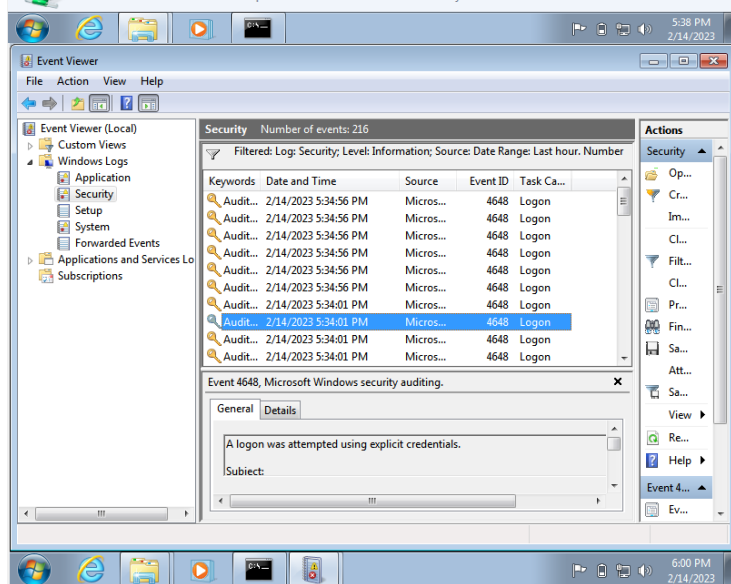
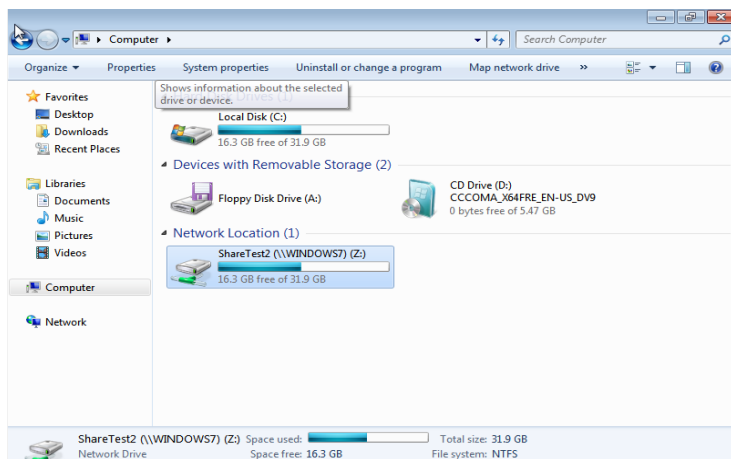
Nmap done: 1 IP address (1 host up) scanned in 3.04 seconds
```

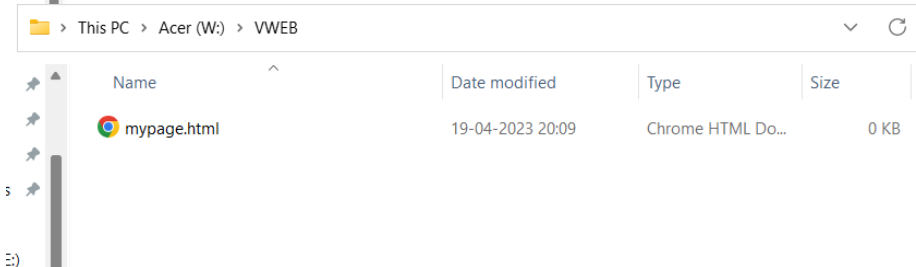
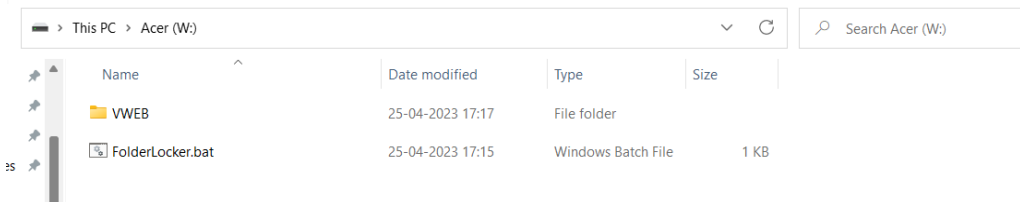
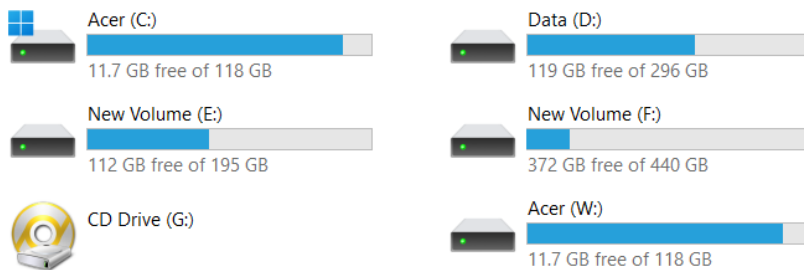
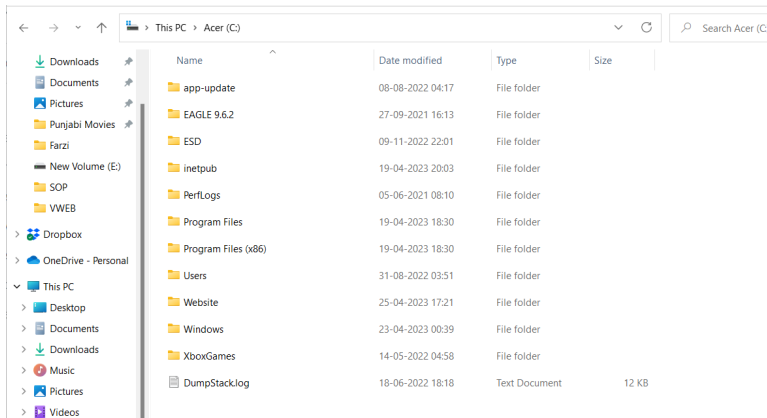
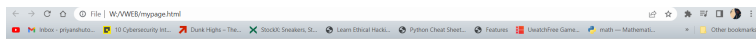
```
Command Prompt

C:\Users\chaud>nmap -sU 224.0.0.22
Starting Nmap 7.93 ( https://nmap.org ) at 2023-04-04 13:59 Eastern Daylight Time
Note: Host seems down. If it is really up, but blocking our ping probes, try -Pn
Nmap done: 1 IP address (0 hosts up) scanned in 1.95 seconds

C:\Users\chaud>
```







Generate RSA Key Online

Select RSA Key Size

1024 bit

Generate RSA Key Pair

Public Key

```
KBgQDivccOkrvRmnTNRjldOUh7ke55/xs+cKh  
Jkhco7ILGVBiBcNZ4y+jMVAZ2PIHtH3Hqldn95  
9hMFhI2a4L3x/+Dfc2GdfG5+6vqD9QOXSKFb  
vL0U68/iQQPJPPVD7GKXibsvzc4znHb2NEJPN  
d+7TDdoBD3qgJadVqf1lPkokOU4wIDAQAB
```

Private Key

```
MIICdgIBADANBgkqhkiG9w0BAQEFAASCAmA  
wggJcAgEAAoGBAOK9xw6Su9GadMIGMt05  
SHuR7nn/Gz5wqEmSFyjuUsZUGJtwInJL6MxUB  
nY/Ue0fceoh2f3n2EwWEJZrgvfH/4N9zYZ18bn  
7q+oPIA5dIoVu8vRTrz+JBA8k+IUPsYpeJuy/N
```

RSA Encryption

Enter Plain Text to Encrypt

Hey, We have some confidential information
for you to share with you.

Enter Public/Private key

```
MIGfMA0GCsQGSib3DQEBAQUAA4GNADCBi  
QKBgQDivccOkrvRmnTNRjldOUh7ke55/xs+c  
KhJkhco7ILGVBiBcNZ4y+jMVAZ2PIHtH3Hqld  
n959hMFhI2a4L3x/+Dfc2GdfG5+6vqD9QOX  
SKFbvL0U68/iQQPJPPVD7GKXibsvzc4znHb
```

RSA Key Type: ☒ Public key ☐ Private Key

Select Cipher Type

RSA

Encrypt

Encrypted Output (Base64):

```
Sw/dkVDuFily9sYXN3uRgYROT366gtg/wm20  
Mc6f4NhP9sTxUqrpei2PSQ5rWwBeCAPEiC  
gjfLBQWnRfVyoE55tSmYtHnXtlaudmHA28
```

RSA Encryption

Enter Plain Text to Encrypt

Hey, Thank you for letting me know. I'll provide
you with a secure network.

Enter Public/Private key

```
MIGfMA0GCsQGSib3DQEBAQUAA4GNADCBi  
QKBgQDivccOkrvRmnTNRjldOUh7ke55/xs+c  
KhJkhco7ILGVBiBcNZ4y+jMVAZ2PIHtH3Hqld  
n959hMFhI2a4L3x/+Dfc2GdfG5+6vqD9QOX  
SKFbvL0U68/iQQPJPPVD7GKXibsvzc4znHb
```

RSA Key Type: ☒ Public key ☐ Private Key

Select Cipher Type

RSA

Encrypt

Encrypted Output (Base64):

```
k0Pmcmmn7yGiQ03oXwkTbZvaucR3Za7G5lp  
cFFGMeATMfdE2mb3NaoCJHjkelX/p7uifXiV  
qu7nsjoZn5+LhX8tiMXxiWcJvjyQCqIvAhuS
```

RSA Decryption

Enter Encrypted Text to Decrypt (Base64)

```
Sw/dkVDuFily9sYXN3uRgYROT366gtg/wm20  
Mc6f4NhP9sTxUqrpei2PSQ5rWwBeCAPEiC  
gjfLBQWnRfVyoE55tSmYtHnXtlaudmHA28
```

Enter Public/Private key

```
MIICdgIBADANBgkqhkiG9w0BAQEFAASCAm  
AwggJcAgEAAoGBAOK9xw6Su9GadMIGMt05  
SHuR7nn/Gz5wqEmSFyjuUsZUGJtwInJL6Mx  
UBnY/Ue0fceoh2f3n2EwWEJZrgvfH/4N9zYZ18  
bn7q+oPIA5dIoVu8vRTrz+JBA8k+IUPsYpeJuy/N
```

RSA Key Type: ☐ Public key ☒ Private Key

Select Cipher Type

RSA

Decrypt

Decrypted Output:

Hey, We have some confidential information
for you to share with you.

RSA Decryption

Enter Encrypted Text to Decrypt (Base64)

```
k0Pmcmmn7yGiQ03oXwkTbZvaucR3Za7G5lp  
cFFGMeATMfdE2mb3NaoCJHjkelX/p7uifXiV  
qu7nsjoZn5+LhX8tiMXxiWcJvjyQCqIvAhuS
```

Enter Public/Private key

```
MIICdgIBADANBgkqhkiG9w0BAQEFAASCAm  
AwggJcAgEAAoGBAOK9xw6Su9GadMIGMt05  
SHuR7nn/Gz5wqEmSFyjuUsZUGJtwInJL6Mx  
UBnY/Ue0fceoh2f3n2EwWEJZrgvfH/4N9zYZ18  
bn7q+oPIA5dIoVu8vRTrz+JBA8k+IUPsYpeJuy/N
```

RSA Key Type: ☐ Public key ☒ Private Key

Select Cipher Type

RSA

Decrypt

Decrypted Output:

Hey, Thank you for letting me know. I'll provide
you with a secure network.