

IoT Labs and Equipment List

Labs	Hardware / Software Needed
Setup a VPN Enabled Network 1. Using DD-WRT w PPTP and OpenVPN endpoints 2. Using a Raspberry PI running OpenVPN	<ul style="list-style-type: none"> • Laptop Computers (easier to setup and use, but desktops could be used as well) • DD-WRT capable routers / APs • Raspberry PIs with Monitors / Keyboards • Ethernet cables
NAS Servers 1. FreeNAS 2. Open Media Vault 3. Xpenology	<ul style="list-style-type: none"> • Computers that can run multiple VMs (8GB+ RAM) * • Computers that can be used as a client (can be the same computer if memory is sufficient)
Media Servers and Home Theatre Media Distribution 1. Plex Server (running in Linux) 2. SageTV 3. Server Devices (Roku, AppleTV, Amazon Fire, etc)	<ul style="list-style-type: none"> • Computers that can run multiple VMs (8GB+ RAM) * • Computers that can be used as a client (can be the same computer if memory is sufficient) • Raspberry PIs / TV Monitors / Remotes with Rasplex • Roku Players <ul style="list-style-type: none"> ○ Optional Apple TV, Amazon Fire TV, Chromecast • iPads and Android tablets • Antennas • AV Amplifiers • Speakers • Blu-ray Players • Televisions that support HDMI
VoIP Server and Telephony 1. Using FreePBX 11 Asterisk Server 2. Using 3CX and Zoiper Softphones	<ul style="list-style-type: none"> • Computers that can run multiple VMs (8GB+ RAM) * • Computers that can be used as a client (can be the same computer if memory is sufficient) • Headphones with Microphones • Webcams <ul style="list-style-type: none"> ○ Optional Hard phones (Polycomm, Linksys, etc) With PoE Switches
Surveillance Services 1. iSpy 2. xProtect 3. Blue Iris 4. Zoneminder (Linux)	<ul style="list-style-type: none"> • Computers that can run multiple VMs (8GB+ RAM) * • IP Cameras • PoE Switches • iPads and Androids

<p>Environmental Systems</p> <ol style="list-style-type: none"> 1. Lighting 2. Thermostat 3. Door Lock and Security 4. Motion Detectors 	<ul style="list-style-type: none"> • Laptop Computers (easier to setup and use, but desktops could be used as well) • IoT Lighting <ul style="list-style-type: none"> ○ Hue ○ GE Wink ○ Osram Lightify • Thermostats <ul style="list-style-type: none"> ○ Honeywell ○ Nest ○ Ecobee • Door locks from Kwikset and Schlage • Ring Doorbell • Samsung SmartThings Hub Kit • Wink Controllers • iPads and Android Tablets
<p>Controllers</p> <ol style="list-style-type: none"> 1. Logitech Harmony 2. Amazon Echo 	<ul style="list-style-type: none"> • Logitech Harmony Elite Remotes • Amazon Echo Dots • iPads and Android Tablets
<p>Custom Automation Programming</p> <ol style="list-style-type: none"> 1. Home Assistant (Open Source Raspberry Pi based) 2. Samsung SmartThings Hubs 	<ul style="list-style-type: none"> • Raspberry Pis • Amazon Echo Dots • Samsung SmartThings Hubs • Logitech Harmony Remotes • Environmental Systems (from above lab) • iPads and Android Tablets • Laptop Computers (easier to setup and use, but desktops could be used as well)
	<p>* For VMs it would be even better if a ESXi host being used for Netlab be available to use to hold all of the VMs that will be used during the class.</p>

Classroom Network Setup

The class will be broken up into groups of 3-4 (2 if there's enough equipment to go around).

The optimal way to setup the lab would be to have the room use a single network connection from the campus network (with only Internet access ... but no outbound ports blocked) and then within the lab use a separate router and switch for connecting all of the "things" together. Even better if every group could have its own router connected to the "room's router" and therefore each group could be in its own little sandbox.

The groups will rotate around the labs so that we can work with 4 sets of equipment, but still have all of the groups work on different labs and then they'll rotate around so that everybody will have a chance to work on all of the labs