How to Earn IPv6 Certifications (Windows Version: Fast)

Why?

IPv6 is coming, whether we like it or not. We all need to learn it, and the sooner we do that, the better. This page will guide you through getting the Hurricane Electric IPv6 Certifications, which demonstrate that you have learned both the theory and practice of using IPv6 on each of these systems:

- Web client
- Web server
- Email server
- DNS server

Each 10 Hurricane Electric points are worth one point in CNIT 60. If you make it all the way to Guru, you get 1000 points from Hurricane Electric, a total of 100 points.

These instructions take you to Administrator level, which is worth 25 CCSF points.

Macintosh Instructions

For detailed Mac instructions, see https://robpickering.com/2011/02/how-to-become-a-certified-ipv6-technician-part-one-424

Windows Versions

I recommend using Windows XP, Vista or 7, a professional version or higher. Lower versions make these projects more difficult. However, it can be done. If you want to try it, see:

Tips for Windows Home Edition Users

Step 1. Registering at Hurricane Electric

Go to http://ipv6.he.net/certification/. In the upper left, click the **"Register"** button. Fill in the form to create an account. Check your email to get your login information, and log in at http://ipv6.he.net/certification/. You should see a badge at the right of the page with your user name and the message **"No Cert Yet"**, as shown below on this page.
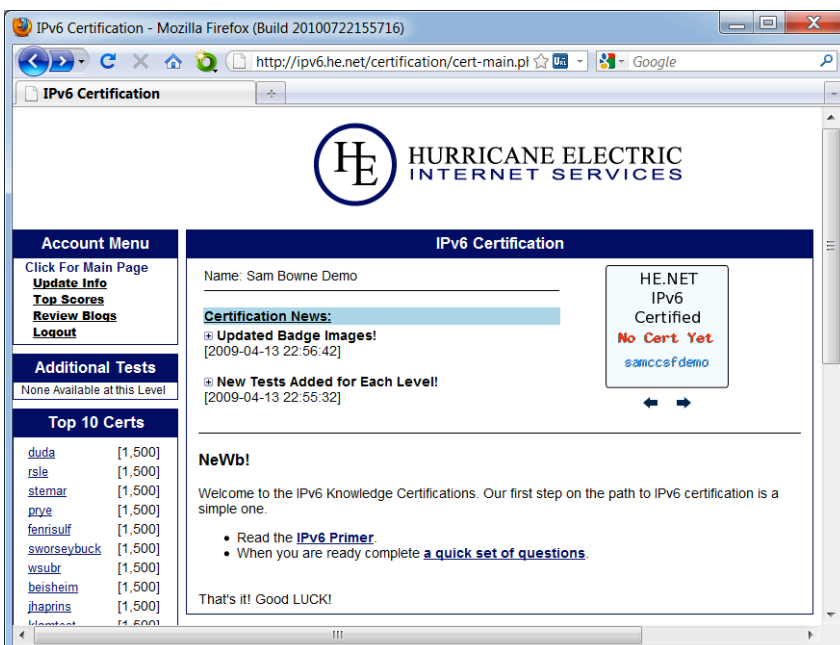
At the upper left of this page, click "**Update Info**". Change your password to something you can remember.

At the upper left of this page, click "**Click For Main Page**".

Step 2. NeWb Test

In the **NeWb!** section, click the "**IPv6 Primer**" link and study the primer. Then click the "**questions**" link and take the test.

When you return to the main page, you should see that your badge has changed to **Newbie**, as shown to the right on this page. Click your badge to see your score: you now have 25 Hurricane Electric points, which are worth 2.5 points in my classes.

Static Image
HE.NET
IPv6
Certified
Newbie
samccsfdemo
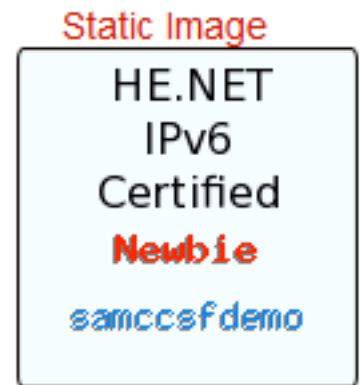
Step 3. Explorer with Gogo6 Tunnel

Since you probably only have IPv4 Internet service, the easiest way to get on IPv6 is to use a Tunnel Broker--a service that converts IPv4 traffic to IPv6. The easiest one is Gogo6. You could use http://www.sixxs.net/ or http://www.tunnelbroker.net/, but they are harder to set up. In these instructions, I assume you are using Gogo6.

Go to http://gogo6.com/. At the upper right of the page, click "**Freenet6**". On the next page, click **Sign Up**. Fill in the form to create an account. You will have to read your email and click a link to verify your account, and also fill out a profile form.

Go to http://gogo6.com/ and, at the top of the page, click "**Freenet6**". Your name should appear at the upper right of the page--Freenet has recorded your ID with a cookie. In the "Freenet Services" section, click the **Download** button.

The next page offers several versions to download. Download the "gogoCLIENT - Basic version" and install it with the default options.

Now you need to create a Freenet6 Tunnel account. In your browser, on the "Download" page, at the top, click the "**Freenet6**" link. scroll down to the "Freenet6" section and click the "**Learn more**" link, as shown below on this page.

On the next page, scroll down to the "Getting started" section, and click the "**here**" link, as shown below on this page. Fill out the form to get a Freenet6 account.
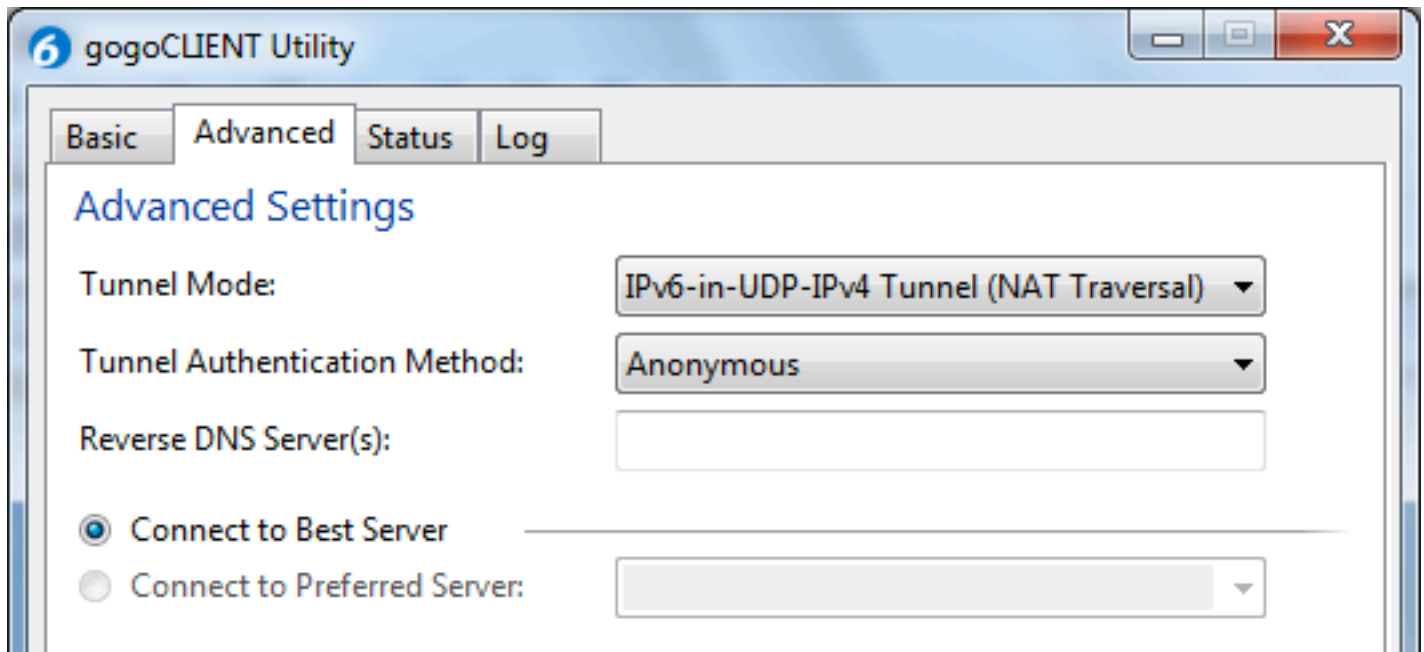

Freenet6
Freenet6 is an IPv6 access service solution for a smooth and increme from behind any NAT device or fro name are assigned to each user, m assigned to a router, enabling the

● LEARN MORE

Getting started
In order to get started download the gogoCLIENT from the download page and install it and then just press connect. It is that simple to get IPv6.
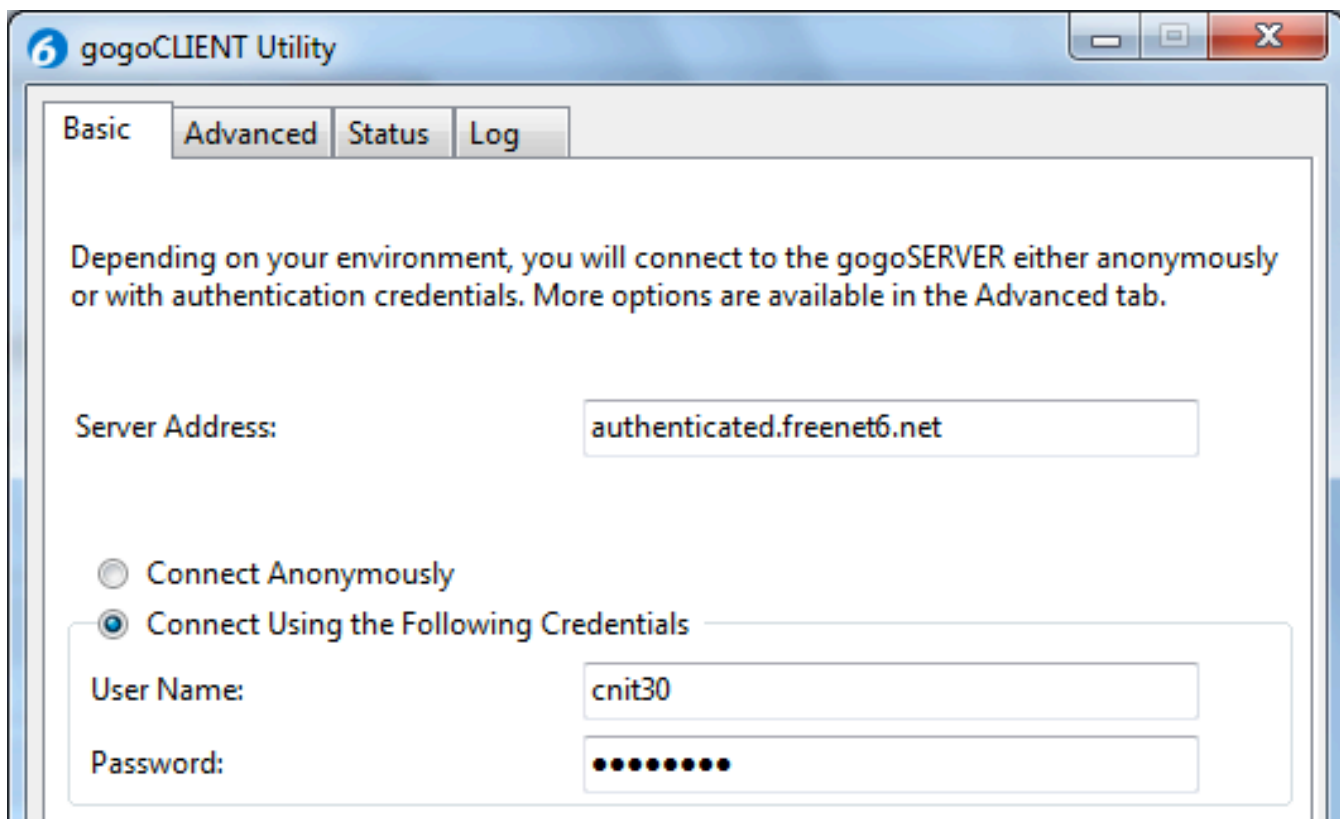
If you want to get a static IPv6 address or get a /56 network you need to get an account on the Freenet6 server. Click here to register. This is different from your gogoNET login.
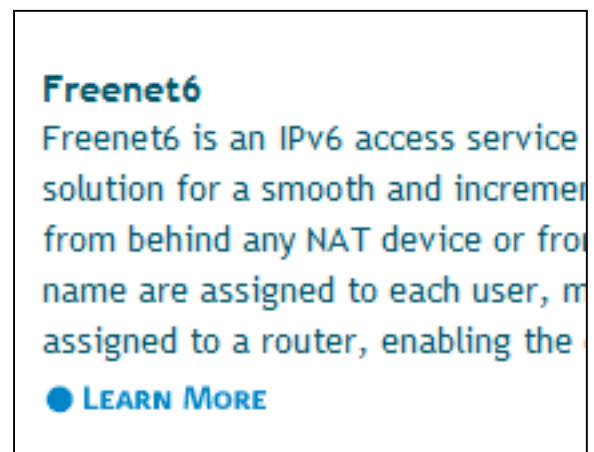
When the gogoCLIENT is installed and running, click the "**Advanced**" tab, and select a "Tunnel Mode" of "**IPv6-in-UDP-IPv4 Tunnel (NAT Traversal)**" as shown below on this page. Click "**Apply**". This is the best choice because it works almost everywhere--even at Starbuck's. Unfortunately, it won't work on CCSF's wireless network at the moment, because it uses UDP Port 3653 which is blocked. So if you do this project on campus, you will need to connect with wired Ethernet, at least at present.

gogoCLIENT Utility

| Basic | Advanced | Status | Log |

Advanced Settings

Tunnel Mode: IPv6-in-UDP-IPv4 Tunnel (NAT Traversal) ▼

Tunnel Authentication Method: Anonymous ▼

Reverse DNS Server(s):   [ ]

◉ Connect to Best Server

○ Connect to Preferred Server: [▼]

In the gogoCLIENT window, click the "**Basic**" tab. Change the "Server Address" to **authenticated.freenet6.net**

In the middle of the window, click the "**Connect Using the Following Credentals**" button. Enter your Freenet6 username and password. Click the "**Connect**" button. A box will pop up asking "Save changes before connecting?". Click **Save**.

gogoCLIENT Utility

| Basic | Advanced | Status | Log |

Depending on your environment, you will connect to the gogoSERVER either anonymously or with authentication credentials. More options are available in the Advanced tab.

Server Address: authenticated.freenet6.net

○ Connect Anonymously
◉ Connect Using the Following Credentials

User Name: cnit30

Password: ••••••••

Click the "**Status**" tab. When it connects, you should see a long IPv6 "Local Endpoint Address", as shown below on this page. If you cannot connect, you may have to adjust your router or firewall to allow UDP port 3653.
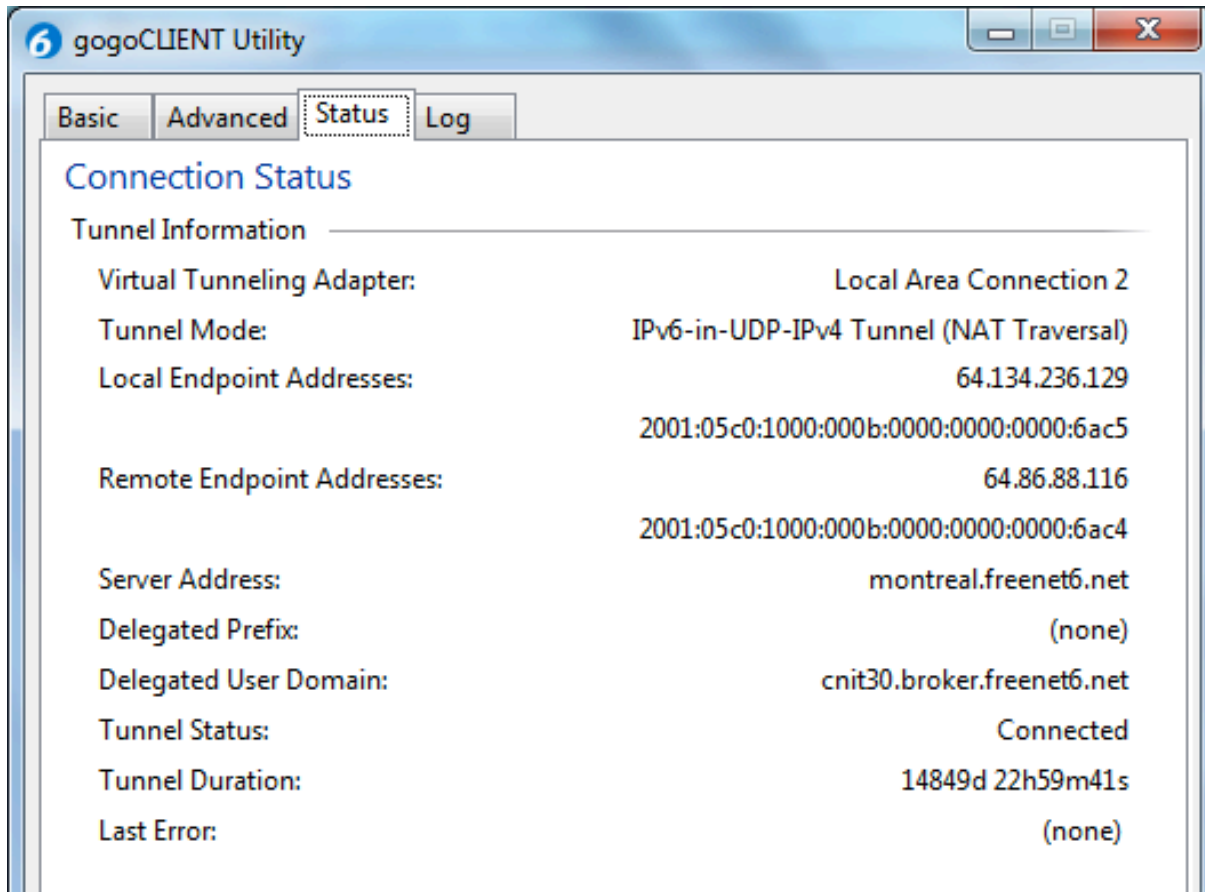
If it's not still open, go to http://ipv6.he.net/certification/ and log in.

If you don't have IPv6 connectivity, you will see this:

But if you do have an IPv6 connection, you pass the test immediately and see this:

Explorer

In the Explorer level, we will need to check if you have IPv6 connectivity:
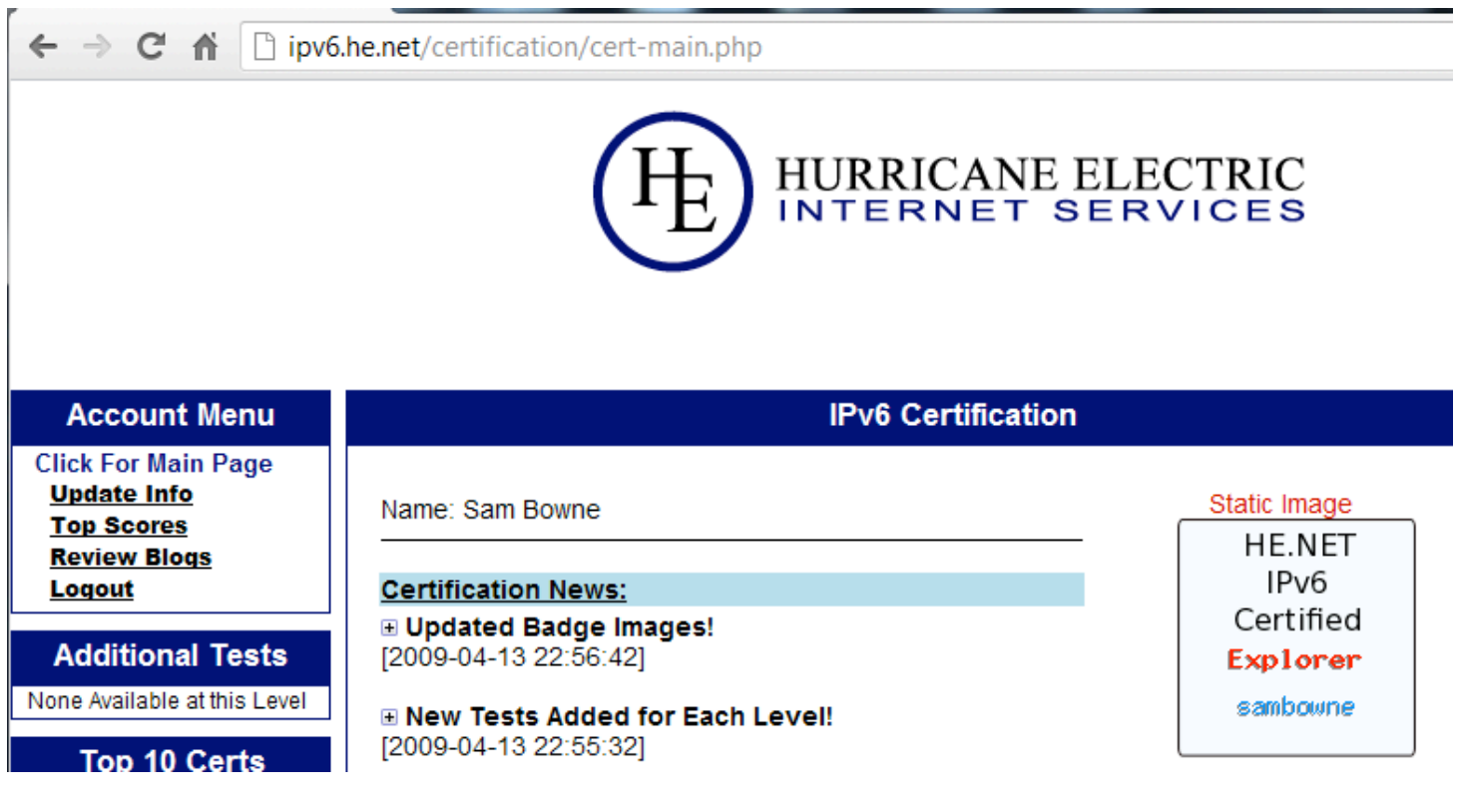
IPv6 **Explorer Test Result:**
Passed

done

Click the **done** button.

Your badge should now show **Explorer**, as shown below. Click your badge to see your score: you now have 75 Hurricane Electric points, which are worth 7.5 points in my classes.

ipv6.he.net/certification/cert-main.php

HE HURRICANE ELECTRIC
INTERNET SERVICES

Account Menu	IPv6 Certification
Click For Main Page	

Account Menu
Click For Main Page
Update Info
Top Scores
Review Blogs
Logout

Name: Sam Bowne

Certification News:
⊞ **Updated Badge Images!**
[2009-04-13 22:56:42]

⊞ **New Tests Added for Each Level!**
[2009-04-13 22:55:32]

Additional Tests
None Available at this Level

Top 10 Certs

Static Image
HE.NET
IPv6
Certified
Explorer
sambowne

Step 4. Enthusiast with IIS Web Server (25 CCSF Points)

The next level requires you to have your own domain name and a working Web server.

Installing IIS

IIS (Internet Information Services) is the Microsoft's Web server. On your Windows 7 desktop, click **Start**, type in **Prog**, and click "**Programs and Features**".

Click "**Turn Windows features on or off**". Click the "Internet Information Services" box, as shown below on this page. Click OK. Wait until IIS is installed.
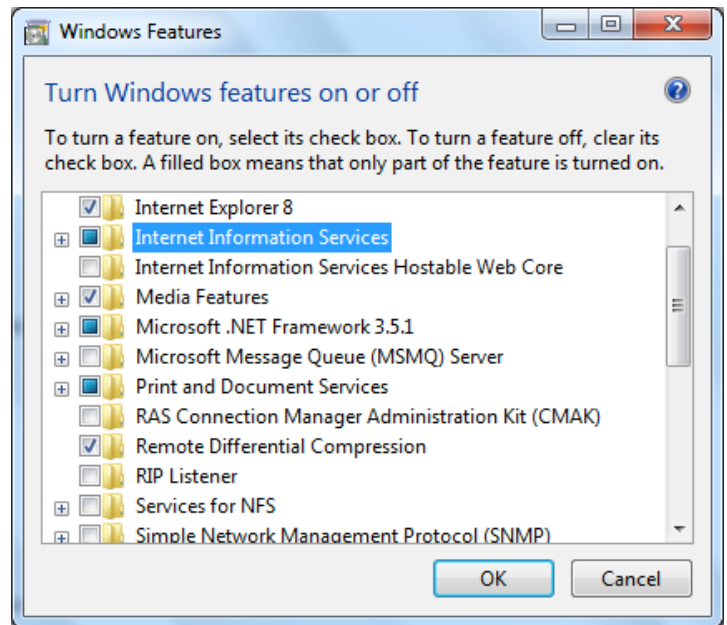
In a Web browser, go to **127.0.0.1**

You should see an IIS Welcome page, as shown below on this page. This shows that IIS is listening on port 80 of IPv4.

Open a Command Prompt and type in the **NETSTAT -AN** command. Scroll back to see the TCP Listening ports. You should see the IPv6 address **[::]** Listening, as shown below on this page. This means that your Web server is serving pages over every IPv6 address.
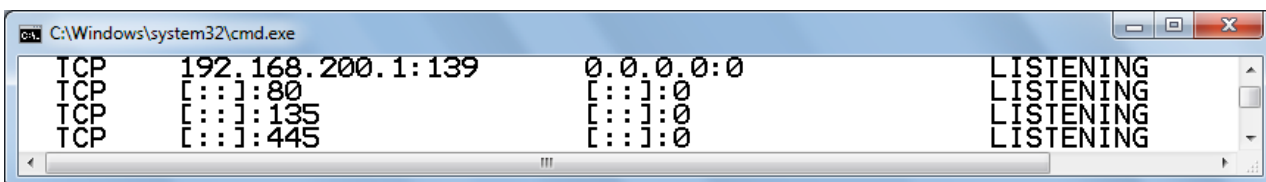
Registering a Domain Name at GoDaddy

The best way I found to do this is to spend $11.99 of real money (price as of 9-30-12). I couldn't find a free service that was good enough. Even most paid services aren't really good enough to get you all the way to IPv6 Sage level, because they don't have full IPv6 functionality including glue records (glue records will be explained later).

Go to godaddy.com. In the middle of the page, type your desired domain, and choose a top-level domain. I recommend using **.info** because I know there are top-level glue records for it. But as time passes, more and more top-level domains will have full IPv6 compatibility, so other choices will become OK. Click **Go**.
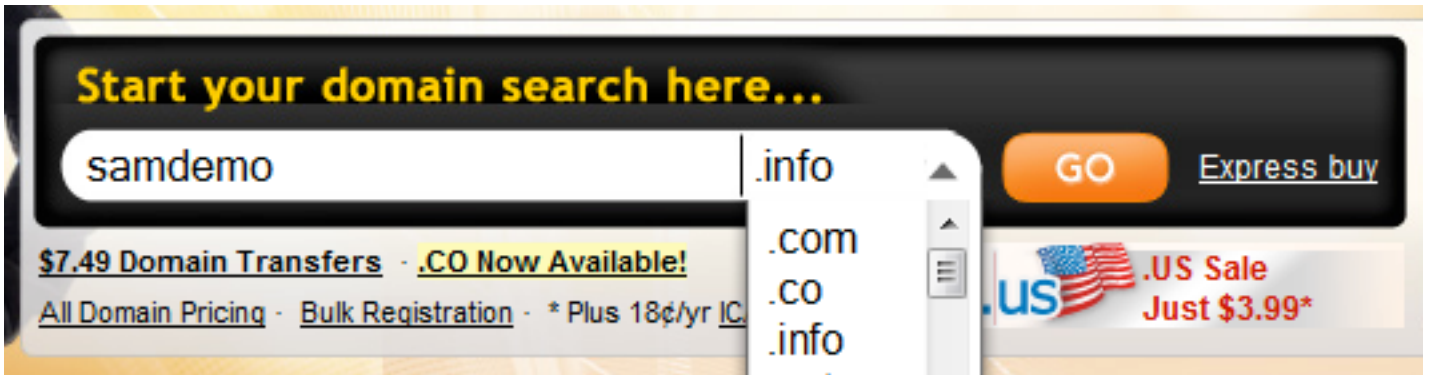

If the domain is available, buy it. You will need a credit card and $11.99 of real money to get a **.info** domain for one year. You will have to enter your real email address, and GoDaddy will offer you a lot of extra features like other domains, email accounts, Web hosting, etc. For IPv6 certification you don't need any of that. You can say No to it all and only pay a total of $12.17.
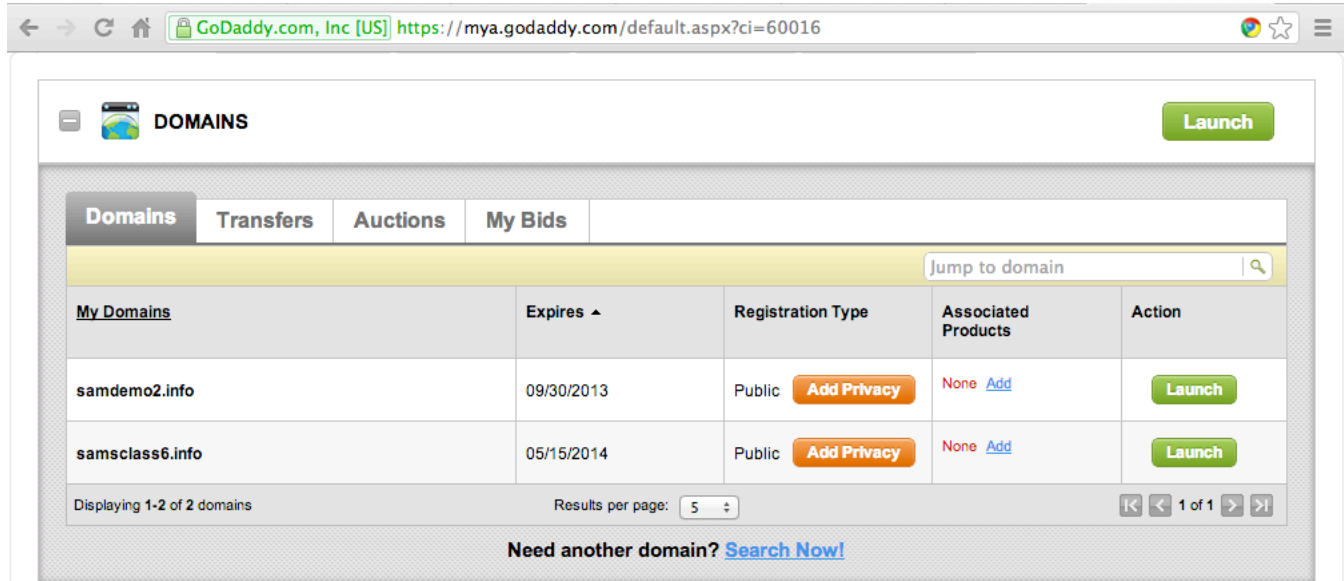
Setting your Nameservers

On the Godaddy website, at the upper left, click the black "**My Account**" button.

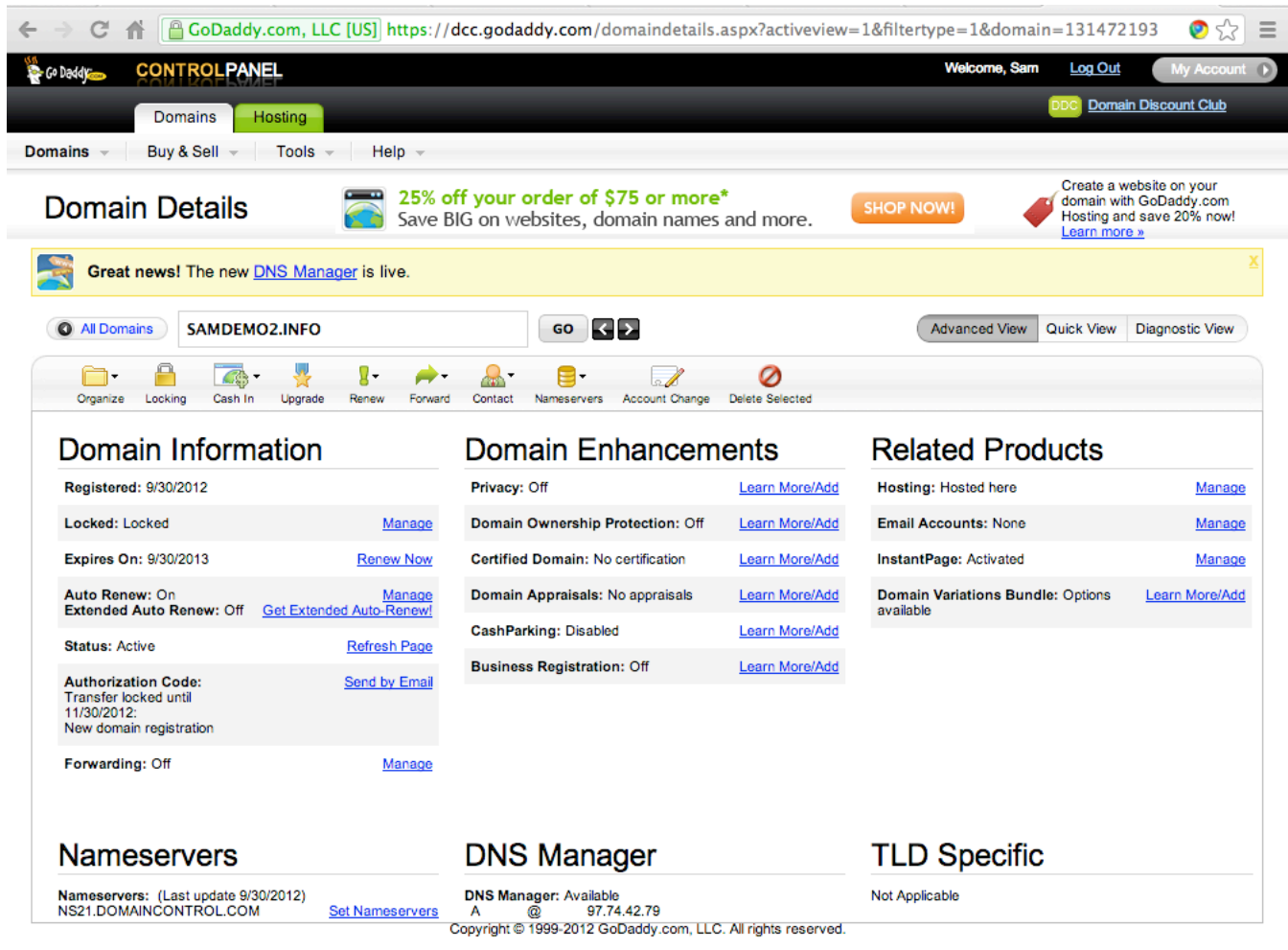A list of your products appears, as shown below:
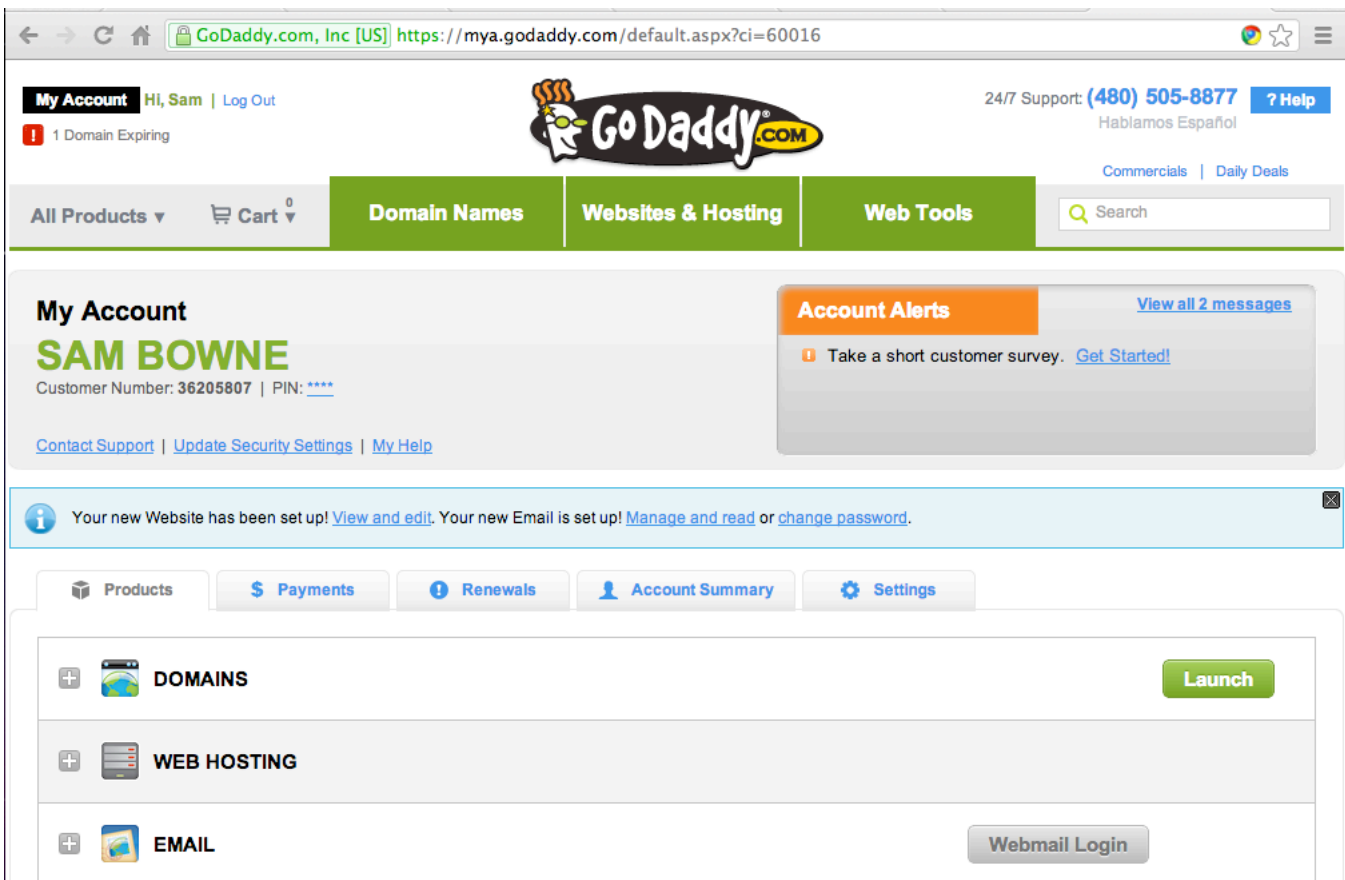
In the lower left, click the + sign in the DOMAINS row.

A list of your domains appears, as shown below:

At the right, click the green **Launch** button for your domain.

The "Domain Details" screen appears, as shown below:

At the bottom left, in the Nameservers section, click the blue "**Set Nameservers**" link.

In the "Set Nameservers" box, click the "**I have specific nameservers for my domains**" box.

Enter these values for nameservers, as shown below:

> ns5.he.net
> ns4.he.net
> ns3.he.net
> ns2.he.net

Click the **OK** button.

On the next page, click the **OK** button.

Observing DNS Propagation

In a Web bowser, go to

http://www.whatsmydns.net/

Enter your domain in the box, and select **SOA** from the drop-down list.

Click the **Search** button.

Records appear from various nameservers, showing the Start of Authority for your domain.

The "domaincontrol.com" servers are at GoDaddy. When DNS updates, you will see "he.net" servers instead.

You can proceed with the next steps even if your SOA has not yet updated to "he.net", but you won't be able to pass any more HE Certification tests till it does.

Entering your AAAA Record at Hurricane Electric

In a Web browser, go to

https://dns.he.net/

At the top left, log in with the same username and password you used for HE certification.

The "Hurricane Electric Free DNS Management" page opens.

On the left side, in the "Zone Functions" section, click "**Add a new domain**".

Enter your domain name, as shown below, and click the green "**Add Domain!**" button.

A "Zone Management" tab appears, showing your domain name.

To the left of your domain name, click the tiny pencil-and-paper icon, as shown below:

The "Managing zone" page opens, as shown below:

Click the "**New AAAA**" tab.

Enter a "Name" of **@**

In the "IPv6 Address" field, enter your Local Endpoint IPv6 address, as shown below on this page. I recommend using copy and paste from the Status tab of the gogoCLIENT utility.

Set the "TTL (Time to live)" to "**5 minutes**

Your screen should look like the example below.

Click the green **Submit** button.
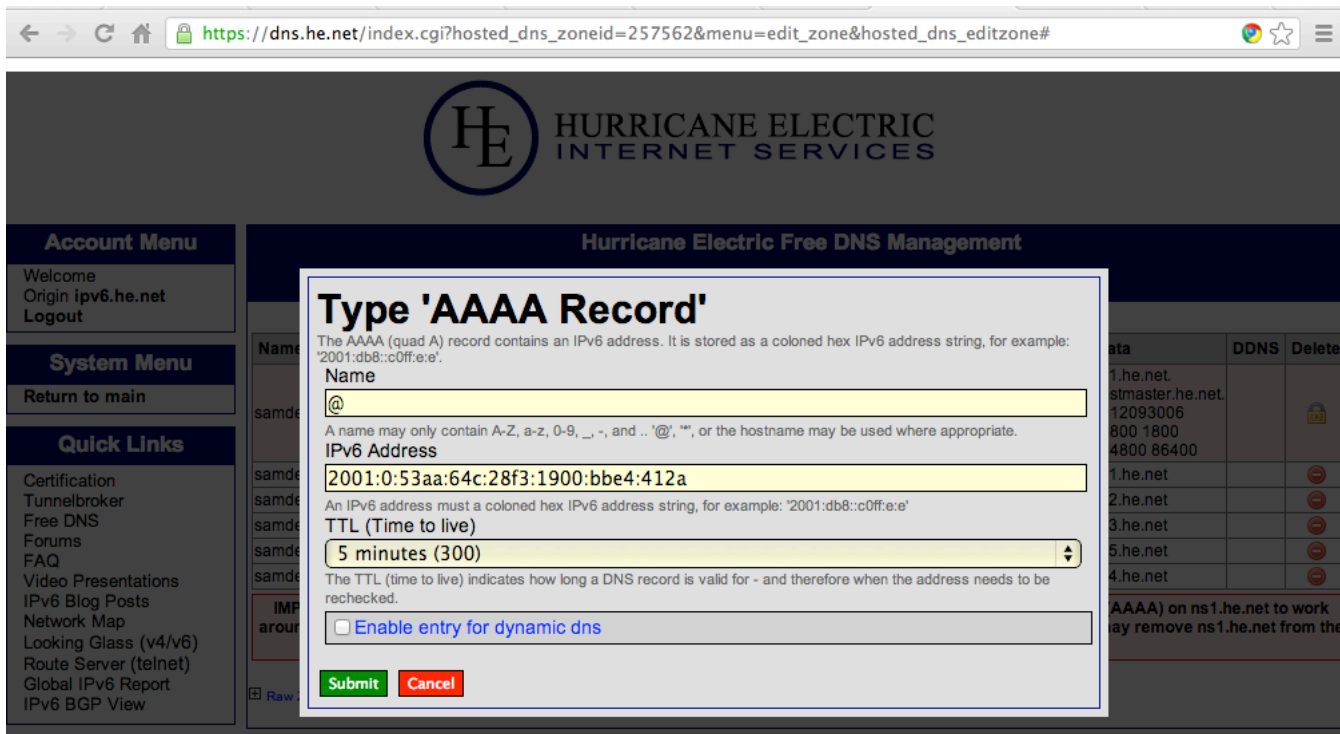
Testing your Webserver (Optional)

If you have another IPv6-connected machine handy, such as one in the S214 lab, you can easily test your Web server.

Enter your IPv6 address in the URL bar of a Web browser, enclosed in square brackets, with an http:// in front of it, like this:

http://[2001:5c0:1000:b::92e1]

The IIS default page should open, as shown below:

Observing DNS Propagation

In a Web bowser, go to

http://www.whatsmydns.net/

Enter your domain in the box, and select **AAAA** from the drop-down list.

Click the **Search** button.

You should see the correct IPv6 address for your domain on at least some of the domain servers, as shown below.

Completing the Hurricane Electric Enthusiast Test

In Firefox, go to http://ipv6.he.net/certification/ and log in.

In the **Enthusiast** section, type your domain name (the one you registered at GoDaddy) and click the "**Get a User Code**" link. Click the "**here**" link to continue with the test. Click the "**Create URL**" button.
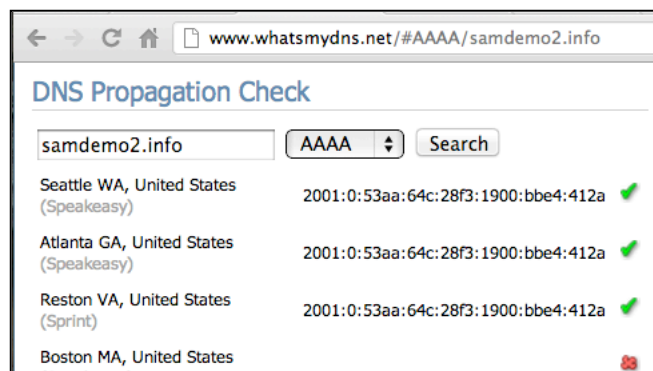
Enthusiast

Congratulations, Explorer! Let's get you on to being an Enthusiast as quick as possible. Let's certify that you have the basics of IPv6 setup. To complete this test you will need:

- An IPv6 capable desktop
- An IPv6 capable website/webserver
- The Domain you provide below will be used in future DNS tests.

[Reset Test]

Help	Step	Description	Data	
ℹ	[1]	Generate a User Code		**Get a User Code**
ℹ	[2]	Tell us what your IPv6 website is; FQDN please	http:// [samdemo.info]	/
ℹ	[3]	We will test grabbing the file:		Create URL
ℹ	[4]	Schedule the test:		Test It!

Now you should see a URL in line [3], something like this:

http://samsdemo.info/Se35fg48.txt

You need to create a file with that name. The filename does not include **http** or your domain name--in the example above, the correct filename is:

Se35fg48.txt

Yoh need to create that file in your Web server's home directory, which is **C:\Inetpub\wwwroot**. You don't have permission to write to that folder by default, but the Administrator does, so the easiest way to make the file you need is to use an Administrator Command prompt and execute this command:

echo 1 > c:\inetpub\wwwroot\Se35fg48.txt

In the Hurricane Electric Web page, click the "**Test It!**" button.

If you pass the test, you will see the "Enthusiast Questionnaire", as shown below on this page.

If you can't pass the test, try these debugging tips:

- Turn off your firewall.

- Test your AAAA record here: http://www.whatsmydns.net/

- Run Wireshark on your Web server, and try the Hurricane Electric test again. Look to see if the HTTP GET ever reaches you, and what response the Web server gives.

- Use a different machine with a Gogo6 tunnel and try opening your web site with a browser from there by entering your domain name, and using a literal IPv6 address in the URL like this: **http://[2001:5c0:1000:b::6ac5]**

Here's the Enthusiast test you need to fill out.

Enthusiast Questionnaire

Test Description: These are a few questions to gauge interest and usage data as to your experiences with IPv6 deployments.

What features of IPv6 do you see yourself using?

When you complete the questionnaire, click the "Here" link to return to the main page.

Your badge should now show **Enthusiast**, as shown to the right on this page. Click your badge to see your score: you now have 150 Hurricane Electric points, which are worth 15 points in my classes.

Static Image

HE.NET
IPv6
Certified
Enthusiast
samccsfdemo

Step 5. IPv6 Email Server (25 CCSF Points)

Installing the Apache James SMTP Server

In Firefox, go to

https://olex.openlogic.com/packages/apache-james

Click the "**Versions & Downloads**" tab. On the left side, section, click **2.3.1**. In the "Apache-james 2.3.1 binary" line, click the "**Download Now**" button. Save the file on your desktop.

Download(s) for this Version:

Platform ▾	Name	Date Published	Filesize		
All	Apache-james 2.3.1 Binary	2009-02-28	7.3 MB	MD5	Download Now
All	Apache-james 2.3.1 Source	2009-02-28	7 MB	MD5	Download Now

On your desktop, right-click the openlogic-apache-james-2.3.1-all-bin-1.zip file and click "**Extract All**". Click **Extract**. Double-click the **openlogic-apache-james-2.3.1-all-bin-1** folder to open it. Double-click the **apache-james-2.3.1** folder to open it. Double-click the **bin** folder to open it. Double-click the **run.bat** file.

> *Note: If the window flashes briefly and vanishes, that usually means you don't have Java installed. Open a browser, go to **java.com**, and install it.*
>
> *Another common reason it closes is that you did not extract the zip file, and you are attempting to run the file inside a Zip folder. That won't work.*
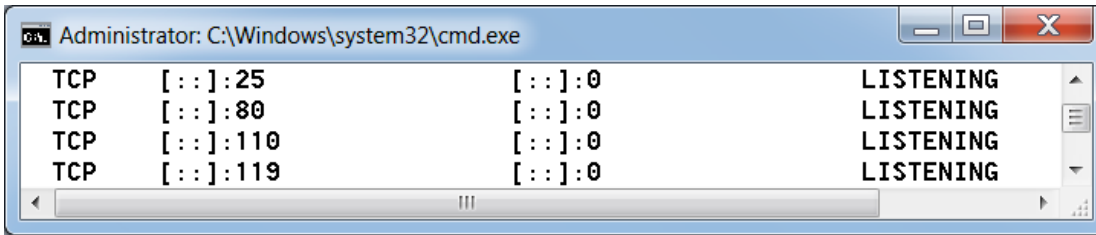
A Command Prompt window opens, and you see some messages, ending with the messages shown below on this page.

Open another Command Prompt window execute this command:

```
Phoenix 4.2

James Mail Server 2.3.1
Remote Manager Service started plain:4555
POP3 Service started plain:110
SMTP Service started plain:25
NNTP Service started plain:119
FetchMail Disabled
```

      NETSTAT -AN | MORE

You should see the IPv6 address **[::]** Listening on port TCP 25, as shown below on this page. Your email server is ready!


```
Administrator: C:\Windows\system32\cmd.exe
  TCP      [::]:25              [::]:0               LISTENING
  TCP      [::]:80              [::]:0               LISTENING
  TCP      [::]:110             [::]:0               LISTENING
  TCP      [::]:119             [::]:0               LISTENING
```

Now you need to add a mail user account to James. To do that, in the Command Prompt window, type this command, followed by the Enter key:

> **telnet localhost 4555**

Windows Features

Turn Windows features

To turn a feature on, select its off, clear its check box. A filled the feature is turned on.

☑ Telnet Client
☐ Telnet Server

> > Note: if you get a message saying "'telnet' is not recognized as an internal or external command, operable program or batch file.", that means Telnet is not installed.
> >
> > To install Telnet, open Control Panel and click "**Programs and Features**". Click "**Turn Windows features on or off**". Check "**Telnet Client**", as shown to the right on this page. Click **OK**.
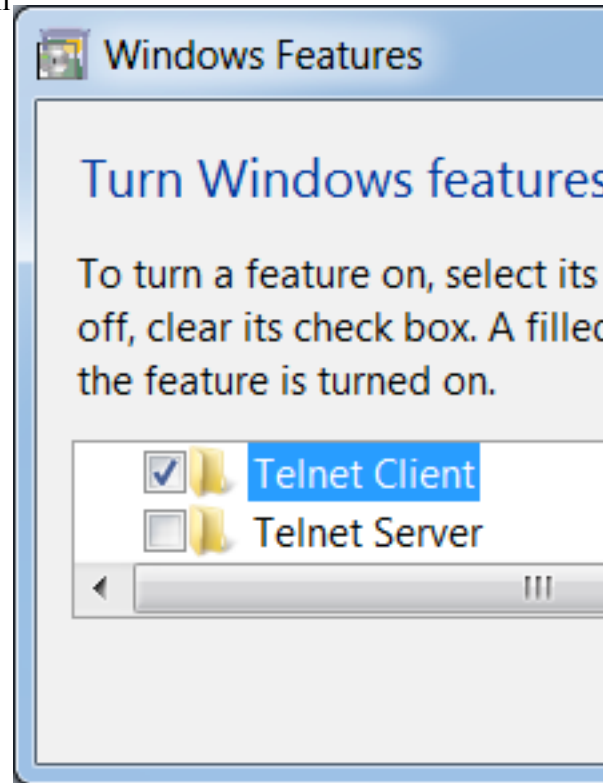
Log in with the use name **root** and a password of **root**. When you see the "Welcome root. HELP for a list of commands" message type this command followed by the Enter key:

> **adduser admin password**

This adds a user named **admin** with a password of **password**.

Type this command followed by the Enter key:

> **quit**

Configuring James

In the Command Prompt window that is running James, press Ctrl+C. When you see the message "Terminate batch job (Y/N)?", type **Y** and press Enter.

Nagivate to the openlogic-apache-james-2.3.1-all-bin-1\apache-james-2.3.1\apps\james\SAR-INF folder and open the config.xml file in Wordpad.

There are two changes you need to make in this file. First, in the servernames section, you need to add a line with your domain name, as shown below on this page.

```
        <servernames autodetect="true" autodetectIP="true">
   <!-- CONFIRM? -->
          <servername>localhost</servername>
          <servername>samdemo.info</servername>
       </servernames>
```

Second, in the dnsserver section, you need to change the default entry of 127.0.0.1 to a real DNS server. I used Google's free server at 8.8.8.8, as shown below on this page.

```
    <dnsserver>
        <servers>
            <!--Enter ip address of your DNS server, one IP address
    per server -->
            <!-- element. -->
            <!--
             <server>8.8.8.8</server>
            -->
        </servers>
```

After making the changes, save the config.xml file and close Wordpad.

Then start James, as you did before: In the **bin** folder, double-click the **run.bat** file.

Adding an MX Record to your DNS Zone

In a Web browser, go to

https://dns.he.net/

At the top left, log in with the same username and password you used for HE certification.

The "Hurricane Electric Free DNS Management" page opens.

A "Zone Management" tab appears, showing your domain name.

To the left of your domain name, click the tiny pencil-and-paper icon, as shown below:

The "Managing zone" page opens. Click the "**New MX**" tab.

Enter a "Name" of **@**

Enter a "Priority" of **10**

Enter a "Hostname" of **@**

Select a "TTL (Time to live)" of **5 minutes (300)**

Your screen should look like the image below. When it is correct, click the green **Submit** button.
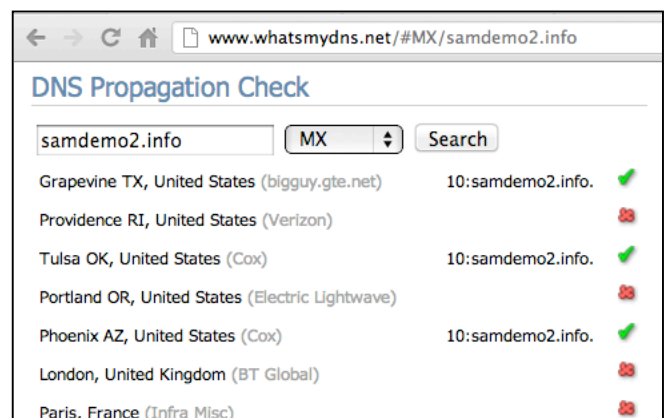

Observing DNS Propagation

In a Web bowser, go to

http://www.whatsmydns.net/

Enter your domain in the box, and select **MX** from the drop-down list.

Click the **Search** button.

You should see the correct MX record for your domain on at least some of the domain servers, as shown below.

Completing the Hurricane Electric Administrator Test

In Firefox, go to http://ipv6.he.net/certification/ and log in.

In the **Administrator** section, Click the "**Generate It!**" link. Enter the email address **admin@yourdomain.info** in the box below the "Generated" message, as shown below on this page. Use your own domain name. Click the "**Send It!**" button.

Administrator

Congratulations, you are an IPv6 Enthusiast! The next step after geting your website online is to make it so you can receive email via IPv6. What you will need is:

- An IPv6 enabled mail system
- Note: If you have "Greylisting" enabled, either whitelist ipv6@he.net or: send, wait for your greylist timer to expire and then reset and send again. We are working on a better solution to this issue.
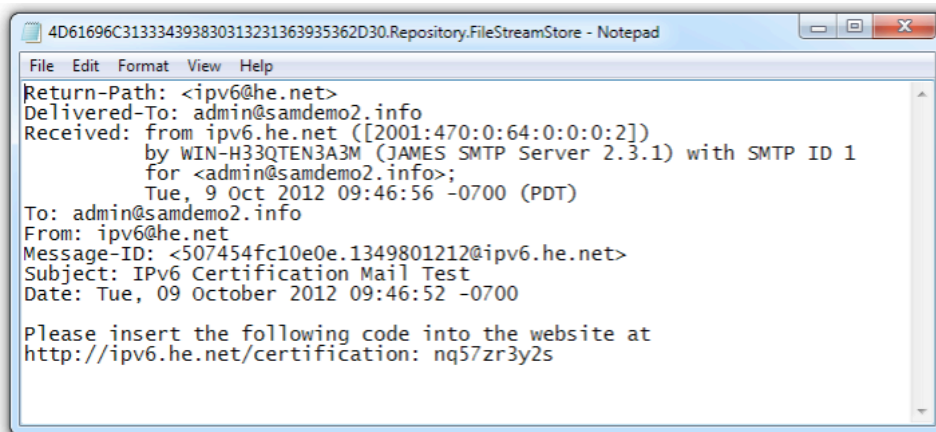
[Reset Test]

Step	Description	Data
1	Generate a New User Code	Generated
2	Tell us what your IPv6 capable email address is (Including the domain):	admin@samdemo.info
3	Schedule a test, and we will email you your new User Code	Send It!
4	Tell us what the code was:	->

Reading your Mail

In Windows explorer, navigate to the openlogic-apache-james-2.3.1-all-bin-1\apache-james-2.3.1\apps\james\var\mail\inboxes\admin folder.

You see your message, as shown below:

Open the message in Notepad to reveal the secret code, as shown below:

```
4D61696C31333439383031323136393536362D30.Repository.FileStreamStore - Notepad

File  Edit  Format  View  Help
Return-Path: <ipv6@he.net>
Delivered-To: admin@samdemo2.info
Received: from ipv6.he.net ([2001:470:0:64:0:0:0:2])
          by WIN-H33QTEN3A3M (JAMES SMTP Server 2.3.1) with SMTP ID 1
          for <admin@samdemo2.info>;
          Tue, 9 Oct 2012 09:46:56 -0700 (PDT)
To: admin@samdemo2.info
From: ipv6@he.net
Message-ID: <507454fc10e0e.1349801212@ipv6.he.net>
Subject: IPv6 Certification Mail Test
Date: Tue, 09 October 2012 09:46:52 -0700

Please insert the following code into the website at
http://ipv6.he.net/certification: nq57zr3y2s
```

In Firefox, in the http://ipv6.he.net/certification page, paste in the code from the email message. Click the **->** button.

The "Administrator Questionnaire" opens, as shown below on this page. Fill it out.

Administrator Questionnaire

Test Description:These are a few questions to gauge interest and usage level for IPv6 and gather data as to your experiences with IPv6 deployments.

Question 1

Are you enjoying the Hurricane Electric IPv6 certification process?
- ○ Very much
- ○ Somewhat
- ○ Not at all

You should now be an Administrator, with a badge like the one shown below on this page. Click the badge to see your score: it is now 245, worth 25 points in any of my CCSF classes.

IPv6 Certification Scorecard

Username: sbowne3   Current Score: **245**

HE.NET
IPv6
Certified
Administrator
sbowne3

⊞ **Newbie Test** ; Score: 5 / 5

⊞ **Enthusiast Test** ; Score: 1 / 1

⊞ **Administrator Test** ; Score: 1 / 1

⊞ **Enthusiast Questionnaire** ; Score: 5 / 5

⊞ **Administrator Questionnaire** ; Score: 4 / 4

⊞ **Explorer Test** ; Score: 1 / 1

To claim your points, save a screen image showing your Administrator status and email it to cnit.60@gmail.com. Use a subject line of "**IPv6 Cert Windows 1 from YOUR NAME**".

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