2.0.1.17

Provides a complete breakdown of leveraging F-Response Universal to perform expert remote e-discovery, computer forensics, and incident response.
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Terminology

The term “Appliance” refers to both the physical and virtual versions of the F-Response Universal product. The F-Response Universal terms “Examiner”, “Subject” and “Target” are used throughout this manual. The definitions for Examiner, Subject and Target used in this manual are as follows:

Examiner
F-Response Universal Examiner refers to the applications used to connect to the F-Response Universal Appliance and attach remote devices and shares.

Subject
F-Response Universal Subject refers to the applications used to present remote devices, drives, memory and shares to Examiners as defined above.

Target
F-Response Universal Targets refer to individual devices, shares, and data sources presented by Subjects to Examiners as defined above.

Supported Platforms

The F-Response Universal client executables are designed to provide all or a subset of the available target types on the following operating systems:

Microsoft Windows (XP, 2003, Vista, 2008, 7, 2008r2, 2012, 8, 2012r2, and 10) both 32 and 64 bit
Linux (Most modern distributions, using glibc 2.3.5 or better)
Apple OSX (10.3+ for command line, 10.6+ for GUI)

Overview

F-Response Universal is an appliance based product provided by F-Response which leverages our patent pending technology (“F-Switch”) to provide access to remote systems virtually anywhere in your network. F-Response Universal provides near instant access to Windows, Linux, and Apple OSX devices virtually regardless of the location provided they have network access. F-Response Universal is the onsite version of our cloud service offering, F-Response Now¹.

¹ https://www.f-response.com/now
Appliance

Hardware Requirements
The Virtual appliance should be configured to closely approximate the hardware of the virtual appliance. The largest overall indicator of performance is the CPU cores (virtual cores) dedicated to the appliance. More virtual cores means more active data connections through the appliance. A good rule of thumb is two active connections per core.

Recommended Virtual Appliance Hardware configuration

- 4-8 Virtual Cores
- 4-8 Gigabytes of RAM
- 20 Gigabytes of Drive Storage
- 1+ Gigabit Ethernet ports

SPECIAL NOTE: Recommendations for dealing with Virtual Host Clustering configurations.
If your hosting virtual environment uses a cluster configuration for high availability there is a chance the F-Response Universal Virtual Appliance will be shifted to a physical host that does not have the same hardware configuration the appliance license was activated on. In order to address this issue we recommend configuring your licensing to use our static IP licensing model.

Network Ports

Network Flow, F-Response Universal

Configuring the Appliance
In this manual all configuration using the terminal will be done using the provided root account over a Windows SSH/SCP Session. A free Windows based SSH tool can be obtained via the Internet from [www.putty.org](http://www.putty.org), for SCP connections (File Copy) we recommend WinSCP, [http://winscp.net/eng/index.php](http://winscp.net/eng/index.php). All examples presented in this manual have been generated using Putty and WinSCP.
Local Authentication

F-Response Universal local authentication entails creating user accounts that reside within the F-Response Universal Appliance. These accounts require both a Username and Password and can be managed using the following command line tools. These commands must be run as “root” or using “sudo/su”.

Adding a Local User
/usr/sbin/fswitchadm adduser --username="USERNAME" --password ="PASSWORD"

Removing a Local User
/usr/sbin/fswitchadm remuser --username="USERNAME"

Changing a password
/usr/sbin/fswitchadm setpass --username="USERNAME" --password="PASSWORD"

Listing all users
/usr/sbin/fswitchadm showusers
Active Directory Authentication

With Active Directory (LDAP) authentication enabled user accounts will not be needed on the F-Response Universal Appliance itself, rather the appliance will be configured to authenticate users directly against Active Directory based on group membership.

There are two options available when configuring LDAP Authentication for Active Directory, Basic, and Advanced. Basic Authentication requires all users be a member of the same domain. In our example that domain is “abcompany”, therefore all users would need to have “abcompany\<USERNAME>” accounts.

Advanced Authentication allows users in multiple domains to authenticate to the appliance provided a suitable domain controller is provided during the configuration.

Configuring LDAP/Active Directory Authentication in many environments is not trivial. As such in addition to this manual we provide a Support Guide on our website design to walk you through the process. You will find that guide on the “Mission Guides and Documentation” page of our website at https://www.f-response.com/support/missionguides.

Basic Authentication
The following information is necessary to configure the F-Response Universal appliance for Basic Active Directory Authentication:

1. A valid Active Directory Domain Controller providing LDAP or LDAP/SSL services (Will need hostname and port)
2. The Active Directory group whose membership controls access to the F-Response Universal Appliance
3. The LDAP Distinguished Name (DN) that completes the path to the aforementioned group

Armed with this information the following changes must be made to the F-Response Universal Configuration File (/etc/fswitch/fswitch.cfg).

In the following example our Active Directory Domain Controller is 10.1.1.22, and it is configured for LDAP/SSL on port 636. The user group we have configured is fresuniv_users and the full domain for the Active Directory is abcompany.local.

Using this information, update the following options in the /etc/fswitch/fswitch.cfg file:

{authtype,ldap}.
{ldap_server,"10.1.1.22"}.
{ldap_group,"CN=fresuniv_users,CN=Users"}.
{ldap_dn,"DC=abcdomain,DC=abcompany,DC=local"}.
{ldap_ssl,true}.
{ldap_port,636}.

Advanced Authentication
The following information is necessary to configure the F-Response Universal appliance for Advanced Authentication:

1. Multiple valid Active Directory Domain Controllers (one for each domain needing access) providing LDAP or LDAP/SSL services (Will need hostname and port)
2. One or more Active Directory group(s) whose membership controls access to the F-Response Universal Appliance
3. The LDAP Distinguished Names (DN) that completes the path to the aforementioned group and provides the search base for the user accounts.

Armed with this information the following changes must be made to the F-Response Universal Configuration File (/etc/fswitch/fswitch.cfg).

In the following example we have two different users we would like to allow access from two different domains “chicago” and “tampa”. The user accounts in this example follow the pattern:

CHICAGO\joeuser
TAMPA\jilluser

We have gathered the following information for each domain:

Domain: Chicago
Server: 192.168.1.1
Port: 636
SSL: Yes
Ldap DN: “dc=chicago,dc=abcompany,dc=com”
Group DN: “cn=fres_users,ou=security,ou=users”

Domain: Tampa
Server: 192.168.2.1
Port: 636
SSL: Yes
Ldap DN: “dc=tampa,dc=abcompany,dc=com”
Group DN: “cn=fres_users_tpa,ou=security,ou=users”

Using this information, update the following options in the /etc/fswitch/fswitch.cfg file:

{authtype,ldap}.
{ldap_server, “192.168.1.1”}.
{ldap_group, “CN=fresuniv_users,CN=Users,DC=chicago”}.
{ldap_dn, “DC=abcompany,DC=local”}.
{ldap_ssl, true}.
{ldap_port, 636}.
{ldap_alternate_servers, [{“tampa”, [{server, “192.168.2.1”}, {port, 636}, {ssl, true}, {ldap_dn, “dc=tampa,dc=abcompany,dc=com”}, {ldap_group, “cn=fres_users_tpa,ou=security,ou=users”}]}]}. If we had multiple domains beyond the “tampa” domain we would add them on the same line as follows:
Testing LDAP Configuration

In addition, the fswitchadm tool provided with the Universal appliance includes a “testldap” option that will use the information in the fswitch.cfg file (mentioned below) to test your ldap setup for accuracy.

Test LDAP Configuration

/usr/sbin/fswitchadm testldap --username="USERNAME" --domain="DOMAIN" --password="PASSWORD"
Configuring Logging

All F-Response Universal logs by default will be sent to Syslog on the F-Response Universal appliance. Alternatively, it is possible to configure the F-Response Universal Appliance Syslog service to leverage remote syslog servers. To enable logging to the remote syslog server, edit the /etc/rsyslog.conf file on the appliance with the following line:

For Remote Syslog Servers using TCP

```
*.* @@IP:PORT
```

For Remote Syslog Servers using UDP

```
*.@IP:PORT
```

Where IP is the address of the syslog server, PORT is the port number for syslog communications, and the '@' symbol denotes whether the traffic is set to TCP or UDP (two '@@' symbols vs one '@' symbol).

Once the rsyslog.conf file has been updated and saved, restart the syslog service on the appliance with the following command:

```
service rsyslog restart
```

All logging will be redirected to the specified syslog server.

Configuring Mission System

The F-Response Universal Mission System requires access to an email (SMTP) server to send Mission Requests, Approvals, Denials, etc. In order to use the F-Response Universal Mission System the following information is needed:

1. A SMTP Server (IP and port)
2. Whether the SMTP Server is using SSL or not
3. Whether the SMTP Server is configured to require authentication or not
4. A username and password if authentication is required

Armed with this information the following changes must be made to the F-Response Universal Configuration File (/etc/fswitch/fswitch.cfg).

In the following example the SMTP Server is 10.1.1.33 and it is listening on TCP Port 587. It is not using SSL, however, SMTP authentication is still required. The username is system and the password is system123. The following configuration options in the /etc/fswitch/fswitch.cfg file are set to reflect these details:

```
{smtp_server,"10.1.1.33"}.
{smtp_port,587}.
{smtp_ssl,false}.
{smtp_username,"system"}.
{smtp_password,"system123"}.
{smtp_auth,true}.
{system,mission}.
```
Complete Summary of all F-Response Universal Configuration File Options

All configuration options reside within the F-Response Universal Configuration file (/etc/fswitch/fswitch.cfg). The following options exist in the configuration file.

{fswitch_port,80}.
F-Response Universal port controls the port the software will bind to on start, the value must be a valid port number that is not already in use by another service, the default port is 80.

{logtype,syslog}.
Logtype controls the logging model, currently the only logging option is syslog.

{authtype,ldap}.
Authtype specifies how F-Response Universal will authenticate Examiners, two options are currently available, local or ldap. “local” will use locally defined and created F-Response Universal Accounts, “ldap” will use the ldap_* settings defined below.

{verlevel,1}.
Verlevel indicates the version of the F-Switch protocol and will be incremented in future releases. This value should not be modified by the user.

{ldap_server,”xxx.xxx.xxx.xxx”}.
Ldap server is the Domain Controller, with LDAP Services enabled, that the appliance will attempt to communicate with to validate Examiner credentials and confirm group membership.

{ldap_group,”xxxxxxxxxxxx”}.
Ldap group is the Active Directory group that Examiners must be a member of to successfully authenticate. Use any defined Active Directory group.

{ldap_dn,”DC=domaina,DC=companya,DC=local”}.
Ldap DN is the distinguished name for the domain in LDAP syntax. Ex. domaina.companya.local becomes “DC=domain,DC=companya,DC=local”.

{ldap_ssl,true}.
Ldap SSL indicates whether the connection to the Domain Controller will be performed with SSL applied. Windows Domain Controllers do not have SSL enabled by default, it must be configured separately on the Domain Controller directly in order to use this option.

{ldap_port,636}.
Ldap port indicates the TCP port to use when connected to the Domain Controller.

{ldap_alternate_servers,[[“domaina”,[[server,”192.168.1.2”],[port,636],[ssl,true]]]]}.

{smtp_server,”xxx...”}.
SMTP Server is used by the Mission System when sending emails to approvers and examiners.

{smtp_port,587}.
SMTP Port indicates the TCP port to use when connecting to the SMTP Server.

{smtp_ssl,false}.
SMTP ssl defines whether SSL is required when communicating to the SMTP Server

{smtp_username,"xxxx@xxxx.xxxx"}.

SMTP Username is used both if SMTP Authentication is required, or to provide the “From” address in the email messages as sent.

{smtp_password,"xxxx"}.

SMTP Password should also be completed if the SMTP server requires authentication.

{smtp_auth,true}.

SMTP Auth indicates whether SMTP Authentication is required, valid options are true and false.

{system,mission}.

System indicates whether the appliance is in Mission Mode (mission) or Standard Mode (standard). If this option is changed a restart of the appliance should be performed.

{socket/inet|inet6|both}.

Socket indicates which type of network socket the appliance software should bind and listen on. No socket option or “inet” will default bind to IPv4 only. “inet6” will bind to IPv6. “both” will bind to IPv4 and IPv6. Please note, enabling IPv6 support may require additional firewall changes to the ip6tables firewall on the appliance. Firewall configuration is outside the scope of this document.

**Stopping, Starting, and Restarting F-Response Universal Appliance Software**

The F-Response Universal Appliance software can be started, stopped, and restarted using the following command line options.

**Starts the F-Response Universal Appliance Software**

service fswitchbasic start

**Stops the F-Response Universal Appliance Software**

service fswitchbasic stop

**Stops and Starts the F-Response Universal Appliance Software**

service fswitchbasic restart

**Powering down the Appliance**

The appliance can be powered down using basic linux system power management commands, such as:

/sbin/shutdown -h now

**Updating the Appliance Software**

The F-Response Universal Appliance software packages are available directly from the F-Response Universal Internet based software repository and can be installed using the yum command line tool. Important note, updating F-Response Universal packages will not overwrite your existing configuration files.

yum update f-response-univ f-response-univ-clients
Changing the root password
The root account password can be changed at any time using the passwd command.

```
passwd root
```

Updating the License file
F-Response uses a subscription based licensing model. To update/activate the appliance, open the hyperlink [http://<APPLIANCEIP>/activate](http://<APPLIANCEIP>/activate) to obtain the activation code. Submit the activation code on the main F-Response website [https://www.f-response.com/univ-license/](https://www.f-response.com/univ-license/)

![F-Response Appliance Licensing](image)

Appliance Activation Code

```
D9wjBaYowSfYxAsQ0DvYe29rnpNtK0541umNH8=
```

Once the activation code has been submitted to F-response and the processing has been completed, a license file will be emailed.

To update the license on the appliance itself, the new file will need to be copied to the `/etc/fswitch` directory (F-Response recommends using the tool WinSCP to accomplish this task). If a license file exists in this directory, delete it and replace it with the new file.
Examiner Software - Linux & OS X

The Linux and OS X examiner consists of a set of command line interfaces for connecting to the Universal/Now appliance and mounting targets, such as disk, volume, and memory.

Linux Distribution Compatibility
The Linux examiner is available in Debian and RPM x86_64 packages and has been tested on Centos 6/7, Debian 8, Ubuntu Desktop 14/16, and SIFT3. For further Linux distribution and package manager support, please contact support@f-response.com.

OS X Versions Compatibility
The OS X examiner is available in an Apple Disk Image (DMG) containing the installation package and has been tested on OS X version 10.8 and up.

Download Packages (DEB, RPM, DMG)
The Linux and OS X examiner installation packages are available from the appliance itself through /univdl for universal or /nowdl for Now (Ex. Universal/Now appliance IP address is 192.168.1.83, the appropriate URL would be http://192.168.1.83/univdl for Universal and http://192.168.1.83/nowdl for Now.)

Installing Packages
Please refer to your distribution or operating system documentation for more details on appropriately installing packages. For your convenience, the following basic instructions should work for most general Linux and OSX systems.

RPM Installation (Redhat, Centos)
To install the RPM package:
# yum install fresponse2univ.x86_64.rpm

To uninstall the RPM package:
# yum remove fresponse2univ

Debian Installation (Debian, Ubuntu)
To install the DEB package:
$ sudo dpkg -i fresponse2univ.x86_64.deb
$ sudo apt-get install -f

To uninstall the DEB package:
$ sudo apt-get remove fresponse2univ

DMG Installation (Apple OSX 10.8+)
To install the PKG package:
$ hdiutil attach fresponse2univ.x86_64.dmg
$ cd /Volumes/fresponse2univ/
$ sudo installer -pkg fresponse2univ.x86_64.pkg -target /
$ cd ~
$ hdiutil detach /Volumes/fresponse2univ/

To uninstall the PKG package;
$ sudo fs_uninstall.sh

On OS X, you can also install through the user interface.

Syslog
The Linux and OSX examiner uses the syslog API to write messages to syslog using the LOG_USER facility and LOG_INFO priority. These messages can be found in the system log under /var/log, but depends on the syslog daemon and configuration, and platform. Note that only processes that run in the background, i.e. with the -d or -daemon option, and with the -v or -verbose option will send messages to syslog.
Examiner Interfaces - Linux & OS X

The examiner and universal interface can be invoked on command line via `fs_exa` or `fs_univ`, respectively. If not, then the environment variable PATH must be updated to include the directory containing `fs_exa` and `fs_univ`.

Updating PATH on Linux Bash shell:
```
# export PATH=$PATH:/usr/bin
```

Updating PATH on OS X terminal:
```
$ export PATH=$PATH:/usr/local/bin
```

Examiner Interface

The examiner interface is used for the following:

1. Adding and removing appliance entries
2. Starting and stopping appliance clients
3. Querying status of appliance client
4. Changing password of local accounts

An appliance entry is an obfuscated configuration file containing the credentials of the user account and the address of the appliance.

An appliance client is a process that maintains an active connection to the appliance and provides facilities for the universal interface (see below), such as querying for a list of subjects, stopping a subject agent, and mounting a subject’s target.

Universal Interface

The universal interface is used for the following:

1. printing the list of missions, subjects, and targets
2. stopping remote subject
3. mounting and unmounting targets

A subject is a host running the F-Response client to expose targets.

A target is a disk, volume, or memory on the subject.

Usage Pattern

Add the appliance entry  
```
# fs_exa add -u jching -p jching -l 192.168.1.83
```

Start the appliance client  
```
# fs_exa start -l 192.168.1.83 --daemon
```

List the available targets  
```
# fs_univ list
```

Mount the target  
```
# fs_univ mount -l 192.168.1.83 -s jching-x64-dev- -t DiscoveryShare-C -m . -d
```

Unmount the target  
```
# fs_univ umount -l 192.168.1.83 -s jching-x64-dev- -t DiscoveryShare-C
```

Stop the appliance client  
```
# fs_exa stop -l 192.168.1.83
```
F-Response Examiner Interface

The examiner interface implements 7 commands:

1. **add** - add appliance entry
2. **remove** - remove appliance entry
3. **status** - print appliance status in csv or json format
4. **start** - start appliance client in foreground or background
5. **stop** - stop appliance client
6. **restart** - performs stop and start command in sequence
7. **pwd** - change local account password

**add**

The add command creates an obfuscated appliance entry, which contains the user’s credentials and appliance address and is stored in `/var/lib/f-response/universal/appliance`. If the password is not specified on the command line, then the controlling terminal will be prompt to enter the password.

```
# fs_exa add -u jching -p jching -l 192.168.1.83
F-Response Universal Linux Examiner 2.0.1.15
Copyright F-Response, All Rights Reserved
Appliance 192.168.1.83 has been added.
```

The default port is 80 (HTTP). The port can be changed by appending a colon and the port number to the `-l` or `-url` option.

```
# fs_exa add -u jching -p jching -l 192.168.1.83:8080
F-Response Universal Linux Examiner 2.0.1.15
Copyright F-Response, All Rights Reserved
Appliance 192.168.1.83 has been added.
```

**remove**

The remove command removes an existing appliance entry. Also, any target mounted through the appliance will be unmounted and the appliance client will be stopped prior to the removal of the appliance entry.

```
# fs_exa remove -l 192.168.1.83
F-Response Universal Linux Examiner 2.0.1.15
Copyright F-Response, All Rights Reserved
Successfully unmounted /root/Desktop/jching-x64-dev-/DiscoveryShare-C.
Sent sigterm to appliance 192.168.1.83 process -- 3123
Waiting for appliance 192.168.1.83 to disconnect .. success
Appliance 192.168.1.83 has been removed.
```

**status**

The status command prints the status of one or more appliance(s) in either CSV or JSON format.

```
# fs_exa status
appliance,status,system_mode,auth_type,expire_date,subject_count,mission_count
192.168.1.83,connected,standard,local,12-30-2017,1,0
```

```
# fs_exa status -json
{
  "appliances": [
    {
      "appliance": "192.168.1.83",
      "auth_type": "local",
      "expire_date": "12-30-2017",
      "mission_count": 0,
      "status": "connected",
      "subject_count": 1,
      "system_mode": "standard"
    }
  ]
}
```
**start**
The start command starts an appliance client in the foreground or background depending on whether the `-d` or `-daemon` option is specified. If appliance is not specified with the `-l` or `-url` option, then all appliances with an appliance entry in `/var/lib/f-response/universal/appliance` will be started in the background.

```
# fs_exa start -l 192.168.1.83 -d
F-Response Universal Linux Examiner 2.0.1.15
Copyright F-Response, All Rights Reserved
Appliance 192.168.1.83 is on standard mode, uses local authentication, and expires on 12-30-2017.
Appliance 192.168.1.83 is connected and running in the background.
Exclude -d,-daemon on command line to run in foreground.
```

**stop**
The stop command stops an appliance client. If appliance is not specified with the `-l` or `-url` option, then all appliances with an appliance entry in `/var/lib/f-response/universal/appliance` will be stopped. Also, any target mounted through the appliance will be unmounted.

```
# fs_exa stop
F-Response Universal Linux Examiner 2.0.1.15
Copyright F-Response, All Rights Reserved
Sent sigterm to appliance 192.168.1.83 process -- 3194
Waiting for appliance 192.168.1.83 to disconnect .. success
```

**restart**
The restart command runs the stop and start command in sequence.

```
# fs_exa restart -l 192.168.1.83 -d
F-Response Universal Linux Examiner 2.0.1.15
Copyright F-Response, All Rights Reserved
Sent sigterm to appliance 192.168.1.83 process -- 3249
Waiting for appliance 192.168.1.83 to disconnect .. success
```

**pwd**
The pwd command changes a local account’s password. After the local account password is updated, the appliance client is stopped and the appliance entry is recreated.

```
# fs_exa -l 192.168.1.83 -p jching pwd
F-Response Universal Linux Examiner 2.0.1.15
Copyright F-Response, All Rights Reserved
Sent sigterm to appliance 192.168.1.83 process -- 3274
Waiting for appliance 192.168.1.83 to disconnect .. success
Appliance 192.168.1.83 has been removed.
Updated password for user jching on 192.168.1.83.
```
F-Response Universal Interface

The universal interface implements 5 commands:

1. list - print missions, subjects, and targets
2. stop - stop remote subject
3. mount - mount target
4. umount - unmount target
5. active - print mounted targets

list

The list command prints missions, subjects, and targets in either CSV or JSON format.

```
# fs_univ list
appliances
192.168.1.83,jching-x64-dev,-DiscoveryShare-C,share,119GB,4096,31431167
192.168.1.83,jching-x64-dev,-Volume-C-122778mb,raw,119GB,512,251449344
192.168.1.83,jching-x64-dev,-Disk-0-Part-1-Unused-1mb,raw,1MB,512,2048
192.168.1.83,jching-x64-dev,-Disk-0-Part-2-Active-100mb,raw,100MB,512,204800
192.168.1.83,jching-x64-dev,-Disk-0-Part-3-Active-122778mb,raw,119GB,512,251449344
192.168.1.83,jching-x64-dev,-Disk-0-Part-4-Unused-1mb,raw,1MB,512,2048
192.168.1.83,jching-x64-dev,-Disk-0-122880mb,raw,120GB,512,251658240
192.168.1.83,jching-x64-dev,-MemoryShare-5120mb,share,5GB,4096,1310720
```

```
# fs_univ list -json
{
    "appliances": [
        {
            "name": "192.168.1.83",
            "subjects": [
                {
                    "id": "7495793870787287257",
                    "name": "jching-x64-dev-",
                    "targets": [
                        {
                            "block_count": "31431167",
                            "block_size": "4096",
                            "case_sensitive": "0",
                            "name": "DiscoveryShare-C",
                            "root_node": "5",
                            "type": "2",
                            "uuid": "1"
                        }
                    ]
                }
            ],
            "system_mode": 0
        }
    ]
}
```

stop

The stop command stops a remote subject and any target mounted through the subject will be unmounted.

```
# fs_univ stop -l 192.168.1.83 -s jching-x64-dev-
F-Response Universal Linux Examiner 2.0.1.15
Copyright F-Response, All Rights Reserved
Checking appliance '192.168.1.83' connection status ... success
Locating subject 'jching-x64-dev-' on appliance '192.168.1.83' ... success
Successfully unmounted /root/fs-linux-exa-prototype/jching-x64-dev-/DiscoveryShare-C.
Unmounting targets from subject 'jching-x64-dev-' ... success
Terminated jching-x64-dev- on 192.168.1.83.
```
mount
The mount command mounts a target, such as a disk, volume, and memory, on the specified mount path via the -m or -mount_path option and in either foreground or background mode depending on the -d or -daemon option. There are two types of targets; a raw target represents a disk or volume as a single file while share target represents volume as a set of files and directories. A raw target file can be mounted on loopback on Linux using mount for a device file (/dev/loopX) and mounted as a disk on OS X using hdiutil (/dev/rdiskX) and then diskutil to mount the filesystems on OS X.

umount
The umount command unmounts a target specified by appliance, subject, and target name. This operation is equivalent to running umount on the mount path on both Linux and OS X.

active
The active command prints a list of mounted targets in either CSV or JSON format.
Examiner Software - Windows

Overview of the F-Response Universal Windows Console

The F-Response Universal Windows Console provides direct access to the F-Response Universal Appliance(s) enabling connections to remote subject machines. The F-Response Universal Windows Console must be installed on any and all examiner computers looking to access F-Response Universal.

Installing the F-Response Universal Windows Console

The F-Response Universal Windows Console software is available directly from the F-Response Universal appliance itself. Use the following link to download and install the F-Response Universal Windows Console:

http://<APPLIANCE HOSTNAME OR IP>/univdl

After a successful installation the F-Response Universal Software will be available from the Start Menu. Select the F-Response Universal Console to begin.
Configuring the F-Response Universal Console

Credentials Settings

Once loaded the F-Response Universal Console File Menu contains the Settings command, this command will open the Settings dialog and allow you to configure one or more F-Response Universal Appliance accounts.

Here the credentials can be entered and saved for each appliance in the environment. Enter the appliance hostname or IP address, account, and password, then click Add to add the credential for each appliance to appear in the console.

The F-Response Universal appliances will appear in the main console window.
Login/Logout of Appliance

Double click on the individual appliance or highlight it and choose the Action->Login/Logout menu command to authenticate to the appliance.

Successful authentication will change the appliance icon from a grey appliance icon to a color appliance icon. Un-successful authentication will raise the messages panel indicating further information.

Configuring Deployment Settings

Click the Deploy->Deployment Settings... menu option to access the deployment settings for the subject software.

The four fields presented here will be populated with default information that can be customized as needed for the environment. Note this is the information that will appear in the services panel of the subject machine.

**Service Name:** F-Response Universal software will run as a service on the subject machine. The service name can be left at
the default or renamed to anything other than an existing Windows service name.

**Service Description:** provides the option for further details about the F-Response Universal Service.

**Executable Filename:** The service executable can be renamed as well.

**Wait Hint(Seconds):** Is the time the subject will wait before checking into the F-Response Universal Appliance should it lose connectivity. The default is one hour (3600 seconds).
Deploying F-Response Universal

F-Response Universal software can be deployed to remote target systems a number of ways, including via Browser, Email, LAN/WAN, or MSI. The browser and email methods are non-covert (a GUI will appear on the subject), while the LAN/WAN and MSI allow for covert connection.

**Deploy Via Browser**

The first deployment option on the list, **Deploy via Browser**, will provide a link to the subject (client) software for various operating systems. Individual software links or the link to the F-Response Client Downloads page can be provided to remote subjects directly.

---

2 Note if the appliance is in mission mode, a mission must be created for the subject(s) prior executing the subject software from the Downloads page.
Windows Subjects
Download the Windows subject software from the link on the Downloads page. The executable must be run with administrative rights to access the subject machine’s resources. Double click on the executable and the F-Response GUI window will appear:

![F-Response GUI window](image)

Click the start link in the window and the GUI will show the software as connected to the Appliance:

![F-Response GUI window](image)

The subject should now be visible in the F-Response Universal console on the examiner machine.
Apple Subjects
The Downloads page contains a link for the Apple OSX subject executable. Use the following steps to download and execute the software on the Apple OSX machine.

Download the OSX client and open the Downloads folder. Double click on the fresponsenowosx.dmg file and it will mount as a drive.

Right-click on the F-Response Now icon and choose Open (Note: double-clicking will not work). Choose Open when presented with the identity warning. The F-Response client software will appear:
Click the start button and enter the password to start the software on the client:

The software will start on the Apple subject and appear in the examiner console:

The subject should now be visible in the console on the examiner machine.

Alternatively, command line version of the software can be downloaded and executed from a terminal session on the Apple subject.

Open the Terminal in Apple OSX, use the Finder->Applications->Utilities->Terminal to get started.

1. Use curl or a similar tool to download the appropriate executable, the ‘JO’ option will copy the subject executable with the relevant information for the appliance:
   
   ```
   curl -JO http://<YOUR APPLIANCE>/dl?file=fresponsonowosxcmd
   ```

2. Mark the file as an executable

   ```
   chmod +x fresponsonowosxcmd<relevantapplianceinfo>
   ```

3. Execute the software as admin using sudo

   ```
   sudo ./fresponsonowosxcmd<relevantapplianceinfo>
   ```

See the example below for downloading and executing the Apple OSX command line version of F-Switch.
Linux Subjects
The Downloads page contains links for both 64 and 32 bit Linux (x86 and x64) subject executables. Use the following syntax to execute the software on the Linux machine:

1. Use wget or a similar tool to download the appropriate executable:
   ```bash
   wget –O fresponsenow-lin http://<YOUR APPLIANCE >/dl?file=fresponsenowlin
   ```
2. Mark the file as executable:
   ```bash
   chmod +x fresponsenowlin
   ```
3. Execute the software as root (either as root directly or using “su” or “sudo”):
   ```bash
   ./F-Response Universal/lin -s <YOUR APPLIANCE>
   ```

See the example below for downloading the x64 version of F-Response Universal to a remote x64 bit Linux machine.

```
Resolving fs-test-univ (fs-test-univ)... 192.168.1.224
Connecting to fs-test-univ (fs-test-univ) [192.168.1.224]:1234... connected.
HTTP request sent, awaiting response... 200 OK
Length: 242796 (237K) [application/octet-stream]
Saving to: ‘F-Response Universal-lin64’
100%: 242796 242796 bytes received in 0.004s (56.6 MB/s)
root@lin64-ubuntu14:/tmp# chmod +x F-Response Universal-lin64
root@lin64-ubuntu14:/tmp# ./F-Response Universal-lin64 -s fs-test-univ -w60
F-Response Universal/Now Client (Linux), (Version 1.0.73.9) Started.
```

Via Email
F-Response Universal can also be deployed via email by simply emailing the client download link to the remote user. The Deploy->Deploy via Email button does this for you by generating a sample email with the appropriate link using your registered email client. The client can then be instructed to follow the same steps for Deploy Via Browser.

Via LAN/WAN
F-Response Universal also has the ability to deploy to subject machines directly over the LAN/WAN in the environment. Select Deploy->Deploy via LAN/WAN from the menu to view the dialog for pushing F-
Response Universal subject software over the network. There are 3 sections here: **Deployment Credentials, Scan for Machines, and Scan Results.**

![ deploy via LAN/WAN interface]

The first step to deploy over the network is to click the Configure Credentials button in the top right corner and the Configure Credentials window will open.
Configure Credentials
Here credentials can be set up for both Windows (the top section of the window) and Non-Windows platforms (the lower portion).

Windows
Under Windows Credentials, enter the User name (with administrator level privileges), Domain (if local account leave blank), and Password. Click Add Credential to add it to the stack.

Apple/Linux
Under Unix Credentials credentials can be added for Apple OSX, and Linux subjects.

Under User Account check User and enter the User name. The user account must have elevated privileges to install and run the subject software so select su or sudo from the drop down list under Assume Root. Next check User Password and enter the password for the account. Alternatively, if using the root account, simple select root under User Account, check Root Password and enter the password. Click Add Credential for each account entered to add them to the stack.

Multiple accounts can be added if needed and the credentials are held for the duration of the F-Response Universal Console session. Click Ok in the lower right corner once all the necessary credentials have been entered.
Scanning for and deploying to Subject Machines

The **Scan for Machines** field allows for the input of a comma separated list of hostnames or IP addresses. Enter the list of subject machines to be deployed to and press **Start Scan** to the right of the text box.

<table>
<thead>
<tr>
<th>Hostname</th>
<th>Platform</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>x64-win7pro-sub</td>
<td>Windows</td>
<td>Started</td>
</tr>
<tr>
<td>x64-win2k8-sub</td>
<td>Windows</td>
<td>Available</td>
</tr>
<tr>
<td>192.168.1.146</td>
<td>Apple OSX</td>
<td>Available</td>
</tr>
</tbody>
</table>

The results will appear in the **Scan Results** box below:

To install the F-Response Universal software on the subject machine, click on the hostname of the machine to highlight it, then select **Install/Start F-Response** on the right. After a short moment, in the **F-Response Software Status** column, the status of the machine will change to **Installed** and then **Started** showing it is connected to the F-Response Universal Appliance.

**Via MSI**

F-Response Universal offers the option to create a MSI which can then be distributed throughout the environment using an alternative software distribution method such as Group Policy in Active Directory, Microsoft System Center Configuration Manager (SCCM), or various other software deployment tools.

The process to create an MSI is very simple. Configure the **deployment settings** under Deploy->Deployment Settings. Once this is complete, click the Deploy->Deploy via MSI menu command and provide the location where the newly created MSI should saved.
Stopping the remote software

When finished using F-Response Universal on one or more subject machines, there are multiple ways to remove or stop the software on the remote machine. If the software was deployed using the LAN/WAN or MSI deployment options it should be stopped and removed using that same option. If the software was started manually by a remote user via the Deploy via Browser or Email option it can be stopped using the Action menu option Stop Remote Agent.
Working with Subjects

Listing Subjects

After starting the F-Response Universal software on one or more remote subjects the subjects will appear in the F-Response Universal Console as seen below.

Selecting any individual subject will populate the Targets window with available targets for that subject. Additional information on individual target types and authenticating to them is available in the “Connecting To Targets” section of this manual.

Filtering Subjects

Using the “View->Filter” menu option you can enable a drop down filter over top of the Subjects listing. This filter view will allow the user to selectively reduce the overall number of visual Subjects using basic filtering (“Ex. z* would show all the Subjects starting with z”).

Filtering can be unapplied at any time by simply turning off the filter view using the View menu.

Connected vs Resolved Targets and Subjects

Connecting to an F-Response Universal appliance triggers a background resolution process. This process will begin resolving and caching Subject machines and their Targets. As resolution updates the bottom right Status bar pain will contain additional details on the number of machines resolved vs connected. Keep in mind that not all Targets may be available until the resolution is complete.
Connecting to Targets

Target Devices

Each remote machine has the ability to display different targets based on the machine itself. The following list identifies the available Target types, where they are available, and what they represent:

- **DiscoveryShares™**
  - DiscoveryShares™ allow F-Response Universal users to access a remote machine's files and folders completely read-only with no file locking, whether they be Windows, Linux, or Apple OSX. DiscoveryShares™ offer a great way for both technical and non-technical users to access a remote machine's files and folders.

- **Physical Drives, Partitions, and Volumes**
  - Physical Drives, Partitions, and Volumes provide a complete SCSI Adapter for presenting remote physical disk(s) as full, read-only SCSI devices.

- **MemoryShares™**
  - MemoryShares™ provide live physical memory access to remote Windows subject physical memory as a live file, suitable for imaging and analysis with virtually any incident response product.

**DiscoveryShares™**

Double click on the DiscoveryShare™ to access the files and folder on the remote subject. All activity is write protected by default.

The remote Apple OSX System files and folders can then be reviewed forensic or eDiscovery tools or simply using Windows Explorer natively.
Physical Drives, Partitions, and Volumes
Double click on a physical device for the remote system. Once attached access to the full physical device is completely read-only. The attached drive is a full physical SCSI device in the context of the examiner machine. Individual partitions can also be connected separately using the Disk-X-Part-X Targets. Individual partitions will be shown as DOS drive letters.

MemoryShares™
Double click on the MemoryShare™ for a Windows system. Once attached, access to the complete physical memory of the remote machine is presented via a “live file” on the share. This live file represents the physical memory of the remote machine in real-time and is not a snapshot or point in time image. Furthermore this image file can be readily opened and analyzed in applications like Volatility\(^3\) for real time analysis.

\(^3\) http://code.google.com/p/volatility/
Mission System

Overview of the Mission System

F-Response Universal offers the option of additional security controls by enabling the patent-pending Mission System, allowing for provisioning and de-provisioning access to F-Response Universal resources and capabilities. To enable the Mission System, enable the option in the F-Response Universal Configuration file (/etc/fswitch/fswitch.cfg).

Access to subject machines is controlled by requests and approvals through email to an ‘Approver’. Once the Approver verifies access is permitted to the requested subject machines, the examiner can then access and perform the required functions.

Creating a Mission

Please note that once a Mission is created it cannot be altered. If additional examiners or subject machines need to be added later the mission can be deleted and a new mission created or an additional mission can be created with the new information.

To add a new mission, highlight the appliance and click the Mission->Open Mission Console… command. If this command is disabled it means the Mission System has not been enabled on that appliance. The Mission Console dialog will open:

When clicking the Mission Console the screen will show the current and pending missions. To create a new mission, click the Create button option in the top right corner. The Create New Mission window will open:
First, create a name for the mission and enter it into the Name field. The Mission length is a minimum of one day and the length of time needed for the assignment is set in the End Date field.

The Approver field is critical as this should contain the email address of the individual in the organization responsible for allowing access to the specific client machine(s) listed in the mission request. The Creator Email address can be the current examiner creating the request, or another examiner who has been assigned to the mission task.

By default the current examiner logged into the system is added to the Examiners field. If additional examiners are part of this assignment they can be added here separated by commas. In the Subjects field, enter the list of subject machines by hostname, again, separated by commas.

Lastly, there is the option to add notes in the Notes field to further explain the Mission request. Click Create in the lower right corner to create the mission and send the request for approval.

Approval Process
The new mission will be listed in the Pending Missions section. There are options that allow for a review of the mission details (View Mission), a reminder of the request for approval (Resend Mission), and the ability to delete the mission completely.

The approver will receive an email detailing the mission request with a link to approve or deny the requested mission:
freswin2k8\examiner has created the following mission, please review the mission and approve or deny the it via the link below.

Mission Name: Sample Mission One
Examiners: freswin2k8\examiner
Subjects: x86-win2k8-sub
Notes: This is only a test

https://fs2-int/mission?msid=677726&op=decision_view&token=677833

Clicking the hyperlink in the email will open a webpage on the switch and allow the approver to deny or approve the mission. Selecting either option will return an “operation completed” message and the approver can close the webpage.

Once the mission has been approved (or denied), the requesting examiner will receive a message notification of the action taken. If the mission is approved, the examiner can click the Refresh Missions link in the top right corner and the mission will appear under the Current Missions section indicating it is now active and will appear in the F-Response Universal Console.
Mission Status
Once the mission has been approved it will move to the Current Missions portion of the window. If the mission console is open and the Approver grants access yet the mission does not appear in the Current Missions section of the screen, simply click the Refresh button.

There are options in the Current Missions sections to allow for a detailed review of the mission (View Mission), the ability to Extend the Mission request, or to Delete the mission completely.

The Extend Mission option will send a notice to the Approver letting them know the additional time that will be needed to complete the mission. Note when a mission expires it is not terminated. However, the Approver will receive a message letting them know the mission is still active. If an extension is sent the Approver will receive notification of the new date and receive another message if the new expiration date is reached.

Working with Active Missions
Approved missions will appear in the main console. Provided the requested subjects have the F-Response Universal client software installed on them, they will appear under the mission as they check into the system. How frequently subjects will check into the switch and appear in the mission is determined by the Wait Hint as configured in Deploy->Deployment Settings....

Once the subject machines appear under the Mission, double click on a machine to obtain a list of potential targets.

Mission Expiration/Deletion
A mission will remain active until deleted by the Examiner in the Mission Console. The Approver will receive a message notification that the mission has reached its allotted time but is still active. The Examiner has the option to extend the date and trigger a new notification to the Approver, but the expiration will not affect the open mission.

If additional subjects need to be added to an investigation, an additional mission must be created for these subjects or the mission deleted and recreated with all the pertinent subjects. Subjects cannot be added to a mission once created.

To Extend a mission, highlight the mission in the Mission Console and click the Extend button to choose the new expiration date:
A new email notification will be sent to the Approver.

To delete the mission completely, simply highlight the mission in the Mission Console and click Delete. A notification will be sent to the approver.
Appendix A.

Legal Notices

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While Agile Risk Management LLC has committed its best efforts to providing accurate information in this document, we assume no responsibility for any inaccuracies that may be contained herein, and we reserve the right to make changes to this document without notice.

Patents

F-Response is covered by United States Patent Numbers: 8,171,108; 7,899,882; 9,037,630; and other Patents Pending.
Appendix B.

Release History

2.0.1.17 -> Improved handling for > 2TB subject devices. Improved the command line tool for managing users (fswitchadm).

2.0.1.16 -> Corrected fragmented read issue when making unusually large read requests. Updated the Universal appliance to handle Amazon Ec2 licensing. Completely redesigned Linux and OSX examiner software.

2.0.1.12 -> Corrected user interface issue when opening multiple devices simultaneously. Updated the Linux subject executable to handle more diverse device targets. Improvements to the Linux and Apple OSX examiner to correct authentication issue. Improvements to the Active Directory/LDAP authentication process allowing for success in more complex environments.

2.0.1.11 -> Updated F-Response Universal deployment processes to handle the recent changes in Apple OSX El Capitan. Additional minor user interface corrections.

2.0.1.6 -> Updated F-Response Universal User Interfaces (Now and Universal) for more efficient usage. Additional icons, grids, and layout to provide for an easier user experience. Modifications to the LDAP authentication system allowing for more diverse Domain authentication scenarios. Additional Examiner software packages for Apple OSX and Linux. Minor adjustments to the Mission System to address ipv6 address differences. Modifications to the F-Response Universal Subject software for Windows to reduce potential for hibernation and sleep while actively mounted.

1.0.75.7 -> Corrected issues with remote DiscoveryShare name content filtering. Upgraded the F-Response F-Switch SCSI Adapter to address a timing issue during drive attach/detach operations. Added a complete LDAP configuration testing tool to address issues with properly configuring LDAP authentication. Added additional options in configuration to handle IPv4/IPv6 socket binding.

1.0.75.6 -> Addressed issues with remote DiscoveryShare content that violates Windows naming conventions. Modified the physical drive numbering detection model. Improved LDAP authentication model to better handle complex LDAP configurations.

1.0.75.5 -> Updated F-Response Universal and Now clients to better detect spurious memory reservations, address internal drive and volume access authentication inconsistencies. Updated F-Response Universal and Now appliance software to improve LDAP/Active Directory integration, better handle systems with modified tcp ports. Updated F-Response Univ/Now Linux examiner to reduce 3rd party dependencies and streamline configuration. Libconfig dropped in favor of Lua style configuration and additional build platform included, Centos 7. Updated Android apk build to improve performance based on internal testing and user feedback. Windows F-Response Univ/Now console improvements for stability.

1.0.75.4 -> Updated F-Response F-Switch SCSI driver to revision 4. Improved stability and performance in high speed IO operations. Modified worker process to improve stability and memory consumption in high speed IO operations.

1.0.75.3 -> Modifications to the internal F-Response Univ/Now architecture to improve data transmission speed and performance.

1.0.75.2 -> Modifications to the examiner driver stack to improve performance, stability, and reduce potential for device timeout.
1.0.75.1 -> Modifications to subject executables to include dynamic reconnection to Univ/Now, additional keep-alive improvements to long haul network links, read timeouts and stability updates.

1.0.74.8 -> Modifications to address worker process loading in non-standard operating environments.

Initial Release -> 1.0.74.7
Appendix C.

Master Software License Agreement

AGILE RISK MANAGEMENT LLC MASTER SOFTWARE LICENSE AGREEMENT

TERMS AND CONDITIONS

1. Scope of Agreement; Definitions. This Agreement covers the license and permitted use of the Agile Risk Management LLC (“Agile”) F-Response Software. Unless otherwise defined in this section, the capitalized terms used in this Agreement shall be defined in the context in which they are used. The following terms shall have the following meanings:

1.1. “Agile Software” or “Software” means any and all versions of Agile’s F-Response software and the related “Documentation” as defined below.

1.2. “Customer” or “Licensee” means the person or entity identified on the invoice and only such person or entity. Customer shall not mean any assigns, heirs, or related persons or entities or claimed third-party beneficiaries of the Customer.

1.3. “Documentation” means Agile release notes or other similar instructions in hard copy or machine readable form supplied by Agile to Customer that describes the functionality of the Agile Software.

1.4. “License Term” means the term of the applicable license as specified on an invoice or as set forth in this Agreement.

2. Grant of Software License.

2.1. Enterprise License. Subject to the terms and conditions of this Agreement only, Agile grants Customer a non-exclusive, non-transferable license to install the Agile Software and to use the Agile Software during the License Term, in object code form only.

2.2. Third Party Software. Customer acknowledges that the Agile Software may include or require the use of software programs created by third parties, and the Customer acknowledges that its use of such third party software programs shall be governed exclusively by the third party’s applicable license agreement.


3.1. No Reverse Engineering; Other Restrictions. Customer shall not, directly or indirectly: (i) sell, license, sublicense, lease, redistribute or transfer any Agile Software; (ii) modify, translate, reverse engineer, decompile, disassemble, create derivative works based on, or distribute any Agile Software; (iii) rent or lease any rights in any Agile Software in any form to any entity; (iv) remove, alter or obscure any proprietary notice, labels or marks on any Agile Software. Customer is responsible for all use of the Software and for compliance with this Agreement and any applicable third party software license agreement.

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4. **Ordering & Fulfillment.** Unless otherwise set forth in an Agile-generated Estimate pricing is set forth on the F-Response website and is subject to change at any time. Each order shall be subject to Agile’s reasonable acceptance. Unless otherwise set forth in an Agile-generated Estimate. Delivery terms are FOB Agile’s shipping point.

5. **Payments.** Customer agrees to pay amounts invoiced by Agile for the license granted under this Agreement. If any authority imposes a duty, tax or similar levy (other than taxes based on Agile’s income), Customer agrees to pay, or to promptly reimburse Agile for, all such amounts. Unless otherwise indicated in an invoice, all Agile invoices are payable thirty (30) days from the date of the invoice. Agile reserves the right to charge and Customer agrees to pay Agile for every unauthorized copy or unauthorized year an amount equal to the cost per copy, per year, per computer, or per user, whichever is greater, as a late payment fee in the event Customer fails to remit payments when due or Customer otherwise violates the payment provisions of this Agreement. In addition to any other rights set forth in this Agreement, Agile may suspend performance or withhold fulfilling new Customer orders in the event Customer has failed to timely remit payment for outstanding and past due invoices.

6. **Confidentiality.**

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