

S^X MANUAL

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CHAPTER

INTRODUCTION

Welcome to Skylable $S^X,...$

USEFUL LINKS

- http://cdn.skylable.com/packages/
- http://lists.skylable.com
- https://bugzilla.skylable.com
- http://wiki.skylable.com

C H A P T E R

INSTALLATION

REQUIREMENTS

Skylable S^X is tested on all popular UNIX platforms, including Linux, FreeBSD, and Mac OS X. We try to support as many platforms as possible, if you have troubles installing, compiling or running our software on your platform please open a bug report.

The latest binary packages are available at:

http://cdn.skylable.com/packages/

In order to compile S^X from source, you will need the following packages to be installed together with their development versions:

- OpenSSL/NSS
- libcurl >= 7.34.0 (otherwise the embedded one will be used)
- zlib

For example, on Debian run:

```
# apt-get install libssl-dev libcurl4-openssl-dev libz-dev
```

COMPILATION

The software is based on autoconf, so just follow the standard installation procedure. In this guide we will install S^X into / opt/sx.

```
$ ./configure --prefix=/opt/sx && make
# make install
```

CLUSTER DEPLOYMENT

3.1 REQUIREMENTS

S^X by default operates on the port 443 or 80, which needs to be available on a given IP address¹. You can build just a single-node S^X cluster, however for data safety reasons it is recommended to create at least two nodes and use replica higher than 1. You can add more nodes to the cluster at any time.

3.2 Creating the first node

Setting up the first node initializes the cluster and makes S^X ready to use. The sxsetup tool presented below performs an automated configuration of the S^X server, which includes creating a local data storage, SSL certificate, and default admin account. You will only need to answer a few basic questions!

In the example we assume the IP address of the first node is **192.168.1.101**, the name of the cluster is **mycluster**, and S^X was installed into /opt/sx. Also in some cases (eg. the path to S^X storage) we assume default values, however your mileage may vary.

 $^{^{1}}$ You can choose a custom port when running sxsetup with in advanced mode

```
# /opt/sx/sbin/sxsetup
   -- SKYLABLE SX CONFIGURATION SCRIPT ---
 The script will help you to create or extend a Skylable SX data
 cluster.
 --- CLUSTER NAME ---
Clients will access your cluster using a sx://clustername/volume/path URI. It is recommended to use a FQDN for clustername, but not required. Refer to the documentation for more info.
Enter the cluster name (use the same across all nodes) []: mycluster
 --- DATA STORAGE ---
Please provide the location where all incoming data will be stored. Path to SX storage [default=/opt/sx/var/lib/sxserver]: <confirm default>
Please specify the maximum size of the storage for this node. You can use M, G and T suffixes, eg. 100T for 100 terabytes. Maximum size [default=1T]: 500G
 --- NETWORKING ---
Enable SSL? (use the same setting for all nodes in the cluster) (Y/n)
Enter the IP address of this node [default=192.168.1.101]: <confirm default> Checking port 443 on 192.168.1.101 ... OK
 --- CLUSTER CONFIGURATION ---
 Is this (192.168.1.101) the first node of a new cluster? (Y/n)
   confirm default>
 --- SSL CONFIGURATION ---
 Generating default SSL certificate and keys in /opt/sx/etc/ssl/private/sxkey.pem /opt/sx/etc/ssl/certs/sxcert.pem
 Generating a 2048 bit RSA private key
writing new private key to '/opt/sx/etc/ssl/private/sxkey.pem'
 --- YOUR CHOICES ---
Cluster: sx://mycluster
Node: 192.168.1.101
 Use SSL: yes
 Storage: /opt/sx/var/lib/sxserver
Run as user: nobody
 Is this correct? (Y/n) <confirm default>
 --- CLUSTER INITIALIZATION ---
 + /opt/sx/sbin/sxadm node --new --batch-mode --owner=nobody:nogroup /opt/sx/
            var/lib/sxserver/data
 [runas]: Switched to nobody:nogroup (65534:65534)
   stands: Serious to house; higher to prove the control of the 
             500G/192.168.1.101 sx://mycluster
 Starting SX.fcgi
 Starting sxhttpd
HashFS Version: SX-Storage 1.5
Cluster UUID: 01dca714-8cc9-4e26-960e-daf04892b1e2
 Cluster authentication: CLUSTER/ALLNODE/ROOT/
           USERwBdjfz3tKcnTF2ouWIkTipreYuYjAAA
```

```
Admin key: ODPiKuNIrrVmD8IUCuw1hQxNqZfIkCY+oKwxi5zHSPn5yOSOi3IMawAA
Internal cluster protocol: SECURE
Used disk space: 17568768
Actual data size: 463872
List of nodes:
             * ec4d9d63-9fa3-4d45-838d-3e521f124ed3 192.168.1.101
                   (192.168.1.101) 536870912000
--- CONFIGURATION SUMMARY ---
     private key (/opt/sx/etc/ssl/private/sxkey.pem):
     --BEGIN PRIVATE KEY--
MIIEvAIBADANBgkqhkiG9w0BAQEFAASCBKYwggSiAgEAAoIBAQCYNdtHyNg1HZQ8
vaO1HJWtZ/eerB2H8OXyQTZpDFRS87qGUNcrRudDNO9EypcueXaW1UN/3L8KKn7ttGhLe6quG8QuKw//UiJDDGTDEICOndtYfBhO7zNR9zgaQRi9loqQB6Iqfe4K/T9F
EONMjVji10F5JI/3SgxEDwoQ4+1eghDuMGMElzJ4VJCojXhiEtvwo1ZruFX+Xogd
rq4Ys6Pch7n9FowdOc2n+IRxPXKb6CqnHC1t9AKEBmbaoP+OzhM8ZFC13WFRChvb
JF8T9ZZ5q3no1668NILNN1f4RRe07+pb9ubfWqNABhuI5hQUnG81wKjcIzjwK4HZ
+3bMwg6PAgMBAAECggEAQ+fTGmV60KTHm4mnXYeRJzm4+SskSaC41e10Ev0TMybV
\label{localization} UlMCi6FoSo6EaNZR0ESsKYKfiI29FRX8ZqQT24kijmaI0WgYzPmhm3Q0CBB2qim2\\ z/UdHB4TMUAv4ValaP+edb9SE872viRVc8SjA2YT/661oNw09kgszLhA72QgZAbG\\ xmxVwCNTRFd7dg4Wmy10Qz3YV0nlC3Qs8C8LoGo00Mci85quhBUw9s7J12skXGbuZGDtpJylgwtfc1q7nojaFkWenGCA9D1HB8zCQKPkhMh+HtA26g8VdFaHPVBzw/pz
avv5r9gLnBETwHfM3XuIYv7h3wowE5uAKVhgvL8w0QKBgQDJs2avbYOwgcEEOf7L
PRQmb5XjJE329KsyIzo4Yw0rZDjQXSYrBjifoBIJzUReDDB7ws5lt0Xy3MExeS4
ngL0/oWotjd7jGU+EdABozKwW3bZuyUTSqTeQJwo+aIhjNtiyMrnpFy3vjYrJKGy
W/9cnv1WjqxpqnQgDjE/yJt36wKBgQDBL7p7iCWjIf+LH1/caFgPchJENd4YZZrB
bhGA/tuo6VJcarc/Etx3BGbKhnJq13LxRRLjyHlPhv/k7oZBdaVK27I+vNfw5Lj
c2KZCYbFnF3kbP5ryuMW0QqGbkZZ/FExzwgFyA0UuCTw2DVmKtPgbP9ywDTJcOZ
Jq/pdz0e7QKBgF0pxn4dvv1H4DgQlk9+2yMcgoduFw5EcC6bQVeXtrCf7elVzTdG
qOvHjQ5gtPJ6GD9ZGIkKusqT6TGhpC2v3SoiKO7CJmFo6tXELbOALhZY2gOWTNqj
q59EzYFxin7AHn/rKb7Lvmm4zF844p1177NLf2nX5EwwF9r0CBmc7F/hAoGAUctH
ha4rYVqvu9PY3pU/U6rUmRTFqEa8s1FLD/bYQjgrcnkyAsa/msHELxIwQPbRi8kx
wpwjmdAmXbTKgnW6WQY+rdGy4cUImEzuXiVubpS6HFEZ18IbTDnN3wUpvEfciN5D
Y09AV0NyoKK+8mvlfJBKCRa+jqfeotuCd7MEpDECgYAhWcDt6aXSsU0tq+jgVNtC
oi9Cnm4FNW7Z/VVgCCRFIwHxpqqAau63/naSGxkLU1K+U0StReiLC2D4FPrqs9Jh
scUH9hTIp3hxwznZBRFkuvU0m3h6CwQ0t3km7AffLRsGQZ9EM1vNb4T5mR/Izgxy
smcEPJfJgX61fx7c//bU6Q==
----END PRIVATE KEY----
SSL certificate (/opt/sx/etc/ssl/certs/sxcert.pem):
      -BEGIN CERTIFICATE --
MIIDpzCCAo+gAwIBAgIJAODcwxKZHi35MAOGCSqGSIb3DQEBCwUAMDsxCzAJBgNV
BAYTAkdCMQswCQYDVQQIEwJVSzELMAkGA1UEChMCU1gxEjAQBgNVBAMTCW15Y2x1
c3RlcjAeFw0xNDAzMjExNDU2NTdaFw0xOTAzMjAxNDU2NTdaMDsxCzAJBgNVBAYT
{\tt AkdCMQswCQYDVQQIEwJVSzELMAkGA1UEChMCU1gxEjAQBgNVBAMTCW15Y2x1c3R1}
cjCCASIwDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBAJg120f12CUdlDy9o7Uc
la1n956sHYfzRfJBNmkMVFLzuoZQ1ytG50M3T0TKly55dpbVQ3/cvwoqfu20aEt7
qq4bxC4rD/9SIkMMZMMQgI6d21h8GHTvM1H3OBpBGL2WipAHoip97gr9POUQ4OyN
WOLU4Xkkj/dKDEQPChDj7V6CEO4wYwSXMnhUkKiNeGIS2/CjVmu4Vf5eiB2urhiz
o9yHuf0WjB05zaf4hHE9cpvoKqccLW30AoQGZtqg/7T0EzxkUKXdYVEKG9skXxP1
lnmreeiXrrw0gs03V/hFF7Tv6lv25t9ao0AGG4jmFBScbzXAqNwj0NYrgdn7dszC
Do8CAwEAAaOBrTCBqjAdBgNVHQ4EFgQUs7Zs8qeEtPdNQ713zs3f2v+MTrswawYD
VROjBGQwYoAUs7Zs8qeEtPdNQ7l3zs3f2v+MTruhP6Q9MDsxCzAJBgNVBAYTAkdC
MQswCQYDVQQIEwJVSzELMAkGA1UEChMCU1gxEjAQBgNVBAMTCW15Y2x1c3R1coIJ
AODcwxKZHi35MA8GA1UdEwEB/wQFMAMBAf8wCwYDVROPBAQDAgEGMAOGCSqGSIb3
DQEBCwUAA4IBAQBGwoULuHM5svPvV7cOtdsBmxovrhCYkMg4MwtPJ8eJQckyrCP3
fIU1VMXXeHKegaZ4q3QzIV9DD01XB9TzifZ8yKm7a2/NlUnvgLQCGu82H/226YLE
abqoipcJsAANo5+2qGYEmYDODmLOnToaCX5bcmbLc1tcG4uf/x880+PGLgh/h5+9
MUMlffyJWAE5eJN1rk9T5k0Onm5PE1QLP/ZQecodHGL9Xxzgj09kLfwBmUruGu/
ft4Ru0o0rQDIDWxQuiBitawQKX/tyaGkpX+g38gyFwDiPINo2q/IHeckxX5EHgF3
YGgPNaWwBnH3jfsJ/kMXcJS52q/zP0IvUCz0
     -- END CERTIFICATE --
Cluster: sx://mycluster
This node: 192.168.1.101
HashFS Version: SX-Storage 1.5
Cluster UUID: 01dca714-8cc9-4e26-960e-daf04892b1e2
```

```
CLUSTER/ALLNODE/ROOT/USERwBdjfz3tKcnTF2ouWIkTipreYuYjAAA
Admin key: ODPiKuNIrrVmD8IUCuw1hQxNqZfIkCY+oKwxi5zHSPn5yOSOi3IMawAA
Internal cluster protocol: SECURE Used disk space: 17568768
Actual data size: 463872
List of nodes:
            * ec4d9d63-9fa3-4d45-838d-3e521f124ed3 192.168.1.101
                  (192.168.1.101) 536870912000
Storage location: /opt/sx/var/lib/sxserver
Run as user: nobody
Sockets and pidfiles in: /opt/sx/var/run/sxserver
Logs in: /opt/sx/var/log/sxserver/sxfcgi.log
 -- END OF SUMMARY ---
Congratulations, the new node is up and running! You can control it with '/opt/sx/sbin/sxserver'
You can add a new node to the cluster by running 'sxsetup' on another server. When prompted, enter the 'admin key', 'SSL private key' and 'SSL certificate' printed above.
You can run 'sxacl useradd joe sx://admin@mycluster' to add a new user.
To create a new volume owned by user 'joe' run:
'sxvol create --owner joe --replica N --size SIZE sx://admin@mycluster/
      VOLNAME,
```

When the script finishes successfully, the node is already functional. Please notice the admin key listed at the end of the summary: it will be needed for both adding more nodes and accessing the cluster. You can always retrieve the admin key with the following command:

That's it - your SX storage is already up and running! You can now go to the next step and add more nodes or go to the next chapter and learn how to perform basic client

operations.

3.3 Adding more nodes to the cluster

Follow these steps to add a new node to the cluster:

- Run 'sxserver status' on one of the nodes of the cluster
- Collect the following information:
 - Cluster name
 - Admin key
 - One of the IP addresses from the list of nodes
 - The content of the SSL private key file (not the path itself!)
- Configure, compile and install S^X by running ./ configure --prefix=/opt/sx && make install
- Run /opt/sx/sbin/sxsetup and provide the collected information. Below we assume the new node is 192.168.1.102 and it's size is 250 GBs.

```
# /opt/sx/sbin/sxsetup
--- SKYLABLE SX CONFIGURATION SCRIPT ---

The script will help you to create or extend a Skylable SX data cluster.
--- CLUSTER NAME ---

Clients will access your cluster using a sx://clustername/volume/path URI. It is recommended to use a FQDN for clustername, but not required. Refer to the documentation for more info.

Enter the cluster name (use the same across all nodes) []: mycluster
--- DATA STORAGE ---

Please provide the location where all incoming data will be stored.
Path to SX storage [default=/opt/sx/var/lib/sxserver]: <confirm default>

Please specify the maximum size of the storage for this node. You can use M, G and T suffixes, eg. 100T for 100 terabytes.
Maximum size [default=1T]: 250G
--- NETWORKING ---

Enable SSL? (use the same setting for all nodes in the cluster) (Y/n) <confirm default>
Enter the IP address of this node [default=192.168.1.102]: <confirm default>
Checking port 443 on 192.168.1.102 ... 0K
```

```
--- CLUSTER CONFIGURATION ---
Is this (192.168.1.102) the first node of a new cluster? (Y/n) {\tt n}
Please provide the IP address of a working node in 'mycluster' IP address: 192.168.1.101
The admin key is required to join the existing cluster.
If you don't have it, run 'sxserver status' on 192.168.1.101.
Below you can provide the key itself or path to the file
containing the key.
Admin key or path to key-file:
                                                    Cwxi5zHSPn5y0S0i3IMawAA
 -- SSL CONFIGURATION ---
Please paste the SSL private key below (and press CTRL+D when
done) or provide a path to it.
SSL private key:
 <below paste the private key from 192.168.1.101>
      --BEGIN PRIVATE KEY---
MIIEvAIBADANBgkqhkiG9wOBAQEFAASCBKYwggSiAgEAAoIBAQCYNdtHyNglHZQ8
vaO1HJWtZ/eerB2H80XyQTZpDFRS87qGUNcrRudDN09EypcueXaW1UN/3L8KKN7t
tGhLe6quG8QuKw//UiJDDGTDEICOndtYfBh07zNR9zgaQRi9loqQB6Iqfe4K/T9F
EONMjVji10F5JI/3SgxEDwoQ4+1eghDuMGMElzJ4VJCojXhiEtvwo1ZruFX+Xogd
rq4Ys6Pch7n9Fowd0c2n+IRxPXKb6CqnHC1t9AKEBmbaoP+0zhM8ZFCl3WFRChvb
\tt JF8T9ZZ5q3no1668NILNN1f4RRe07+pb9ubfWqNABhuI5hQUnG81wKjcIzjWK4HZ
JF01922.5q3n01000xm1Entil*Tarkeof***pb=u0l**wqnxBnUt3nQnlaGl**wq122_Jwx+12

+3bMwg6PAgMBAAECggEAQ+fTGmV60KTHm4mmXYeRJzm4+Ssk8aC41e10EvOTMybV

U1MCi6YoSo6EaNZR0ESsKYKfi129FRX8ZqQT24kijmaI0WgYzPmhm3Q0CBB2qim2

z/UdHB4TMUAv4ValaP+edb9SE872wiRVc8SjA2YT/661oNw09kgszLhA72QgZAbG

xmxVwCNTRFd7dg4Wmy10Qz3YV0n1C3Qs8C8LoG000Mc185quhBUw9s7J12skXGbu
ZGDtpJylgwtfc1q7nojaFkWenGCA9D1HB8zCqKPkhMh+HtA26g8VdFaHPVBzw/pz
avv5r9gLnBETwHfM3XuIYv7h3wowE5uAKVhgvL8w0QKBgQDJs2avbYOwgcEEOf7L
nPRqmb5XjJE329KsyIzo4Yw0rZDjQXSYrBjifoBIJzUReDDB7wv51t0Xy3MExeS4
ngL0/oWotjd7jGU+EdABozKwW3bZuyUTSqTeQJwo+aIhjNtiyMrnpFy3vjYrJKGy
W/9cnv1WjqxpqnQgDjE/yJt36wKBgQDBL7p7iCWjIf+LH1/caFgPchJENd4YZZrB
bhGA/tuo6VtJcarc/Etx3DGbKhnJq13LxRRLjyHlPhw/k7oZBdaVK27I+vNfw5Lj
c2KZCYbFnF3kbP5ryuMWQQGbkZZ/FExzwgFyAOUuCTw9L2VmKtPgbP9ywDTJCOZ
Jq/pdz0e7QKBgF0pxn4dvv1H4DgQ1k9+2yMcgoduFw5EcC6bQveXtrcff7elVzTdG
q0vHjQ5gtPJ6GD9ZG1kKusqT6TGhpC2v3SoiK07CJmFo6tXELb0ALhZY2g0WTNqj
q59EzYFxin7AHn/rKb7Lvmm4zF844p1177NLf2nX5EwwF9r0CBmc7F/hAoGAUctH
ha4rYVqvu9PY3pU/U6rUmRTFqEa8s1FLD/bYQjgrcnkyAsa/msHELxIwQPbRi8kx
wpwjmdAmXbTKgnW6WQY+rdGy4cUImEzuXiVubpS6HFEZ18IbTDnN3wUpvEfciN5D
YO9AVONyoKK+8mvlf]BKCRa+jqfeotuCd7MEpDECgYAhWcDt6aXSsUOtq+jgVNtC
oi9Cnm4FNW7Z/VVgCCRFIwHxpqqAau63/naSGxkLU1K+UOStReiLC2D4FPrqs9Jh
scUH9hTIp3hxwznZBRFkuvU0m3h6CwQ0t3km7AffLRsGQZ9EM1vNb4T5mR/Izgxy
smcEPJfJgX61fx7c//bU6Q==
----END PRIVATE KEY----
 CTRL+D>
Successfully obtained SSL certificate from 192.168.1.101
--- YOUR CHOICES ---
Cluster: sx://mycluster
Node: 192.168.1.102
Storage: /opt/sx/var/lib/sxserver
Is this correct? (Y/n) <confirm default>
 --- CLUSTER INITIALIZATION ---
Connecting to 127.0.0.1
Server certificate:
               Subject: C=UK; L=London; O=SX; CN=mycluster
               Issuer: C=UK; L=London; O=SX; CN=mycluster
SHA1 fingerprint: 627917198424168ad0c144e721567eb4ebc90db1
```

```
Do you trust this SSL certificate? [y/N] y
     /opt/sx/sbin/sxadm node --new --batch-mode --owner=nobody:nogroup --
          cluster-uuid=01dca714-8cc9-4e26-960e-daf04892b1e2 --cluster-key=/opt/sx
           /var/lib/sxserver/cluster.key /opt/sx/var/lib/sxserver/data
Starting SX.fcgi
Starting sxhttpd
SX node started successfully
     /opt/sx/sbin/sxadm cluster --mod 536870912000/192.168.1.101/ec4d9d63-9fa3
            -4d45-838d-3e521f124ed3 250G/192.168.1.102 sx://admin@mycluster
 HashFS Version: SX-Storage 1.5
 Cluster UUID: 01dca714-8cc9-4e26-960e-daf04892b1e2
 Cluster authentication:
CLUSTER/ALLNODE/ROOT/USERwBdjfz3tKcnTF2ouWIkTipreYuYjAAA
Admin key: ODPiKuNIrrVmD8IUCuw1hQxNqZfIkCY+oKwxi5zHSPn5y0S0i3IMawAA
Internal cluster protocol: SECURE
Used disk space: 17568768
Actual data size: 463872
List of nodes:
          - ec4d9d63-9fa3-4d45-838d-3e521f124ed3 192.168.1.101 (192.168.1.101)
                    536870912000
          * 02e01f5d-80d8-4a01-b1f7-a56eecb8aef5 192.168.1.102 (192.168.1.102)
                    268435456000
 --- CONFIGURATION SUMMARY ---
SSL private key (/opt/sx/etc/ssl/private/sxkey.pem):
          BEGIN PRIVATE KEY--
MIIEvAIBADANBgkqhkiG9w0BAQEFAASCBKYwggSiAgEAAoIBAQCYNdtHyNg1HZQ8
vaO1HJWtZ/eerB2H80XyQTZpDFRS87qGUNcrRudDN9BypcueXaW1UN/3L8KKn7ttGhLe6quG8QuKw//UiJDDGTDEICOndtYfBh07zNR9zgaQRi9loqQB6Iqfe4K/T9FE0NMjVji10F5JI/3SgxEDwoQ4+1eghDuMGME1zJ4VJCojXhiEtvwo1ZruFX+Xogd
rq4Ys6Pch7n9Fowd0c2n+IRxPXKb6CqnHC1t9AKEBmbaoP+0zhM8ZFCl3WFRChvb
JF8T9ZZ5q3no1668NILNN1f4RRe07+pb9ubfWqABhuI5hQUng81wKjcIzjWK4HZ
 +3bMwg6PAgMBAAECggEAQ+fTGmV6OKTHm4mnXYeRJzm4+SskSaC41elOEvOTMybV
xmxVwCNTRFd7dg4Wmy10Qz3YVOn1C3Qs8C8LoGo00Mci85quhBUw9s7J12skXGbu
{\tt ZGDtpJylgwtfc1q7nojaFkWenGCA9D1HB8zCqKPkhMh+HtA26g8VdFaHPVBzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdefahfvbbzw/pzdef
 avv5r9gLnBETwHfM3XuIYv7h3wowE5uAKVhgvL8w0QKBgQDJs2avbYOwgcEEOf7L
PRqmb5XjJE329KsyIzo4YwOrZDjQXSYrBjifoBIJzUReDDB7wv5lt0Xy3MExeS4
ngLO/oWotjd7jGU+EdABozKwW3bZuyUTSqTeQJwo+aIhjNtiyMrnpFy3vjYrJKGy
W/9cnv1WjqxpqnQgDjE/yJt36wKBgQDBL7p7iCWjIf+LH1/caFgPchJENd4YZZrB
bhGA/tuo6VtJcarc/Etx3DGbKhnJq13LxRRLjyHlPhw/k7oZBdaVK27I+vNfw5Lj
c2KZCYbFnF3kbP5ryuMWQQqGbkZZ/FExzwgFyAOUuCTt9L2VmKtPgbP9ywDTJCOZ
 Jq/pdz0e7QKBgF0pxn4dvvIH4DgQ1k9+2yMcgoduFw5EcC6bQVeXtrCf7e1VzTdG
 q0vHjQ5gtPJ6GD9ZGIkKusqT6TGhpC2v3SoiK07CJmFo6tXELb0ALhZY2g0WTNqj
 q59EzYFxin7AHn/rKb7Lvmm4zF844p1177NLf2nX5EwwF9r0CBmc7F/hAoGAUctH
 ha4rYVqvu9PY3pU/U6rUmRTFqEa8s1FLD/bYQjgrcnkyAsa/msHELxIwQPbRi8kx
 wpwjmdAmXbTKgnW6WQY+rdGy4cUImEzuXiVubpS6HFEZ18IbTDnN3wUpvEfciN5D
YO9AVONyoKK+8mvlf]BKCRa+jqfeotuCd7MEpDECgYAhWcDt6aXSsUOtq+jgVNtC
oi9Cnm4FNW7Z/VVgCCRFIwHxpqqAau63/naSGxkLU1K+UOStReiLC2D4FPrqs9Jh
scUH9hTIp3hxwznZBRFkuvUOm3h6CwQOt3km7AffLRsGQZ9EM1vNb4T5mR/Izgxy
 smcEPJfJgX61fx7c//bU6Q==
          -END PRIVATE KEY ---
SSL certificate (/opt/sx/etc/ssl/certs/sxcert.pem):
 ----BEGIN CERTIFICATE--
 MIIDpzCCAo+gAwIBAgIJAODcwxKZHi35MAOGCSqGSIb3DQEBCwUAMDsxCzAJBgNV
BAYTAkdCMQswCQYDVQQIEwJVSzELMAkGA1UEChMCU1gxEjAQBgNVBAMTCW15Y2x1
 c3R1cjAeFw0xNDAzMjExNDU2NTdaFw0xOTAzMjAxNDU2NTdaMDsxCzAJBgNVBAYT
CShtJaerwandarjezhezhidar watolarijaknbozatan danbezezhigar bart
AkdCMQswCQYDVQQIEwJVSzELMAkGA1UEChMCU1gxEjAQBgNVBAMTCW15Y2x1c3R1
cjCCASIwDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBAJg120f12CUdlDy9o7Uc
la1n956sHYfzRfJBNmkMVFLzuoZQ1ytG50M3T0TK1y55dpbVQ3/cvwoqfu20aEt7
qq4bxC4rD/9SIkMMZMMQgI6d21h8GHTvM1H30BpBGL2WipAHoip97gr9P0UQ40yN
WOLU4Xkkj/dKDEQPChDj7V6CEO4wYwSXMnhUkKiNeGIS2/CjVmu4Vf5eiB2urhiz
o9yHuf0WjB05zaf4hHE9cpvoKqccLW3OAoQGZtqg/7T0EzxkUKXdYVEKG9skXxP1
```

```
VROjBGQwYoAUs7Zs8qeEtPdNQ713zs3f2v+MTruhP6Q9MDsxCzAJBgNVBAYTAkdC
MQswCQYDVQQIEwJVSZELMAkGA1UEChMCU1gxEjAQBgNVBAMTCW15Y2x1c3RlcoIJ
AODcwxKZHi35MA8GA1UdEwEB/wQFMAMBAf8wCwYDVROPBAQDAgEGMAOGCSqGSIb3
DQEBCwUAA4IBAQBGwoULuHM5svPvV7cOtdsBmxovrhCYkMg4MwtPJ8eJQckyrCP3
fIU1VMXXeHKegaZ4q3QzIV9DD01XB9TzifZ8yKm7a2/N1UnvgLQCGu82H/226YLE
abqoipcJsAANo5+2qGYEmYDODmLOnToaCX5bcmbLc1tcG4uf/x880+PGLgh/h5+9
MUMlffyJWAE5eJN1rk9T5k0Onm5PElQLP/ZQecodHGL9Xxzgj09kLfwbRmUruGu/
ft4Ru0o0rQDIDWxQuiBitawQKX/tyaGkpX+g38gyFwDiPINo2q/IHeckxX5EHgF3
YGgPNaWwBnH3jfsJ/kMXcJS52q/zP0IvUCz0
    --END CERTIFICATE ---
Cluster: sx://mycluster
This node: 192.168.1.102
Port number: 443
HashFS Version: SX-Storage 1.5
Cluster UUID: 01dca714-8cc9-4e26-960e-daf04892b1e2
Cluster authentication: CLUSTER/ALLNODE/ROOT/
     USERwBdjfz3tKcnTF2ouWIkTipreYuYjAAA
Admin key: ODPiKuNIrrVmD8IUCuw1hQxNqZfIkCY+oKwxi5zHSPn5yOSOi3IMawAA
Internal cluster protocol: SECURE
Used disk space: 17568768
Actual data size: 463872
List of nodes:
     - ec4d9d63-9fa3-4d45-838d-3e521f124ed3 192.168.1.101 (192.168.1.101)
          536870912000
     * 02e01f5d-80d8-4a01-b1f7-a56eecb8aef5 192.168.1.102 (192.168.1.102)
           268435456000
Storage location: /opt/sx/var/lib/sxserver
Run as user: nobody
Sockets and pidfiles in: /opt/sx/var/run/sxserver Logs in: /opt/sx/var/log/sxserver/sxfcgi.log
--- END OF SUMMARY ---
Congratulations, the new node is up and running! You can control it with '/opt/sx/sbin/sxserver'
You can add a new node to the cluster by running 'sxsetup' on another server. When prompted, enter the 'admin key', 'SSL private key' and
'SSL certificate' printed above.
You can run 'sxacl useradd joe sx://admin@mycluster' to add a new user.
To create a new volume owned by user 'joe' run:
'sxvol create --owner joe --replica N --size SIZE sx://admin@mycluster/
      VOLNAME,
```

The node successfully joined the cluster - at the end of the summary you can see the current list of nodes in the cluster. Repeat the same steps to add more nodes to the cluster.

C H A P T E R

CLUSTER MANAGEMENT

FILL ME



CLIENT OPERATIONS

ACCESSING THE CLUSTER

To access the cluster you need to have credentials for an existing account. In this example we will use the default admin account created during cluster setup. The following command sets up the admin access to the S^X cluster "mycluster" for the client tools. Because "mycluster" is not a DNS name, we need to point sxinit to one of the nodes of the cluster. It will automatically discover the IP addresses of the other nodes. Additionally, we create an alias @cluster, which later can be used instead of sx://admin@mycluster.

S^X allows creating additional users of your choice and assigning them appropriate privileges. In this Quick Start Guide we will only use the default admin account, though. Please refer to sxacl useradd --help on how to add new users to the cluster.

CREATING NEW VOLUMES

Volumes are logical partitions of the S^X storage assigned to particular groups of users and managed with the <code>sxvol</code> tool. Below we create a basic volume of size 50G owned by admin and fully replicated on two nodes. We're also making use of the <code>@cluster</code> alias, which stands for <code>sx://admin@mycluster</code>.

```
$ /opt/sx/bin/sxvol create --owner=admin --replica=2 --size=50G
@cluster/mydata
Volume 'mydata' (replica: 2, size: 50G, max-revisions: 1) created.
```

WORKING WITH FILES

S^X provides easy to use file tools, which resemble typical UNIX commands. Below we show how to upload a file to the 'mydata' volume, display it, and list files in the volume.

```
$ echo Hello World! > /tmp/hello.txt
$ sxcp /tmp/hello.txt @cluster/mydata/
$ sxcat @cluster/mydata/hello.txt
Hello World!
$ sxls @cluster/mydata/
$ sx://admin@mycluster/mydata/hello.txt
$ sxrm @cluster/mydata/hello.txt
Deleted 1 file(s)
```

Use sxcp - r to recursively upload directories to S^X . See the man pages (eg. man sxcp) for examples and usage details.

CHAPTER

TROUBLESHOOTING

FILL ME