Apps Specifications

SDK v2.0

Department: Author:

ECO History

ECO Number	Rev	Description	Change Admin/Date
	2.0.1	Initial revision.	03/01/2013
	2.0.2	add icon control	05/13/2013
	2.0.3	1. enhance app name and web UI display name issue 2. add UI type control 3. add user permission control	02/13/2014
	2.0.4	1.add check firmware version	06/24/2014
	2.0.5	1.upadte image 2.add multi-language set	08/06/2014
	2.0.6	1. Update usercontrol and centertype setting	09/04/2014
	2.0.7	1. App update	09/18/2014
	2.0.8	1.Update the note about directory name explain	09/19/2014
	2.0.9	1. Update item length in apkg.rc file	02/06/2015
	2.0.10	1. Update screenshot for white UI	05/21/2015
	2.0.11	2. Update install/re-install script command	05/27/2015

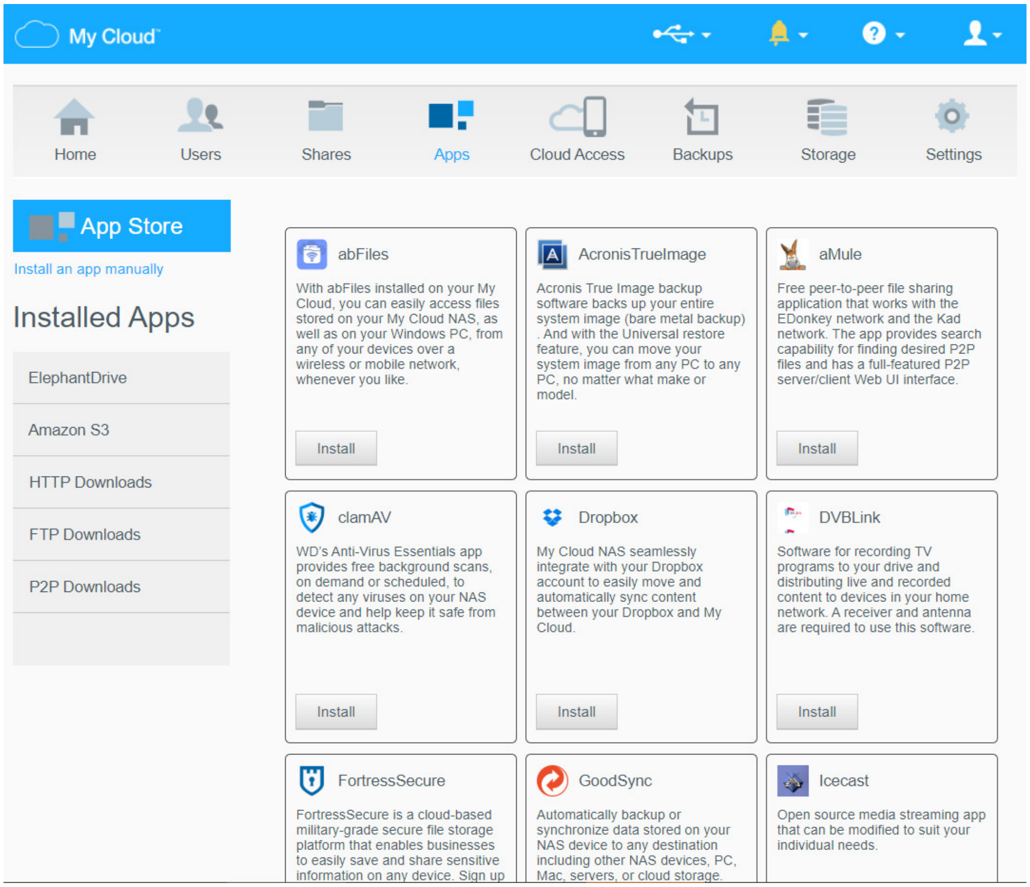
	2.0.12	1. Update apkg support project	07/21/2015
	2.0.13	1. Update RangerPeak model name	10/15/2015
	2.0.14	1. Update BryceCanyon/BlackCanyon model name	01/27/2016
	2.0.15	1. Update example	11/14/2018
	2.0.16	1. Update 32-bit and 64-bit mksapkg usage	11/21/2018
	2.0.17	1. All the changes are for Godzilla project 2. Add app_id to identify each different apps of module 3. Change the sign key encrypt method from md5 to sha256 4. Only support MyCloudPR4100, MyCloudPR2100, WDMyCloudEX4100, WDMyCloudMirror, MyCloudEX2Ultra, WDMyCloud, WDCloud 5. support 64-bit mksapkg only	01/16/2020
	2.0.18	1. Add Sprite/Aurora/Yostmise support in OS5	04/28//2020

1. Introduction

Apps Package is a small package management system that designed for the WD My Cloud Series products. We refer to Add-ons in the document as Apps as. As you can see by the below image, the UI refers to Add-ons as Apps. The SDK v2.0 provides basic functions to control packages. These controls are install, remove, start, and stop. You only need to use the templates that are contained in the SDK, which are just simple shell scripts to create an App quickly and easily without writing complex programs.

2. Apps Package SDK v2.0

Apps Package SDK v2.0 includes the below two components:
mksapkg/MyCloudOS5_mksapkg: wrapping application into an App package
document: this file



abFiles

With abFiles installed on your My Cloud, you can easily access files stored on your My Cloud NAS, as well as on your Windows PC, from any of your devices over a wireless or mobile network, whenever you like.

AcronisTrueImage

Acronis True Image backup software backs up your entire system image (bare metal backup) . And with the Universal restore feature, you can move your system image from any PC to any PC, no matter what make or model.

aMule

Free peer-to-peer file sharing application that works with the EDonkey network and the Kad network. The app provides search capability for finding desired P2P files and has a full-featured P2P server/client Web UI interface.

clamAV

WD's Anti-Virus Essentials app provides free background scans, on demand or scheduled, to detect any viruses on your NAS device and help keep it safe from malicious attacks.

Dropbox

My Cloud NAS seamlessly integrate with your Dropbox account to easily move and automatically sync content between your Dropbox and My Cloud.

DVBLink

Software for recording TV programs to your drive and distributing live and recorded content to devices in your home network. A receiver and antenna are required to use this software.

FortressSecure

FortressSecure is a cloud-based military-grade secure file storage platform that enables businesses to easily save and share sensitive information on any device. Sign up

GoodSync

Automatically backup or synchronize data stored on your NAS device to any destination including other NAS devices, PC, Mac, servers, or cloud storage.

Icecast

Open source media streaming app that can be modified to suit your individual needs.

3. Getting started: using mksapkg

“mksapkg” is a small tool to create the App for My Cloud NAS and it is based on Apps Package SDK v2.0. We provided the executable binary that users can use to create their own Apps on our system. Users must install libxml2 and GNU “tar” in their Linux system to run mksapkg. (support 64-bit x86-64 version only)

```
Usage:
mksapkg -E -s -m [module_name]
```

The supported WD My Cloud NAS modules are listed as below:

Module name	Project name
WDMyCloud	Glacier
WDMyCloudEX4100	YellowStone
WDMyCloudDL4100	Sprite
WDMyCloudEX2100	Yosemite
WDMyCloudDL2100	Aurora
WDMyCloudMirror	GrandTeton
MyCloudEX2Ultra	RangerPeak
MyCloudPR4100	BlackCanyon
MyCloudPR2100	BryceCanyon
WDCloud	MirronMan

Missing xml2 library?

For Fedora:

```
$ yum -y install libxml2 libxml2-devel
```

For Debian, Ubuntu:

```
$ apt-get install libxml2 libxml2-dev
```

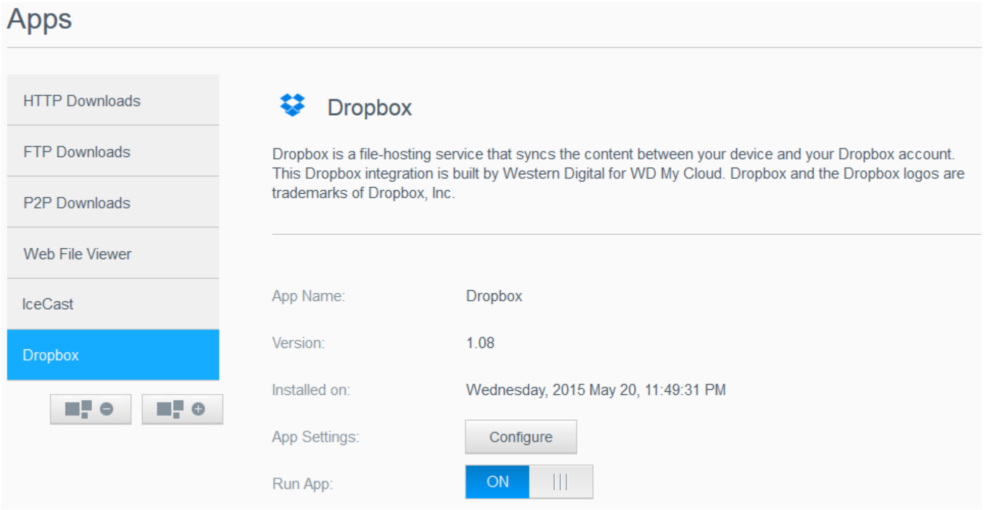
4. Write your own apkg.rc file

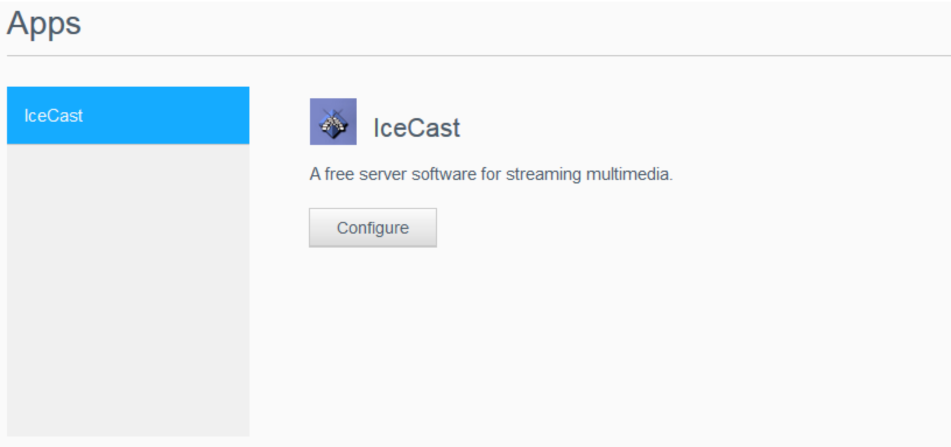
All strings cannot contain space character except the Description field.

Package:	utelnetd	(space is not allowed, m
Section:	Apps	

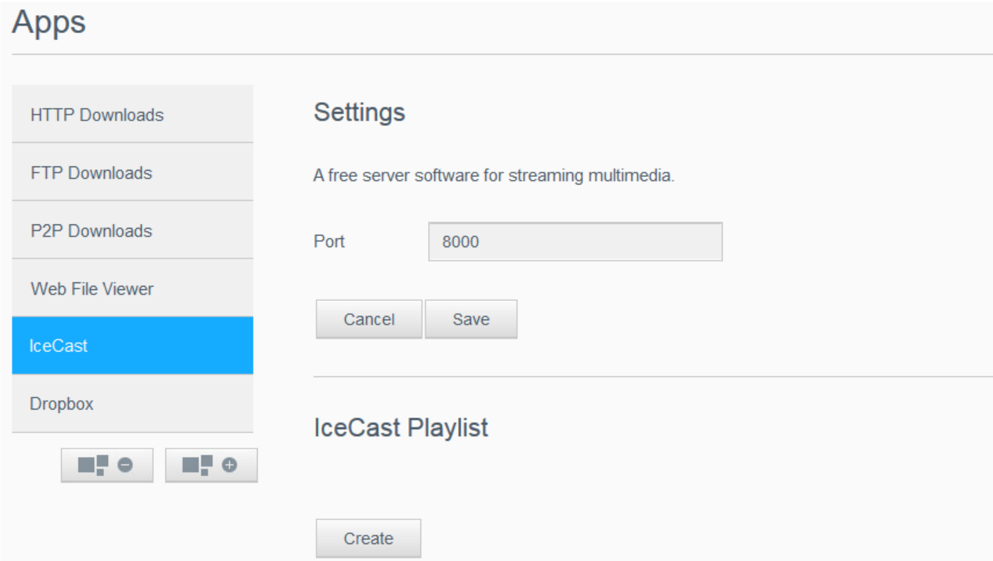
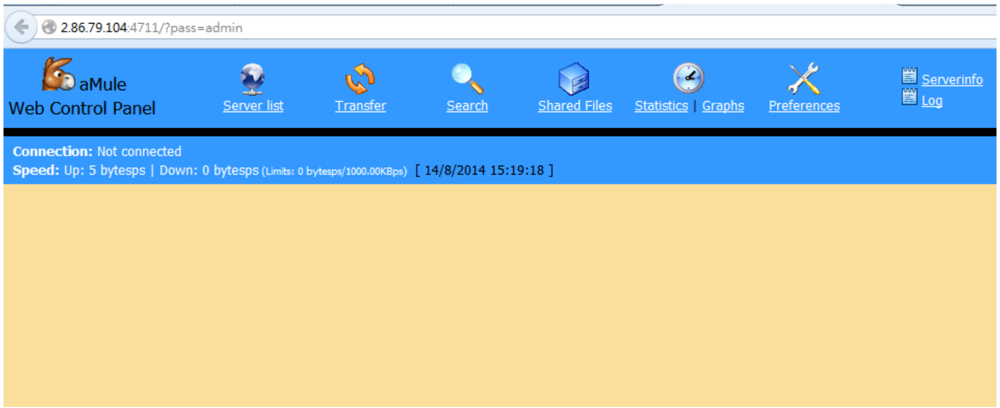
Version:	1.00	(max length < 32)
Packager:	WD	(max length < 32)
Email:	support@wdc.com	(max length < 64)
Homepage:	http://support.wdc.com	(max length < 64)
Description:	This is a simple demonstration to wrapped telnet daemon.	(max length < 256)
AddonShowName:	utelnetd	(max length < 64)
Icon:	utelnetd.png	
AddonIndexPage:		
AddonUsedPort:		
InstDepend:		
InstConflict:		
StartDepend:		
StartConflict:		
CenterType:		
UserControl:		
MinFWVer:	5.00.194	(only support GZA firmw
MaxFWVer:		(max length < 32)
IndividualFlag:		

About UserControl

value	note	
1	Only admin could use the app	 Apps Dropbox Dropbox is a file-hosting service that syncs the content between your device and your Dropbox account. This Dropbox integration is built by Western Digital for WD My Cloud. Dropbox and the Dropbox logos are trademarks of Dropbox, Inc. App Name: Dropbox Version: 1.08 Installed on: Wednesday, 2015 May 20, 11:49:31 PM App Settings: Configure Run App: ON HTTP Downloads FTP Downloads P2P Downloads Web File Viewer IceCast Dropbox

0	Both admin and normal users could use this app	 A free server software for streaming multimedia.

About CenterType

value	note	
1	The App UI page is embedded in currently Apps web page	 Apps HTTP Downloads FTP Downloads P2P Downloads Web File Viewer IceCast Dropbox Settings Cancel Save IceCast Playlist Create A free server software for streaming multimedia. Port 8000
0	The App UI is opened in the new browser tab	 2.86.79.104:4711/?pass=admin aMule Web Control Panel Server list Transfer Search Shared Files Statistics | Graphs Preferences Serverinfo Log **Connection:** Not connected **Speed:** Up: 5 bytesps | Down: 0 bytesps (Limits: 0 bytesps/1000.00KBps) [14/8/2014 15:19:18]

About MinFWVer & MaxFWVer

Format	[0-9]\{1,4\}\(\\.[0-9]\{1,4\}\)\{0,5\} i.e. 1.00.122 1.02.03.04.05.06
Max Length	Total length < 32 char

Note: Basically, it **Must match the version format of GZA**

If the MaxFWVer or MinFWVer is empty and it means this app could be ran in all the firmware without version limitation.

Example:

MinFWVer: 1.03.001

MaxFWVer: 1.04.002

If the current firmware version is 1.02.00 or 1.05.00, the failed result will be returned during the install process.

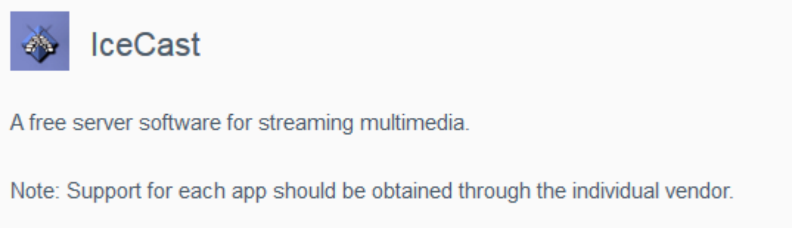
About IndividualFlag

WebUI will show some notice information for apps.

Example:

Note: Support for each app should be obtained through the individual vendor

(The apps description will show this information on WebUI)



IceCast

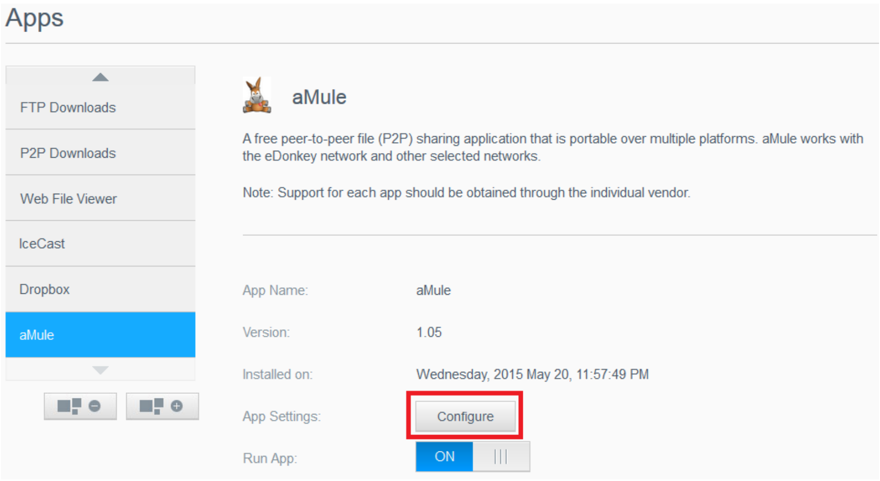
A free server software for streaming multimedia.

Note: Support for each app should be obtained through the individual vendor.

About AddonIndexPage

When the "AddonIndexPage" is empty, it means that this app has no setting pages on web UI.

The web will still show the "configure" grayed out button, and it cannot be pressed.



aMule

A free peer-to-peer file (P2P) sharing application that is portable over multiple platforms. aMule works with the eDonkey network and other selected networks.

Note: Support for each app should be obtained through the individual vendor.

App Name: aMule

Version: 1.05

Installed on: Wednesday, 2015 May 20, 11:57:49 PM

App Settings: Configure

Run App: ON

Dependency & conflict rules defined by the App SDK v2.0

```
Package:                    A
…
InstDepend:                 B
InstConflict:               C
StartDepend:                D
StartConflict:              E,F
```

- App A can't install when App B not installed
- App A can't install when App C is installed
- App A can't enable when App D not being enabled
- App A can't enable when App E or F is enabled

About Version

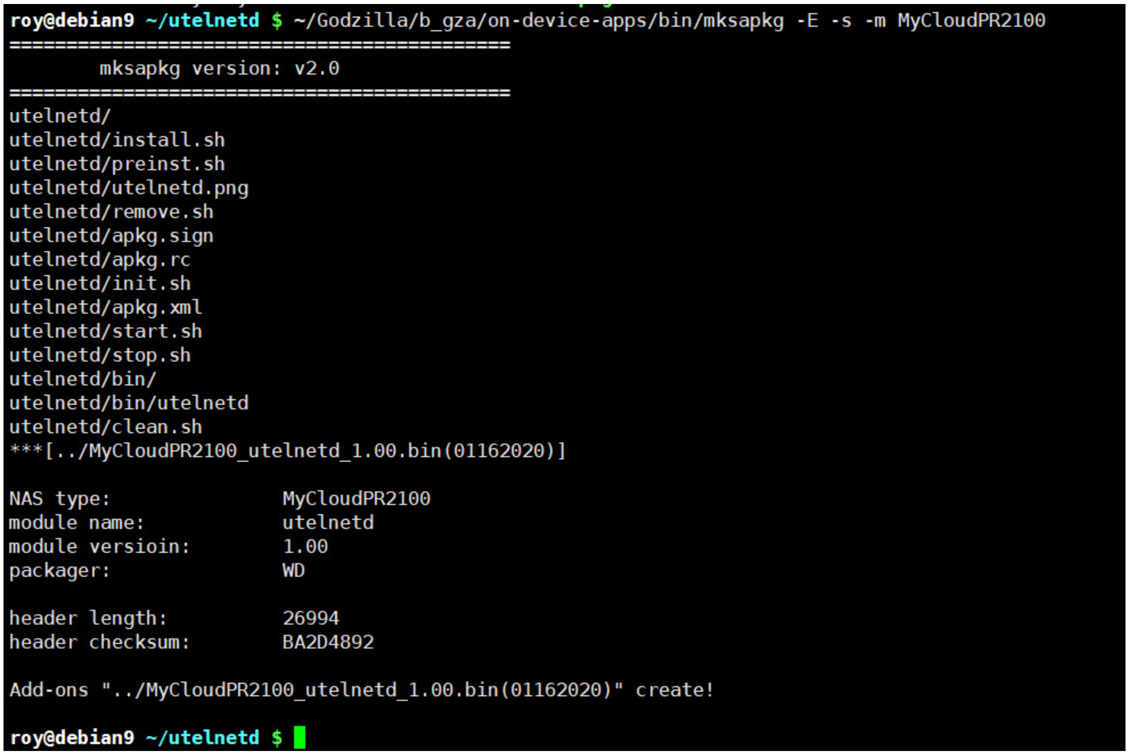
It must conform to the following format: xx.yy.zz… (ex: 1.2, 1.02.03, 1.02.03.04)

When running mksapkg, it will parse apkg.rc to create apkg.xml, and the generated apkg.xml will be used by the App Server to get information about the installed App.

Sample:

```
<?xml version="1.0" encoding="UTF-8"?>
<config>
  <apkg>
    <item>
      <procudt_id>0</procudt_id>
      <custom_id>20</custom_id>
      <model_id>8</model_id>
```

```
            <app_id>11</app_id>
            <user_control>0</user_control>
            <center_type>0</center_type>
            <name>utelnetd</name>
            <show>utelnetd</show>
            <enable>1</enable>
            <version>1.00</version>
            <date>202001016</date>
            <inst_date></inst_date>
            <path></path>
            <ps_name></ps_name>
            <url></url>
            <url_port></url_port>
            <apkg_version>WD</apkg_version>
            <packager>WD</packager>
            <email>support@wdc.com</email>
            <homepage>http://support.wdc.com</homepage>
            <inst_depend></inst_depend>
            <inst_conflict></inst_conflict>
            <start_depend></start_depend>
            <start_conflict></start_conflict>
            <description> This is a simple demonstration to wrapped telnet daemon. </description>
            <icon>utelnetd.png</icon>
            <MinFWVer>5.00.194</MinFWVer>
            <MaxFWVer></MaxFWVer>
        </item>
    </apkg>
</config>
```



```
roy@debian9 ~/utelnetd $ ~/Godzilla/b_gza/on-device-apps/bin/mksapkg -E -s -m MyCloudPR2100
============================================
        mksapkg version: v2.0
============================================
utelnetd/
utelnetd/install.sh
utelnetd/preinst.sh
utelnetd/utelnetd.png
utelnetd/remove.sh
utelnetd/apkg.sign
utelnetd/apkg.rc
utelnetd/init.sh
utelnetd/apkg.xml
utelnetd/start.sh
utelnetd/stop.sh
utelnetd/bin/
utelnetd/bin/utelnetd
utelnetd/clean.sh
***[../MyCloudPR2100_utelnetd_1.00.bin(01162020)]

NAS type:               MyCloudPR2100
module name:            utelnetd
module versioin:        1.00
packager:               WD

header length:          26994
header checksum:        BA2D4892

Add-ons "../MyCloudPR2100_utelnetd_1.00.bin(01162020)" create!

roy@debian9 ~/utelnetd $ 
```

Note: The folder name must be the same with the package field in apkg.rc file. (important !!!)

Shell script files

preinst.sh: This script is used to pre-run some commands if needed, or for user to backup their configuration files to other place when re-install App, such as: /tmp, /var/tmp or any directory in your hard drive before start installing an App.

install.sh: Will copy files and install App to an appropriate folder.

remove.sh: Will remove the installed App from hard drive.

init.sh: Will create necessary symbolic links of installed App before being executed. (We suggested creating the symbolic link to /usr/bin or /usr/sbin.) If necessary, restore those configuration files that being backup through preinst.sh back to App installed folder.

clean.sh: Will remove all links or files that created by init.sh.

start.sh: Will start App daemon.

stop.sh: Will stop App daemon.

5. Apps Package naming rule and header definition

Apps package naming rule

Ex: MyCloudPR2100_aMule_1.06.bin(01162020)

Apps package file blocks

apkg header
Module tar file

Header structure definition

```
typedef struct _APKG_HEADER_
{
    char            ah_magic_num[MAGIC_NUM_LEN];
    char            ah_module_name[APKG_64_LEN];
    char            ah_version[APKG_32_LEN];
    int             ah_apkg_version;
    int             ah_product_id;
    int             ah_custom_id;
    int             ah_model_id;
    int             ah_app_id;
    int             ah_module_signed;
    char            ah_reserve[60];
    unsigned long    ah_checksum;
    unsigned long    ah_length;
} APKG_HEADER, *APKG_HEADER_ID;
```

Header magic number definition: the last byte of magic number must be **0x5a** in App SDK v2.0

```
MyCloudPR2100: {0x42,0x72,0x79,0x63,0x65,0x43,0x79,0x5a}
```

6. When will the shell script files will be called?

When the Web UI uploads an App package, we will install it to

```
Example: module name is (MNAME) = utelnetd
default install path: (INST_PATH) = /mnt/HD/HD_a2/Nas_Prog/$MNAME
default upload path: (UPLOAD_PATH) = /mnt/HD/HD_a2/Nas_Prog/_install
```

The install and upload path is scanned dynamically by App server when daemon initiate.

When installing a new App the following shell script will be called

```
$UPLOAD_PATH/install.sh $UPLOAD_PATH $INST_PATH
$INST_PATH/init.sh $INST_PATH
```

When removing an App the following shell script will be called

```
$INST_PATH/stop.sh
$INST_PATH/clean.sh
$INST_PATH/remove.sh $INST_PATH
```

When enabling an App the following shell script will be called

```
$INST_PATH/start.sh
```

When disabling an App the following shell script will be called

```
$INST_PATH/stop.sh
```

When re-installing an App the following shell script will be called

```
$INST_PATH/stop.sh
$INST_PATH/clean.sh
```

```
$INST_PATH/preinst.sh $INST_PATH
$INST_PATH/remove.sh $INST_PATH
$UPLOAD_PATH/install.sh $UPLOAD_PATH $INST_PATH
$INST_PATH/init.sh $INST_PATH
```

When your app has its own configure file settings, you need to backup these files to other place in preinst.sh script file and copy files back in init.sh. Because remove.sh will remove all configuration files of this App on the hard disk and reinstall it in install.sh. Beware of incorrect shell script files which may cause the system to crash. For example, without the remove link from hard drive correctly, it may cause the system to format hard drive failure due to hard drive can't be un-mounted.

7. App Server

The App Server will scan all volume to find out the installed Apps and enable it if necessary.
The App Server will control and maintain installed database of App.
Apps Server will provide interface to run shell script file from Web GUI.
The main purpose of Apps SDK v2.0 is implemented the App dependencies and configuration check.

8. A sample app package without a Web UI

Prepare the necessary binary of your application, and create a folder name that is the same name as the Package field in apkg.rc file.

```
$ ls -R
.:
apkg.rc    bin    clean.sh    init.sh    install.sh    preinst.sh    remove.sh    start.sh    stop.sh

./bin:
utelnetd
```

Create your own apkg.rc file.

```
Package:                utelnetd
Version:                1.00
Packager:               WD
Email:                  support@wdc.com
```

```
Homepage:              http:// support.wdc.com
Description:           This is a simple demonstration to wrapped telnet daemon.
Icon:                  utelnetd.png
AddonShowName:         utelnetd
AddonIndexPage:
AddonUsedPort:
InstDepend:
InstConflict:
StartDepend:
StartConflict:
CenterType:
UserControl:
MinFWVer:              5.00.194
MaxFWVer:
```

Write preinst.sh.

```
#!/bin/sh

path_src=$1
path_des=$2
#we do nothing here for utelnetd
```

Write install.sh (Basically, most applications will use the following example.)

```
#!/bin/sh

path_src=$1
path_des=$2
mv $path_src $path_des
```

Write remove.sh (Basically, most applications will use the following example)

```
#!/bin/sh

path=$1
rm -f /usr/bin/utelnetd    2> /dev/null
rm -f /var/www/utelnetd >/dev/null
rm -rf $path
```

Write init.sh

```
#!/bin/sh

path=$1

#create link
ln -s $path/sbin/utelnetd /usr/bin/utelnetd
ln -s $path/var/www/utelnetd /var/www

#cmd on pre-install
idx=0
while [ $idx -lt 7 ]; do
        mknod /dev/ptyp$idx c 2 $idx 2>/dev/null
        mknod /dev/ttyp$idx c 3 $idx 2>/dev/null
        idx=`expr $idx + 1`
done
```

Write clean.sh

```
#!/bin/sh

#remove link
rm -f /usr/bin/utelnetd    2> /dev/null
rm -f /var/www/utelnetd >/dev/null
rm -f /dev/ttyp*
rm -f /dev/ptyp*
```

Write start.sh

```
#!/bin/sh

#start daemon
utelnetd -d
```

Write stop.sh

```
#!/bin/sh
```

```
#stop daemon
killall utelnetd
```

Create Apps package using mksapkg.

```
[hostname ~ /mksapkg/utelnetd]$ ls
apkg.rc    bin    clean.sh    init.sh    install.sh    preinst.sh    remove.sh    start.sh    stop.sh
[hostname ~ /mksapkg/utelnetd]$ ~/bin/mksapkg -E -s -m MyCloudPR2100
============================================
            mksapkg version: v2.0
============================================
utelnetd/
utelnetd/install.sh
utelnetd/preinst.sh
utelnetd/utelnetd.png
utelnetd/remove.sh
utelnetd/apkg.sign
utelnetd/apkg.rc
utelnetd/init.sh
utelnetd/apkg.xml
utelnetd/start.sh
utelnetd/stop.sh
utelnetd/bin/
utelnetd/bin/utelnetd
utelnetd/clean.sh
***[../MyCloudPR2100_utelnetd_1.00.bin(01162020)]

NAS type:                   MyCloudPR2100
module name:                utelnetd
module version:             1.00
packager:                   WD

header length:              26994
header checksum:            BA2D4892
```

```
Add-ons "../MyCloudPR2100_utelnetd_1.00.bin(01162020)" create!
```

What happens when the installed App doesn’t work?

If an App is not installed correctly, it will result in the package can’t install, remove, enable or disable, due to improper creating of shell script files. It is easy to solve this error by removing the installed package folder and sending a rescan command to the Apps daemon.

```
# rm -rf /mnt/HD/HD_a2/Nas_Prog/utelnetd
# kill -USR1 `pidof apkg`
```

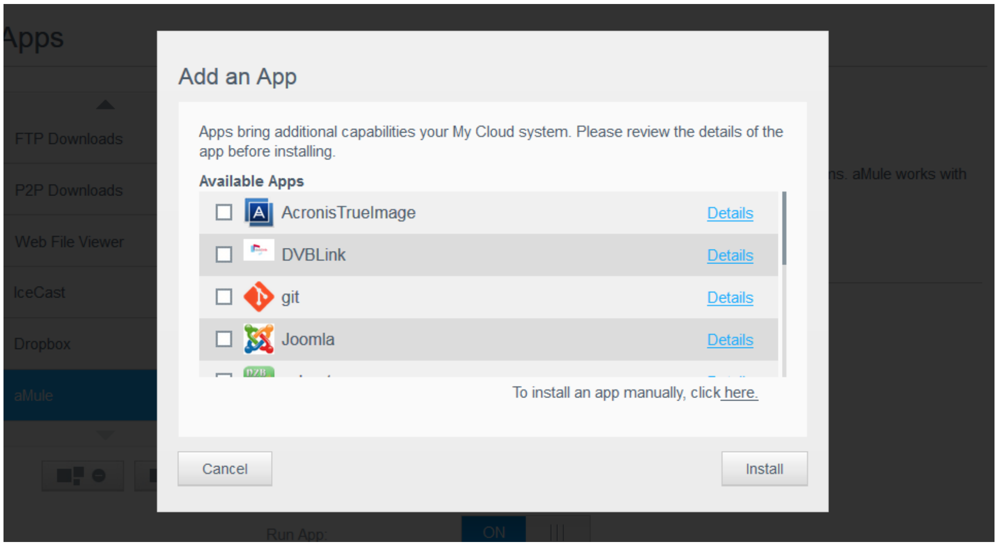
When you are at the stage of development, it is recommended not to install other Apps. Because a clean environment will help you to reduce development time for debugging.

9. Creating a web page for your own app

check this item in apkg.rc file

```
Package:                hello
...
Icon:                   hello.png
AddonShowName:          hello
AddonIndexPage:         index.html
AddonUsedPort:
…
```

Note: If your package does not require a GUI, make sure you keep the AddonIndexPage field empty.



Add an App

Apps bring additional capabilities your My Cloud system. Please review the details of the app before installing.

Available Apps

- □ AcronisTrueImage Details
- □ DVBLink Details
- □ git Details
- □ Joomla Details

To install an app manually, click here.

In the Application page, we need to have an App icon and the recommended icon size is 128xn or nx128 (n > 128).
Icon naming rules: Package_name.png. When package name is s hello, you should rename it as hello.png. And make sure the icon can be found in the /var/www/hello/hello.png.

Put your html, jpg, css files in the webpage directory. You should link webpage to /var/www/hello, because the root path of web server is /var/www.

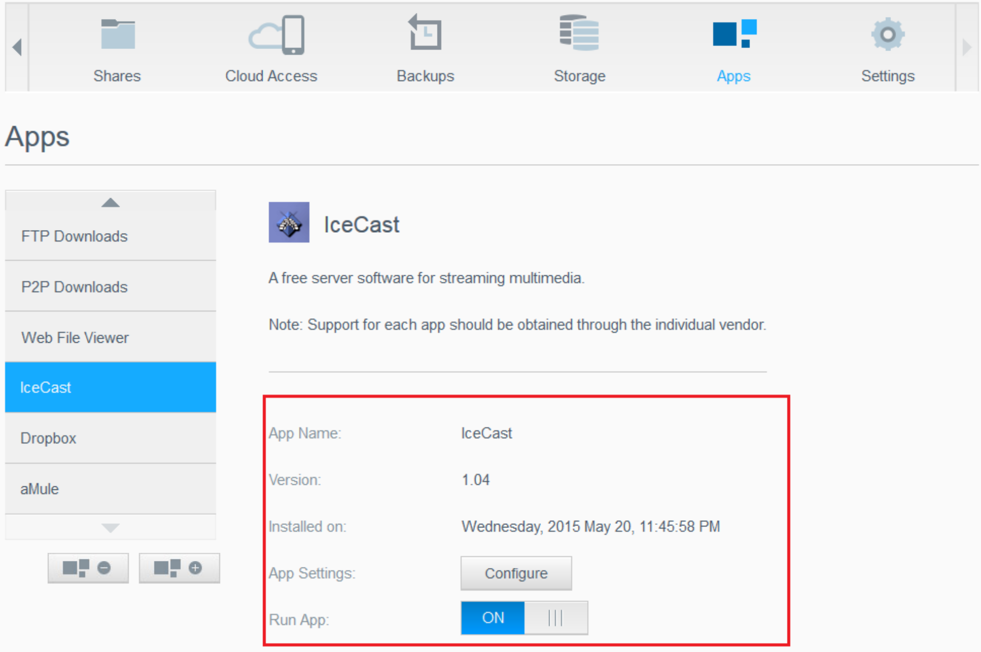
When you implement cgi functions, you should link to /var/www/cgi-bin. Just write it down on init.sh script file. And remember to add remove link command on clean.sh script file.

```
ln -s $path/webpage /var/www/hello
ln -s $path/cgi/* /var/www/cgi-bin/
```

Make sure the path of index file is correct.

ex:

AddonIndexPage:	index.html -> you should have this file in /var/www/hello/index.html
AddonIndexPage:	/web/index.html -> you should have this file in /var/www/hello/web/index.html



IceCast

A free server software for streaming multimedia.

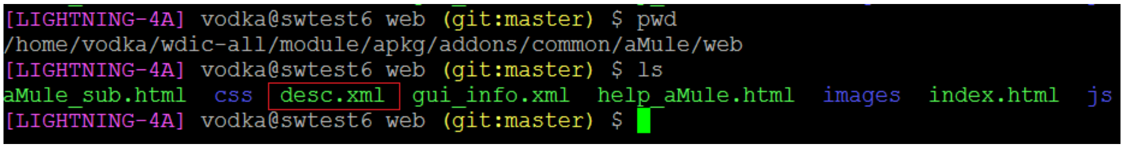
Note: Support for each app should be obtained through the individual vendor.

App Name: IceCast
Version: 1.04
Installed on: Wednesday, 2015 May 20, 11:45:58 PM
App Settings: Configure
Run App: ON

10. Support multi-language for App description

To support multi-language of app description, the app developer should provide the desc.xml.

1. Put language xml file in the add-on folder.



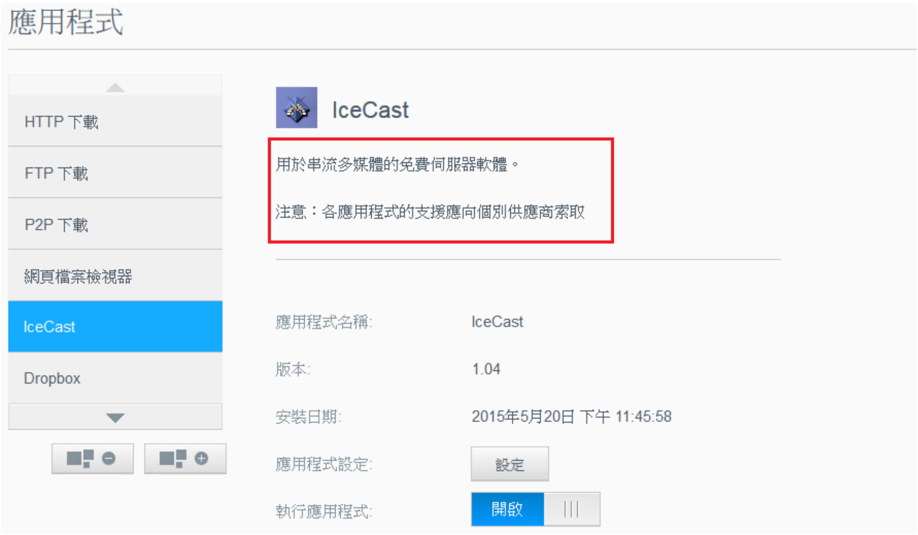
```
[LIGHTNING-4A] vodka@swtest6 web (git:master) $ pwd
/home/vodka/wdic-all/module/apkg/addons/common/aMule/web
[LIGHTNING-4A] vodka@swtest6 web (git:master) $ ls
aMule_sub.html  css  desc.xml  gui_info.xml  help_aMule.html  images  index.html  js
[LIGHTNING-4A] vodka@swtest6 web (git:master) $
```

2. Create a link for the desc.xml file to /var/www/Addon_Name in init.sh

```
#!/bin/sh
path=$1

ln -s $path/web/desc.xml /var/www/aMule/
```

It is able to put desc.xml to anywhere in app source folder and create soft-link desc.xml correctly to its web root folder. WebUI will read the “desc.xml” file to show the indicated language.



用於串流多媒體的免費伺服器軟體。

注意：各應用程式的支援應向個別供應商索取

應用程式名稱: IceCast

版本: 1.04

安裝日期: 2015年5月20日 下午 11:45:58

應用程式設定: 設定

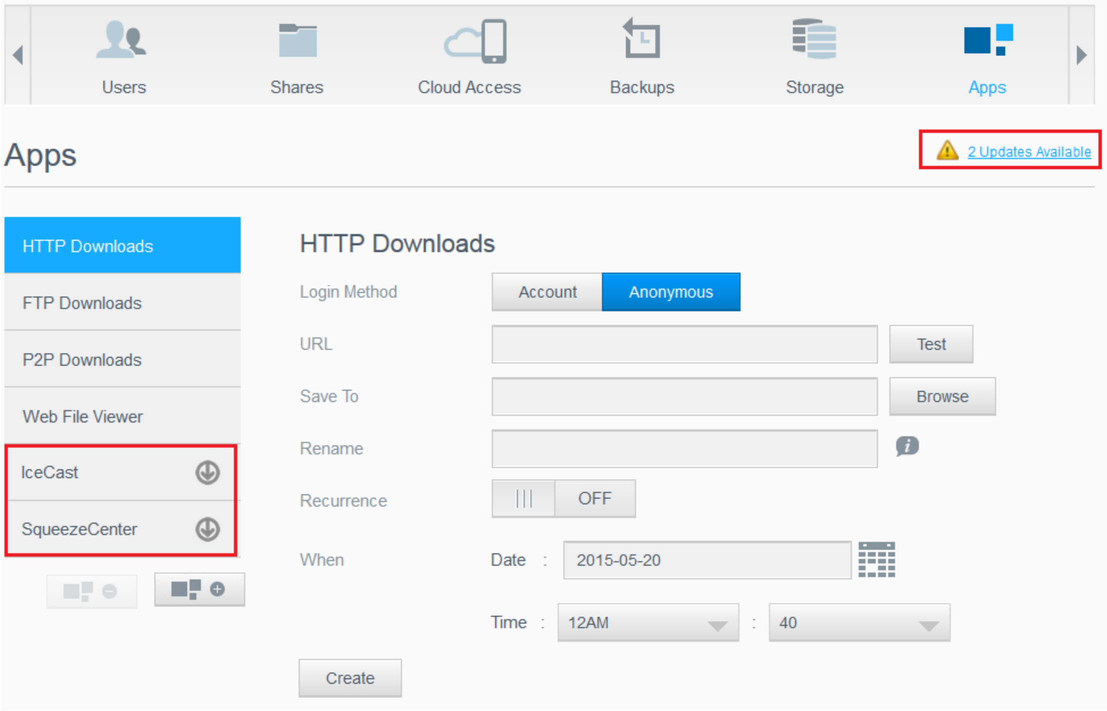
執行應用程式: 開啟

The desc.xml example for Icecast:

```
<?xml version="1.0" encoding="utf-8"?>
<config>
  <en-US>A free server software for streaming multimedia.</en-US>
  <cs-CZ>Bezplatný serverový software pro vysílání multimediálního obsahu.</cs-CZ>
  <de-DE>Eine kostenlose Serversoftware für das Streaming von Multimedia-Inhalten.</de-DE>
  <es-ES>Software gratuito de servidor para transmitir contenido multimedia.</es-ES>
  <fr-FR>logiciel serveur gratuit de diffusion de contenus multimédias.</fr-FR>
  <hu-HU>Ingyenes kiszolgálószoftver a multimédiás tartalmak adatfolyam útján történő továbbításához.</hu-HU>
  <it-IT>software server gratuito per lo streaming dei contenuti multimediali.</it-IT>
  <ja-JP>マルチメディア ストリーミング用の無料サーバー ソフトウェア。</ja-JP>
  <ko-KR>멀티미디어 스트리밍을 위한 무료 서버 소프트웨어.</ko-KR>
  <no-NO>Et gratis serverprogram for direkteavspilling av multimedia.</no-NO>
  <nl-NL>Een gratis serversoftware voor het streamen van multimedia.</nl-NL>
  <pl-PL>Bezpłatne oprogramowanie serwerowe do strumieniowych transmisji danych multimedialnych.</pl-PL>
  <pt-BR>Um software de servidor gratuito para fazer transmissão multimídia.</pt-BR>
  <ru-RU>Бесплатное серверное программное обеспечение для потокового воспроизведения мультимедиа.</ru-RU>
  <sv-SE>En gratis serverprogramvara för strömning av multimedia.</sv-SE>
  <tr-TR>Multimedya akışına yönelik ücretsiz bir yazılım.</tr-TR>
  <zh-CN>用于流式传输多媒体的免费服务器软件。</zh-CN>
  <zh-TW>用於串流多媒體的免費伺服器軟體。</zh-TW>
</config>
```

11. Update apps and backup configuration settings

If an installed app has the new update available, the system will automatically prompt a message on web UI. User can click on the “update available” notice to check the apps with available updates.



HTTP Downloads

Login Method: Account [✓ Anonymous]

URL

Save To

Rename

Recurrence: OFF

When: Date : 2015-05-20

Time : 12AM : 40

After update process is one, the app will be replaced to the new version. If the configuration values have to be kept after update, it need to implement the backup command in preinst.sh and recover command install.sh. The “preinst.sh” script will back-up the app’s configuration, then “install.sh” will recover the configuration.

Re-install flow:

stop.sh -> clean.sh -> preinst.sh -> remove.sh -> install.sh -> init.sh

Example:

preinst.sh

```
#!/bin/sh
path_des=$1

cp -R $path_des/iceconf /mnt/HD/HD_a2/.systemfile/
```

Install.sh

```
#!/bin/sh
path_src=$1
path_des=$2

echo "Addon IceCast (install.sh): installing ..."
mv $path_src $path_des

if [ -d /mnt/HD/HD_a2/.systemfile/iceconf ]; then
        echo "Addon IceCast (install.sh): restore configs ..."
        cp -R /mnt/HD/HD_a2/.systemfile/iceconf "${path_des}/IceCast/"
        rm -rf /mnt/HD/HD_a2/.systemfile/iceconf
fi
echo "Addon IceCast (install.sh): Done ..."
```

Note:

If the app’s configuration is too large, then the script can use “mv” command to back-up the configuration.