

MICHIGAN STATE

U N I V E R S I T Y

Beta Presentation

Virtual Appliance Simulator

The Capstone Experience

Team Whirlpool

Cody Littley

Lisa Kelly

Evan Liang

Department of Computer Science and Engineering

Michigan State University

Spring 2014

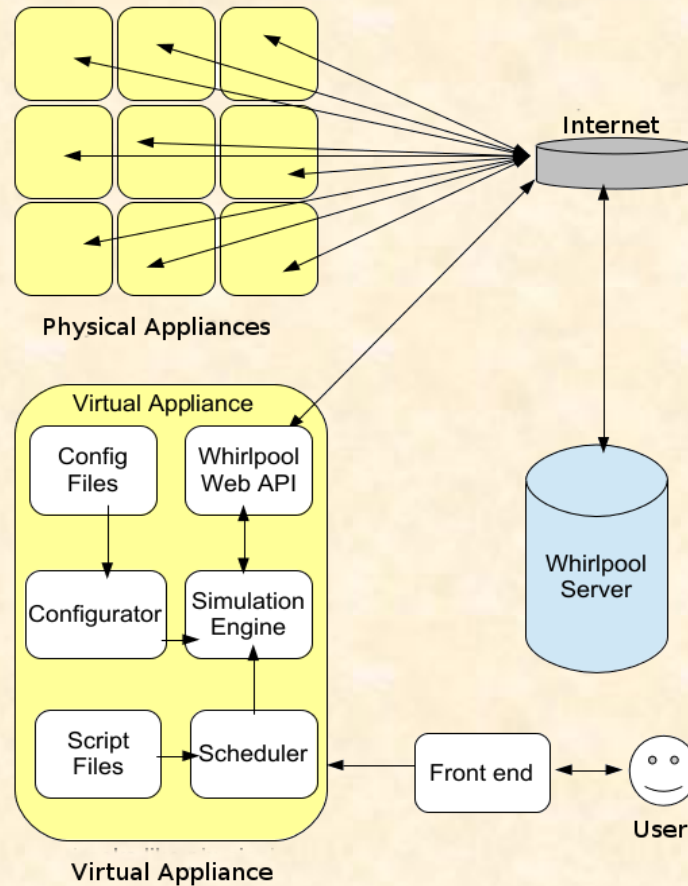


*From Students...
...to Professionals*

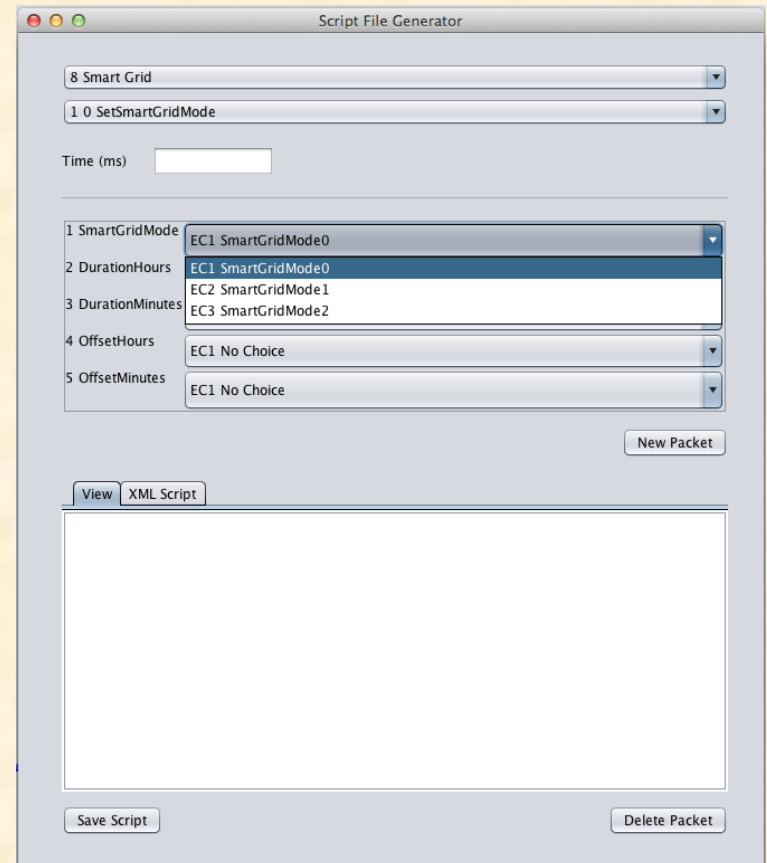
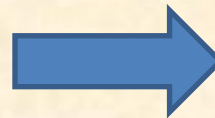
Project Overview

- Provide a digital tool for Whirlpool employees to simulate hardware
- Interface with Whirlpool Cloud Servers as if the virtual appliance was a real appliance
- Provide a cross platform, web-based user interface
- Science

System Architecture



Script File Generator



Configuring the Simulation

Virtual Appliance System

Washing Machine

Information Select

Dryer

Information Select

Refrigerator

Information Select

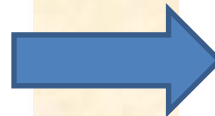
Dish Washer

Information Select

Add Appliance (Filetype must be ".XML")

Configuration Files	API Files
Filename: <input type="text"/> Choose File no file selected	Filename: <input type="text"/> Choose File no file selected
<input type="button" value="Upload"/>	

[Add another appliance](#)



Virtual Appliance System

Washing Machine

Scripts Units per script

script3.xml

script2.xml

[Add another Script](#)

Upload Successful!

1

1

Dryer

Scripts Units per script

no file selected

[Add another Script](#) no file selected

1

1

Smart Appliance Identification Upload


SAID List # of SAID's Needed

no file selected



Running the Simulation

Virtual Appliance System Switch View



Washing Machine x2 Dryer x0 Refrigerator x0 Dish Washer x0

Start Simulation

Subitem two

Subitem three

Subitem four

Subitem five

Subitem six

```
Washing Machine - Washing Machine x 1
Receiving...
0000ED0007E60000000000
0000ED0007E60000000000
0000ED0003E600
0000ED0003E600
0000ED0003E600
0000ED0003E600
0000ED0003E600
0000ED0003E600
0000ED0003E600

Washing Machine - Washing Machine x 1
Receiving...
0000ED0005E6000000
0000ED0005E6000000
<< Simulation has ended >>
```

Whirlpool Cloud (Arrayent Utility App)

Utility Application msudev Logout

Devices **Monitor and Control** Alerts Customer Info

DEVICE MONITOR AND CONTROL

Device Code: Device Id: 100050058 Device Type: Generic_Appliance

Device is offline

ATTRIBUTE NAME	ATTRIBUTE DISPLAY NAME	ACTIVE VALUE	UPDATE TIME	
AntennaRSSIValueA	Wifi RSSI Antenna value A		?	View History
AntennaRSSIValueB	Wifi RSSI Antenna value B		?	View History
ApplianceRemoteControlStatus	Appliance Remote Control Status 0 = Remote Control Disabled, 1 = Remote Control Enabled, 2 = Radio Turned Off		?	
ApplianceSmartGridCompliance	Appliance complying with Smart Mode 0-comply,1-user override, 2-appliance override		?	
ApplianceSmartGridMode	The Smart Mode the Appliance is currently in		?	
BoardPartNumber	ECM Board Part Number		?	
BoardRevisionNumber	ECM Revision Number		?	
Brand	Brand of appliance	Undefined	03/30/2014 04:01:24 UTC+0000	
Category	Appliance Category / Type	Unknown	03/30/2014 04:01:24 UTC+0000	
DeviceInformationChanged	Device Information Changed		?	
DeviceInformationEmpty	Device Information Empty	1	03/30/2014 04:01:24 UTC+0000	
FaultCodeDetails	Appliance Fault Code Details		?	View History
GetAntennaSelector	Set to 0 for Antenna A; set to 1 for Antenna B		?	
GetApplianceRemoteControlStatus	Get Appliance Remote Control Status Trigger		?	
GetCommModuleInformation	Get Comm Module Info Trigger	1	03/30/2014 04:00:52 UTC+0000	
GetDeviceInformation	Get Device Info Trigger	1	03/30/2014 04:01:23 UTC+0000	
MAC_Address	ECM MAC Address attached to appliance		03/30/2014 04:01:24 UTC+0000	
ModelNumber	Model Number of Appliance		?	
online	Appliance online status	<input type="radio"/> ON <input checked="" type="radio"/> OFF	03/30/2014 21:19:56 UTC+0000	
password	password		?	
ProjectReleaseNumber	ECM Project Release Number		?	
PublishSmartGridMode	PublishedSmartGridMode SmartGridMode DurationHours Duration Minute OffsetHours OffsetMinutes PendingSmartGridMode		?	
PushNotificationCode	Push Notification Code - Enumerated List of Notifications		?	
PushNotificationString	Push Notification String Text String from Appliance		?	
ReasonCode	Generic return code app cmds		?	



What's left to do?

- “Beautify” the front end
- Work out the kinks in the Cloud interface
- Large scale testing for quality assurance purposes
- Provide more detailed documentation
- General bug fixes

