ICT Educator Webinar Series

Virtual Labs: NETLAB+ Updates & Cybersecurity Competitions

September 13, 2019

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Welcome

STEVE WRIGHT: Thank you. Welcome, everybody, to the ICT Educator Webinar Series. It's a place where we hope you can experience exceptional conference-quality presentations in real time and participate. Or, if you prefer to watch our archived sessions, we take each video and chapterize it and post it on our website along with a printed transcript of the session and any presentation slides that we have or other associated materials.

Thanks to our producer Nicole Sherman for putting all that together on the website, which she tries to get all of it together within about a week after these sessions, and she tries to get it all there at the same time instead of piecemeal. So, in about a week from now, you'll be able to have a complete package. We think that's really valuable. We have a lot of historic ones from last spring you might want to take a look at.

Upcoming Webinars

SEPTEMBER 20
Choosing the Right Cybersecurity Activities for Your Campus

SEPTEMBER 27
3 Ways Your Campus Can Offer Industry Certification Exams

OCTOBER 4
How Business Engagement Informs Guided Pathways

OCTOBER 11
Using the Haiku Cyber Range for Cybersecurity Training

OCTOBER 25
Save Money on Certifications with CompTIA's Academy Partner Program

[00:00:57]

STEVE WRIGHT: Coming up in the next few weeks, you can see on the slide…

I want to highlight a little bit next Friday. **We'll be looking at some of our formerly called DSN/now called Regional Directors of Industry Engagement**, their experience with working with K-12 in cyber competitions, whether it's Cyber Patriot or the Cyber Camps or the Mayor's Cup, and how they handle that.

Then, we're going to split the second half of the presentation—it's going to be **Dan Manson and Franz Payer from National Cyber League** talking about the competitions for community college students that they're championing with their platform.

Then, finally, Paula Hodge will come on and talk about **the Cyber Innovation Challenges at San Luis Obispo in 2020**.

What We'll Cover Today

[00:01:44]

STEVE WRIGHT: So, next week should be really exciting, but today, we're going to hear a little bit about cyber competitions as well. I know Irvin has got his own take on that and the technology that Rich Weeks' organization brings to us enables a lot of wonderful things.

RICH WEEKS
Network Development Group

SUSAN COEFIELD
VMware, Inc.

IRVIN LEMUS
Western Academy Support and Training Center

But in order to go through the panel and introduce everybody and run that part of the show, I'd like to now introduce Shawn Monsen, who is our ICT statewide roving ICT subject matter expert, who also manages the NETLAB User Group. So, Shawn, take it away.

SHAWN MONSEN: Thanks, Steve. I'm not sure how much roving I'm doing, but I'm happy to be here today, and I'm really grateful that Rich has agreed to come and talk to us—he's always been so supportive.

This is our ICT Webinar Series specifically around virtual labs. We'll have a number of these throughout the year, and we're absolutely happy to have NDG with us today. They have done an amazing job of supporting our community colleges, and specifically Rich, who is the President of NDG, has always gone out of his way to support our NETLAB User Group, so I really appreciate him and what he does for us.

As you probably know, NETLAB is used a lot throughout California at the community colleges. **We have an active User Group, and there's lots of really great content available through our NETLAB labs.**

Specifically, today, we're going to be talking about… Well, first of all, Rich is going to give us **some updates on the NETLAB product**, and in addition to that, we're going to talk specifically about the **cyber competition elements of NETLAB**. It's a great resource for us, and it's been used at some of our community colleges by our staff, by our faculty, and we have Irvin here to talk about how he's actually using these cyber competition labs for the work that he's doing.

So, anyway, it should be a great meeting today, and there will be time for questions at the end, so if you have questions, you can either put them in the chat box or wait until the end, and we will have an opportunity to ask questions.

One last thing—Nicole will put out the link to our NETLAB User Group, so if you haven't already joined, if you would like to go out and join the NETLAB User Group, you'll get on our distribution list for NETLAB.

So, Rich, I will turn the rest of the time over to you. Thanks!

NETLAB+ User Group Update September 2019

RICH WEEKS: Thanks, Shawn. I appreciate that. I'm going to share my screen. Can somebody confirm you can see my screen just fine?

SHAWN MONSEN: Yes, we can.

RICH WEEKS: All right, terrific. Let me know if I flip the pages or the screen too fast for anybody because, obviously, I want to share a lot of information. I want to pull up chat. I'm not going to try to interact on chat while I present, but I will try to give you some helpful contact information and URLs when time allows through the chat interface, and then I'll look for questions to be answered by the end of today.

The first thing I want to highlight… **What NDG has tried to do is help the career tech education sector, and our goal is to partner with industry to help schools (STEM high schools that have vocational programs, community colleges, and universities) help people get jobs.**

What I really appreciate about what many of the people that are on this call do is you actually help somebody. If you can help somebody go from low income or zero income to income that actually helps them pay their bills, especially in certain markets in the U.S. like L.A. or California, where we see social impact issues, it can change not only their life but their family's life.

So, I really feel blessed that I've been able to do this the last twenty years, so I thank so many of you on this call. I recognize a lot of names on here, and I know you have cool programs, and there are even a couple of you I've talked to about your impact.

I won't call them out, but you'll remember the conversation. I know an instructor on this call that actually took money out of his own pocket to help homeless students, and he and I tried to figure out how to donate more to those homeless students. What I like about NETLAB is, if you host it, everything is free for your students—I love that because there are so many people that are

economically challenged. All right, with that shared, that's what we hope to accomplish. I've got a couple things I want to share with you today.

Agenda

- Three new micro-courses
- Several lab library updates for NETLAB+ host sites
- Cybersecurity examples:
  - Stanly.edu/IT-Academy – Kelly Caudle
  - Baycyber.net – Irvin Lemus

[00:06:52]

RICH WEEKS: We've been working hard with VMware to try to upgrade some of the offerings that we support for the VMware IT Academy, and one of the things that we've done that was really successful with our partnership with Cisco is we built a **micro-course that teaches the basics of Linux.**

There were some topics that kept coming up, and we asked VMware if we could work with them to do some micro-courses around those topics, and I want to go over those with you today. Those three micro-courses, I hope, will be something that will add a lot of value to many different classes. They're designed to be a chapter you can add to your LMS to any course you choose to, or you can point your students to them as self-paced.

Then, there are several lab library updates for NETLAB+, so if you're hosting a NETLAB, I've got a lot of new labs that you can either add or you can be aware of that are coming, and I'd like to share that with you.

And then, I had two cybersecurity examples—Shawn mentioned competitions. I reached out to Kelly Caudle. He supported SkillsUSA the last ten-plus years, which is a very popular

program, and he ran competitions for some high schools using our NETLAB product, and he was going to present the SkillsUSA work and competitions. Unfortunately, he had a family issue come up, so he can't be here today, so I apologize for that—we'll have to reschedule Kelly.

Then, Baycyber.net is a website that Irvin and the WASTC.org folks have stood up, but it highlights what they did this past summer. They ran a lot of **summer camps and competitions**, and Irvin is going to share that. It's pretty impressive what they pulled off this summer in their area.

Three New Micro-Courses

1. Cloud and Virtualization Concepts
2. Network Virtualization Concepts
3. Software-Defined Storage Concepts

All three are designed to be a chapter you can add to any course OR offer to self-paced learners.

RICH WEEKS: All right, so that's my agenda. Jumping right into it, we have three new micro-courses. I'll make sure you have a link in your chat, so you don't have to write any notes, and I'm sure that Nicole will share these slides with you.

Cloud and Virtualization Concepts

You may remember we came up a small course we released about two years ago called 'Introduction to Virtualization.' Well, we got feedback that a lot of students needed more around cloud—really, what you might call it is 'hyperconvergence' in the current market—so we rewrote that short course, and it's now '**Cloud and Virtualization Concepts**.' We put more cloud concepts into the content.

Now, that short course is designed, like I said earlier, to be one chapter you can add to any course. You can add it to an A+ course, IT Essentials course, Introduction to Computing course, anything you want, and it's going to teach them high-level cloud concepts to your students.

I've got some examples of slide decks that we've already built for you. I'll go through those quickly, but what we've learned is it's really helpful for instructors if we add slide decks to these short courses.

<u>Network Virtualization Concepts</u>

RICH WEEKS: Now, VMware corporation we've been partnered with has been very generous to schools. You can go to their VMware IT Academy Portal managed by Kivuto, and you can get a lot of e-books and resources.

This short course is not designed to teach students networking. What it is designed to do is to complement a networking course you might already have (NET+, Cisco) and add a chapter in that explains NSX, which is VMware's software-defined network solution, but instead of just diving into NSX, we make sure that the student gets an overview of network virtualization.

Now, the first course is designed for any student that is beginning—they can know nothing, and we'll take them from zero knowledge to a little bit of understanding about cloud and virtualization.

This Network Virtualization Concepts is not for beginning students. This is designed for a networking student that's already taking some content to get exposed to how networks are being virtualized. Now, it's really important you don't throw this chapter at a beginning student with zero knowledge because they won't get a lot of value out of it. They'll get more value out of it if they understand some networking concepts.

<u>Software-Defined Storage Concepts</u>

Now, the third one is kind of near and dear to my heart. We used to work a lot with storage training because there were not a lot of storage courses that were out there, so we had a lot of really storage-centric hands-on that you could add to any course, and we're seeing where, obviously, a lot of people are used to storage—you use it on your phone, you use it on your computer, you back up things into the cloud—but you might not understand if you're working towards an IT degree or an IT job that you really need to work with storage when you get into an IT job, and you need to understand these concepts.

This short chapter that can be added to any course where it would be relevant to teach storage is designed to highlight storage concepts that a student should be familiar with. Again, this

course can be added to any course, and it can be taught self-paced. So, all of three of these, you can enroll a student self-paced.

That's the material that I think is going to be valuable and helpful. All three courses are available on this URL: ndg.tech/VMware. I'll type it into chat for you, so you can go out there and explore if you want. You can enroll in it, or you can click the 'Teach' button. That's readily available for you to start using now.
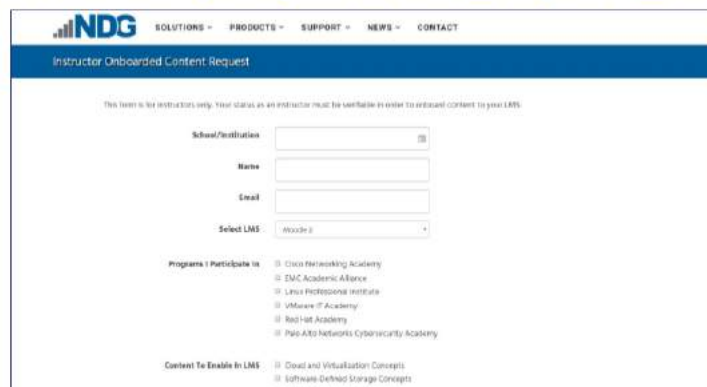
Here's the URL. You can go check all three courses. If you click on 'Learn,' if you want to enroll directly into the course. Click on 'Teach' if you want to see the slide decks and the presentations that I'm going to cover here briefly.

Add Content to Your LMS

[00:12:50]

RICH WEEKS: Now, all of these courses can be added to your own LMS. We're going to be sharing more tools, so you can add a lot of content that we offer in labs right to your LMS, if you so choose, and I'll briefly cover that in a second.

But for now, if you'll use this request form, you can ask for keys to add that content that I just covered on your LMS, and you can enter the key. Once you enter the key, whether it's Moodle or Canvas or whatever tool you're using for your LMS, you'll be able to integrate it into a course, and your students can enroll.

Now, once your students are using that content, they could come through your LMS—so, obviously, all the information is out at your location. We do ask them to provide an email and authenticate to us, so we can support them.

Micro-Course Slide Deck Demonstration
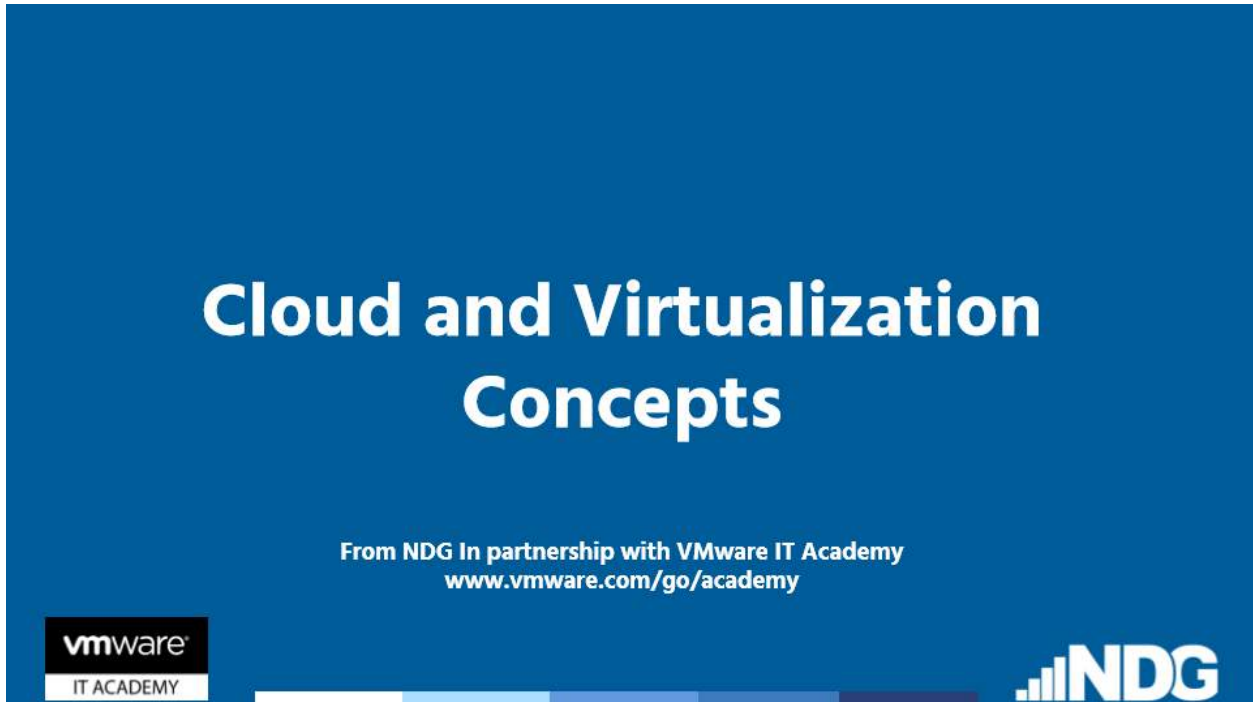
Cloud and Virtualization Concepts

[00:13:42]

RICH WEEKS: Now, if you click on that 'Teach' link on that URL that I just gave you, you're going to see several slide decks, and I'm just going to cover them really quickly because I think it will give you a feel for how good the content is.

Teach basics of Cloud and Virtualization

- Modern computing is more efficient due to virtualization

- Virtualization can be used for mobile, personal and cloud computing

- You can also use virtualization in your personal life

So, the first course teaches the basics of cloud and virtualization, which is very important to modern computing, and we stress—and we even have some labs in there—that you can use virtualization in your personal life.

VMware has products that are readily free to your students if you join the VMware IT Academy. One of the most popular tools with my staff are the VMware Workstation products because you can virtualize your operating system and back up the entire client as a virtual machine. Students probably should be taught this early on—it might save them a whole lot of headaches in the future.

Then, we're going to cover a lot of cloud concepts in this course…

What is a VM?

- Virtualization creates virtual hardware by cloning physical hardware

- The hypervisor uses virtual hardware to create a virtual machine (VM)

- A VM is a set of files

- With a hypervisor and VMs, one computer can run multiple OS simultaneously

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Now, obviously, we need to educate a student on what is a VM. Believe it or not, we've had students in the vSphere Style, Configure, and Manage, which is an advanced course, that struggle with these concepts, so we want to make sure they understand what a VM is, what a hypervisor is, what is a data center, computer systems, networks, storage, benefits of virtual data center, server virtualization, storage virtualization, network virtualization, the cloud (which is really somebody else's computer that's been put in a lot of data centers, so it can scale)...

All of these things will be covered at a high level, and then, obviously, types of cloud computing, and then we cover VMware products that enable cloud computing at many Fortune 500 companies around the world.

Network Virtualization Concepts

[00:15:30]

RICH WEEKS: All right, then the Network Virtualization Concepts course—this is the slide deck from it but not all the slides. There are 50 to 70 slides that you can cover with your students. As I mentioned, this content will cover NSX, which is a very popular virtualized software for virtualizing data centers with virtualized networks.

Now, we're going to highlight why network virtualization is such a big deal. I've got some high-speed network labs that you can use, but with students, this is something actually extremely important for an IT student to understand. **Networks are so critical to every virtualized data center and, obviously, to modern communications, so we want to educate the student on why network virtualization is changing the marketplace.**

Then, we educate in the last course what a hypervisor is. We're going to cover a network hypervisor, software-defined networks, then virtual networks in the physical network, so you can embed virtual networks, then virtual switches, which many of you as instructors use probably to create custom labs—we use them all the time, very important—and then how those switches can

be distributed in the vSphere product. Then, obviously, logical switches and logical routing, and then edge routing/NAT and NSX logical firewalls.

As you can see, it's going to be pretty detailed information—that's why I say you don't want to introduce this to a zero-beginning student. This would be more for a networking student to add maybe to their second course in networking, maybe a little bit more advanced, to give them an overview once they learn protocols and networking concepts.
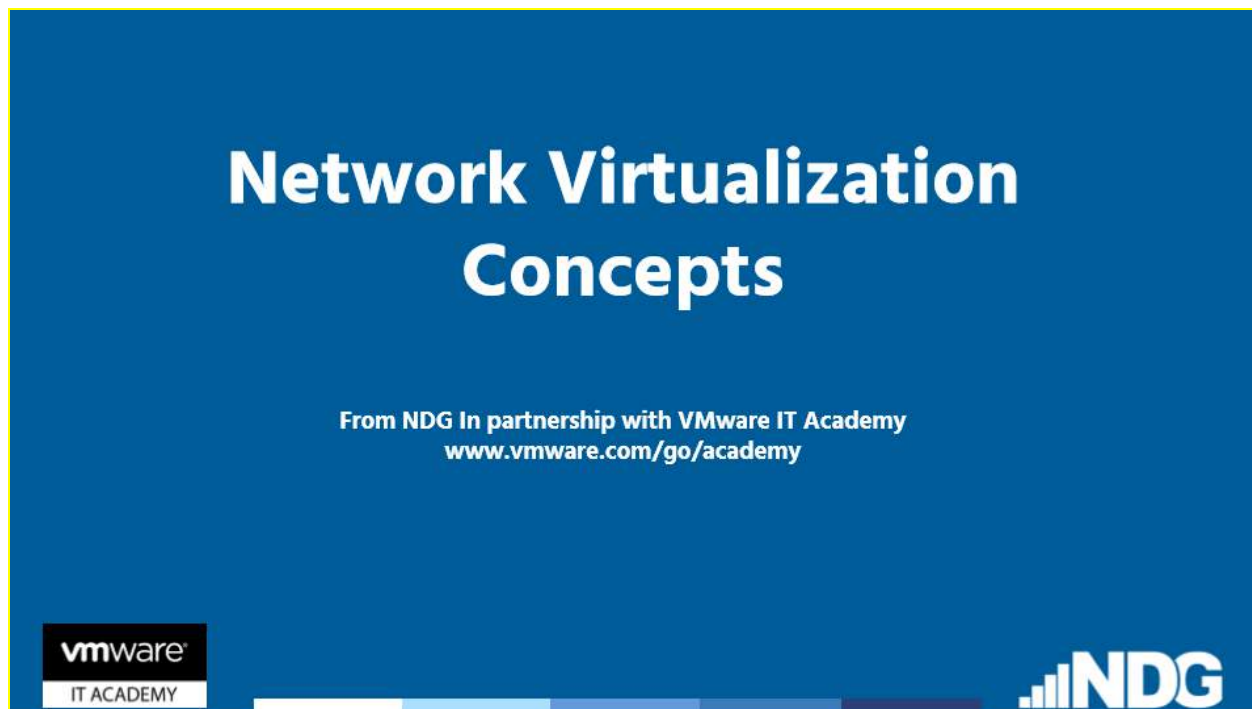
Software-Defined Storage Concepts

[00:17:20]

RICH WEEKS: All right, then the third course that we're making available is Software-Defined Storage Concepts. Now, this course is very similar. It's not really a perfect course for a beginning student; it's more for a student that's gotten some exposure to IT and technology. You could put it in front of a beginning student, but you would maybe have to hold their hand a little more.

It's going to have a lot more information thrown at the student in a short window of time, but it's really important information to teach a student studying IT that expects to get a job. In fact, I would say if a student wasn't exposed to storage concepts in their two-year degree or whatever program they're pursuing continuing ed and they decide to go to interview, they may want to take this short course before they go to the interview. If nothing else, they could talk the language to an employer that shows they're aware of these storage concepts that are important to the industry.
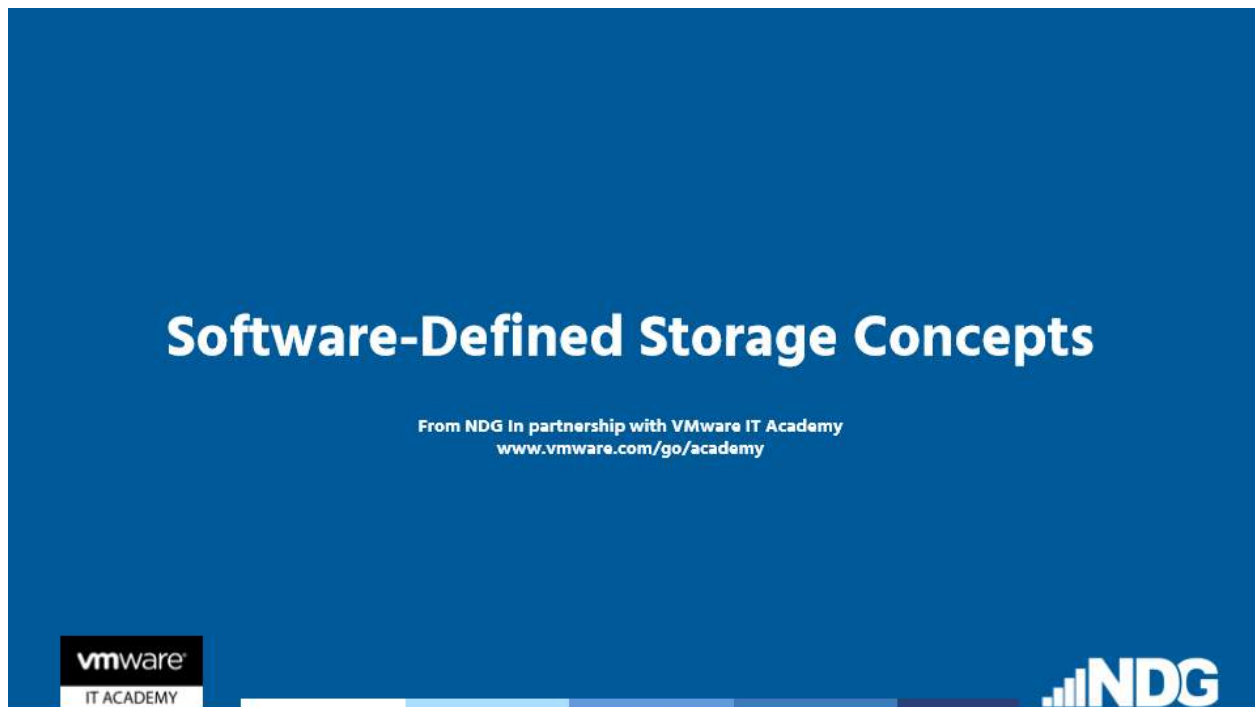
Helping You Help Students

[00:18:19]

RICH WEEKS: Now, obviously, all these courses need to relate to the student where they're at versus the content just jumping them right into topics, so we do cover things like Local Disk Storage and more, but the main focus is to talk about storage concepts that they may see if…

- …they worked in a data center
- …they worked for a company that's providing infrastructure compute

So, these three courses (as you can see, there are slide decks that are made available to you on that 'Teach' tab) are designed to help you teach students concepts that are relevant in the marketplace. Hopefully, if nothing else, they can speak the language and understand the language if they get in an interview where they're getting that first opportunity or first job. They won't be lost if certain words are thrown around.

For example, I've had IT people ask me, "What does 'hyperconverge' really mean?" And quite frankly, I've heard it used in so many different ways by different vendors that I have even myself had to reread it and go, "OK, what do they really mean by this?" So, I think this is really good material to help your students to get an understanding of topics.

What Do You Think?

[00:19:29]

RICH WEEKS: All right, now, I'm going to pause here on purpose before I go to the next section. What I'd like to get is some feedback—are these short courses of value? Are these they type of thing you would like?

I know Linux Unhatched was a big hit in the Cisco Networking Academy community. Will this be a big hit in your community? Is this information you value? "This costs a lot of money; I spent a lot of my budget on this"—is this worthy of more things like this?

OK, I'm getting some very positive feedback—thank you for that. I would appreciate private messages, too. Again, this is designed to be self-paced. Say you're getting ready to teach a very complex class, and you're afraid some of the students don't have the background. You could put it in your syllabus to 'please study this as a self-paced to make sure you understand these concepts before you come into this class.' Or it could just be exposure to topics that they may need, as I said before, before they go into an interview.

[00:20:37]

SHAWN MONSEN: Rich, this is Shawn.

RICH WEEKS: Yeah, Shawn—go ahead.

SHAWN MONSEN: So, I think this is excellent. The way you've decided to implement this is really good in a couple of ways. First of all, there's a lot of interest at the state level right now around cloud computing and virtualization, and having this as a resource that instructors can use to add to their existing curriculum, I think, is very valuable.

As an instructor of data networking, we do cover network virtualization, so I think that content is going to be really valuable for those instructors that are teaching maybe the Network+ exam certification classes and those kinds of things. So, I think it's great content, and I think the way that you've implemented it as an adjunct to an existing curriculum is the right approach.

Accessing and Integrating the New Micro-Courses

RICH WEEKS: Perfect. Thanks for that feedback. That was based on just the feedback we got on Linux Unhatched being used in so many different ways with multiple courses, especially for Intro to Cybersecurity. I'm going to give everybody a pre-done paragraph right here—it's the link again, and then there's the request form if you want us to give you a key to add it to your LMS. So, let's dive into some information about that.

So, here's the URL again—please click on it. There's a 'Learn' tab that's aimed at self-paced enroll. We've learned that at many organizations and some schools, you don't have control over your own LMS. So, if you don't have control of your own LMS, you may want to point the student and let them enroll right off of our website. That's why 'Learn' is there.

Key Request for Adding to Your LMS

[00:22:27]

RICH WEEKS: If you want to add it to your own LMS, we're adding tools, but what's really important is to give you an **LTI key**. There's a request form at https://netdevgroup.com/ioc_request_form, and you can ask us to give you a key.

Now, we're going to be adding some tools that are just going to make it easier for you to onboard things in your LMS, and we'll be announcing those, so if you give us a request, we'll follow it up and give you links to these, so your institution can get keys from us to add these modules like this into your own LMS.

And I'm really happy that VMware has allowed us to do it this way. Obviously, this is our intellectual property, and we invested our funds in it, but VMware has done some really cool things. Let me share with you the courses really quickly, and then I'll jump…

Demonstration

[00:23:19]

RICH WEEKS: First of all, can you see the website? The 'Learn' and 'Teach' on my screen? Is it shared?

ATTENDEE: Yes.

RICH WEEKS: OK, perfect. All right, so if you go into the courses, you're going to see you can navigate them. If you're familiar with Linux Unhatched, you can just navigate with the module, and your student can submit a help ticket to us. So, if something is going wrong, we can help them direct.

Now, all these modules have a badge, and I want to thank VMware. I have Susan Coefield— let me give you Susan's information here. Susan and I and her peers worked on getting all this together for you. They're giving your student a badge, and they're covering the cost to make it free for any student to get a badge if they complete this content, so there's no reason for your students to go through all your courses, if you add these modules in, and they can't get a badge to put on their resume for these topics. So, if nothing else, a motivated student can show potential

employers that they understand these concepts, and that badge, again, is ready for them to simply, at the end of the course, ask for the badge—and that's it! It's that straightforward.

In the chat, you have my peer at VMware, [Susan Coefield](#), who is on the call with us today. If you want to send her a private message, she's looking at the chat, I'm sure. You can ask about the VMware IT Academy program and these offerings.

vSphere ICM and O&S 6.7 Labs

RICH WEEKS: Now, I'm going to go back to my slides and try to speed it up a little bit to give everyone plenty of time. All right, we've got lots of lab updates to provide you.

For a while there, we didn't have access to some of the latest vSphere labs. **VMware has changed that in their program—you can do vSphere latest ICM and O&S labs.** We already support 6.7—that is available to all of your NETLAB sites now, and we're hosting them. You can order for individual students through Kivuto to get a lab service from us, or you can set it up so it's free on your NETLAB system.

Again, that's my favorite because it's free! A lot of students are economically challenged. I have to charge a fee, so I can recoup my compute cost. These are very IO-intensive labs, so I have to have lots of servers for these.
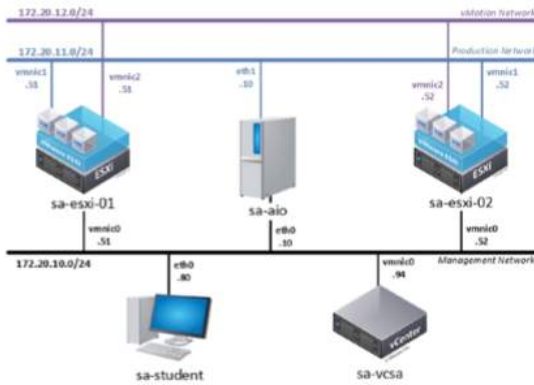
O&S is going to come out this month. We're right now in the final stages of Q&A. We're weren't committed to doing these, but we did them anyway. Not many schools teach O&S, but if you do, your students really learn a lot—these are really good labs.

They even get introduced to VSAN. They get introduced a little bit to NSX. They're optimizing vSphere, which is a cornerstone for VMware's product and platforms—that's why we support ICM and O&S. It's because vSphere is so important.

Find Out More

[00:26:10]

RICH WEEKS: All right, the VMware IT Academy Program, I gave you the link a few seconds ago in the chat, and I also gave you Susan's email, and Susan's here to chat with you. Thank you, Susan, for joining us. I know you've got a really good program, and I know you're working very hard to make it a better program. Susan, anything you want to add to this before I move on to other things we've added for the NETLAB community?

[00:26:36]

SUSAN COEFIELD: No, I just want to say thanks to Rich for partnering with us for these three new courses. I'm not super technical like many of you on the call, but I am going through the Cloud and

Virtualization course myself, and it's really taught me a lot about the concepts, and it's helped me a lot, just in my job, personally.

But if there's anything I can do for you guys beyond the three free courses that Rich is addressing here, or if you just want to subscribe to our software licensing program, please reach out to me, and I'll be glad to help you through the process.

[00:27:10]

RICH WEEKS: Yes. Susan, your software licensing program now is under one umbrella—that's your team, correct?

[00:27:16]

SUSAN COEFIELD: That is correct. So, I think that will hopefully resolve some of the confusion that may have been out there in the past. So, I'm the contact for both programs.

[00:27:26]

RICH WEEKS: Right. So, if I was just using software licensing in the past, I might not have been using the content or vice versa—I might have been using the content but not the software. There are two different doors I went through, but now it's one door—is that accurate?

[00:27:40]

SUSAN COEFIELD: It's one door, but it's two applications. I always tell everybody just to apply to become an Academy, and then you get everything, and if you decide that you want to teach ICM on down the road, you already have the teaching materials and all the resources in addition to all the software.

[00:28:01]

RICH WEEKS: So, Susan, you and I worked together for many years at Cisco, and we saw the power of the community colleges helping students get jobs. When you joined VMware, I said one of the

things I think is underutilized by the community colleges is the Kivuto licensing of your software portal.

SUSAN COEFIELD: Right.

RICH WEEKS: If I join the VMware IT Academy, my students get the VMware software for free—is that accurate?

[00:28:24]

SUSAN COEFIELD: That is correct. It's $250 to $300 to join—you have to use a PO or a credit card—but you get vSphere, you get NSX, which was just added, you get VSAN Workstation, Workstation Player, you get vSphere… It's for your entire department, so if you have 10 students, it's going to be the flat rate of $250 to $300. If you have 50 students, it's going to be the same price.

[00:28:56]

RICH WEEKS: Which is a great deal because students can take these classes and then play with virtualization without paying a fee because the school joined the program.

SUSAN COEFIELD: Right?

RICH WEEKS: Correct?

[00:29:05]

SUSAN COEFIELD: Yes, and even if your students all just want it for Fusion (oh yeah, Fusion is in there, too—I forgot that one), then it's just the flat fee, and every student that has a Mac can download an annual software license just for Fusion.

[00:29:21]

RICH WEEKS: Anybody that's ever lost a laptop and needed all the data but forgot to back it up will absolutely love VMware's products and the fact that you taught them how to virtualize and back up their virtual machine.

SUSAN COEFIELD: That's right.

RICH WEEKS: All right!

Cisco Networking Academy Content Update

RICH WEEKS: So, moving on… Cisco Networking Academy… I know many of you on this call, and Cisco programs are important.
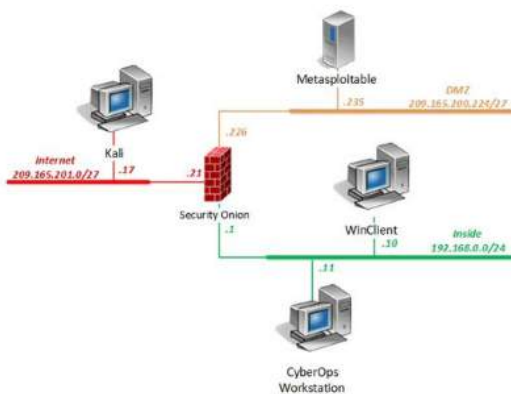
I want to highlight **CCNA CyberOps is supported by your NETLAB system.** CyberOps, in my opinion, is one kick-butt course from a context of teaching people relevant skills. They can learn some networking, and then they can learn cyberoperations, and I believe it really makes a difference when you get in an interview. So, I really like this—that's why I'm highlighting it. We have the lab service, but you can also host it yourself. So, that's available to you from NETLAB.

Linux Courses

[00:30:11]

RICH WEEKS: Our Linux courses are still extremely popular. The numbers have grown and grown!

Linux Unhatched

Linux Unhatched has been purposefully rewritten. We rewrote it, so if you load the latest version into Cisco NetAcad, you're going to find a lot of the Linux commands and the information educates students for cybersecurity. Not only for CyberOps, but if you've got to do a cybersecurity course in the modern world, more than likely, you're going to deal with Cally or Onion or some product that depends on Linux commands. So, we've really tried to make it a short self-paced add-to-any-course chapter to help your students know enough Linux that they can be competent in a cybersecurity class.

Linux Essentials

Linus Essentials has been rewritten to add more content and align to the LPI certificate, in case your students want it.

Linux I

LPIC-1 certification has changed. CompTIA and LPI are no longer partnering on the Linux certs. LPI's cert, in my opinion, is a little more intense—you have to pass two certification exams and two courses. CompTIA may be more attractive because it's one exam and one short course. So, we're rewriting the content to be aligned to the LPIC-1, a pretty intense overview of Linux I.

Linux II

We haven't released the new content for Linux II yet, but it's aimed for November.

And all this is, basically, not funded—we're just doing it because we know it's the right thing, and if you know Linux, you can get a job. We do charge $29.95 for Linux I and Linux II, and

it's just to try to help us recover some of the costs for the virtual machines that are built into the course.

Cisco CCNA IT Essentials 7 Aiming for January
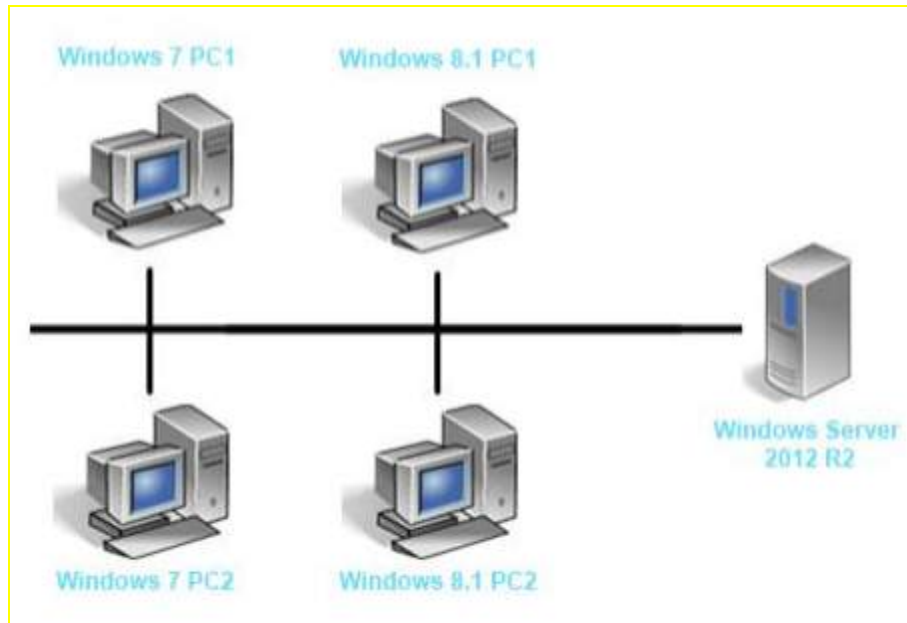
[00:31:54]

RICH WEEKS: All right, Cisco came out with IT Essentials, and we apologize to the audience, but we just couldn't get it in with all the other labs that we were updating and working on, and you're going to see quite a few labs here that are coming out, and you'll understand why.

But even though they handed it over to us, we got it when you got it, so we haven't been able to get it ready for this semester. We're aiming for January to support the new IT Essentials. We apologize if that is too slow for you, but the labs are pretty close to 6—the delta is not that big.
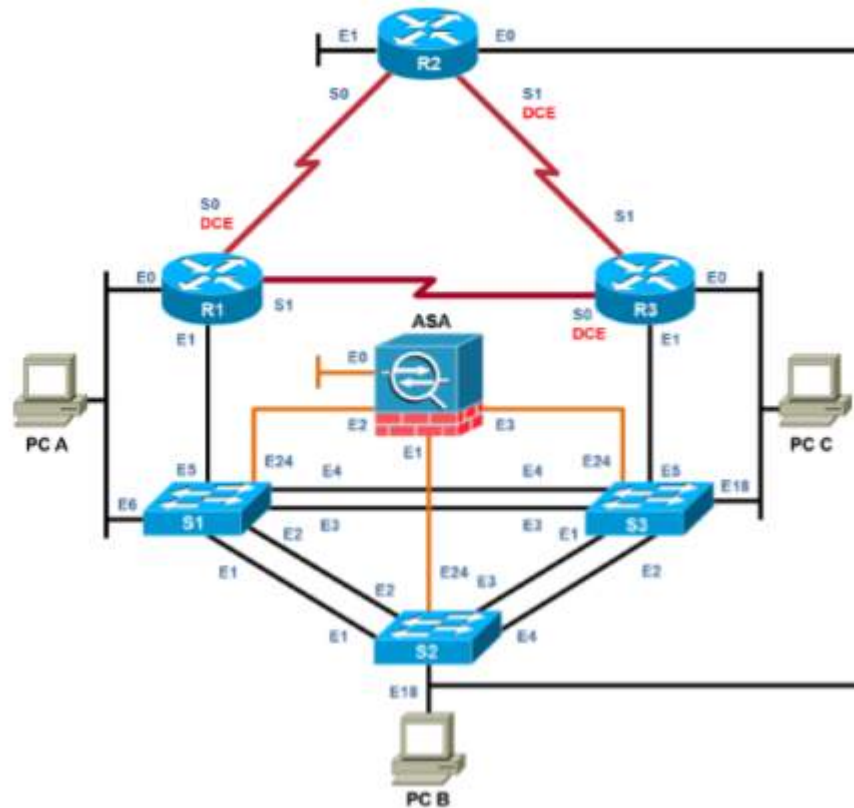
We're still waiting on the CCNA new networking labs, but we are in meetings with Cisco—they actually use NETLAB on the curriculum team, so they're running the latest version of NETLAB VE for the Cisco team that works on the content. They actually use it to test and work on even things that will end up in Packet Tracer, so we work closely with them. As soon as we have to access to the final labs, we'll get you information—we hope we can support it in January.

Additional Lab Updates

[00:32:52]

RICH WEEKS: All right, some additional lab updates… I'm going to go quick, and I apologize I've got so much to share.

CCCC0 CySA+
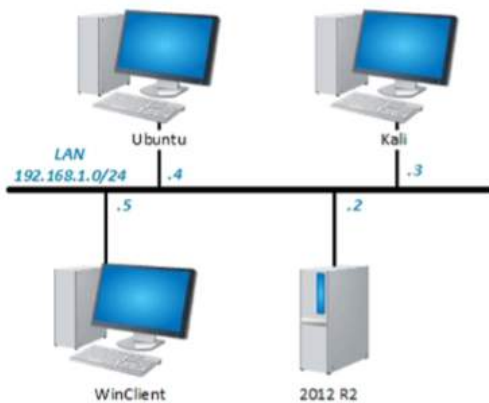
- Funded by California Community College's Office, Workforce Development Division, Deputy Sector Navigator Steve Linthicum (developed with CSSIA.org)

- 12 Lab Exercises:

  1. Vulnerability Scanning
  2. Web Application Scanning
  3. Analyzing Web Packets
  4. Host Hardening
  5. Understanding ACLs & Firewalls
  6. Working with Log Data
  7. Memory Forensic Analysis
  8. Extracting Data from a Compromised Machine
  9. Digital Forensic
  10. Introduction to Bash Scripting
  11. Log Analysis with Bash Scripting
  12. Password Cracking with Hashcat

I don't know if you guys know Steve Linthicum, but Steve is a cool guy. He's a Deputy Sector Navigator—I think he is! I don't know all the context. You guys have got so many guys and gals doing good things in California, but Steve funded a Lab Library with some kind of grant out of the California—forgive me for not knowing all the terms, but it's the California community college office workforce development that funded this.

There were 12 labs, and we asked Steve if we could make it available to the NETLAB community. When we QA'ed them, we thought they needed a little bit of additional work, so we redid a lot of them and added a lot of content, and we hope you'll be happy with that. Steve gave us the right because, the way grant was formed, we could do derivative works. So, we did derivative works and improved the labs—that is ready for your NETLAB system.

Now, this is really complementary to CyberOps, and I would strongly highlight, if you guys want to do more projects like this, any lab provider can work with these derivative works. We'll gladly work with you! If anybody wants to know a grant to do more labs that are missing in the marketplace, because there are a lot of things that you don't have access for labs and content,

we'll work with you and distribute them. We'd love to do more like this—we were able to work with Steve, who originally worked with CSSIA.

A+ Update Labs (Version 4)
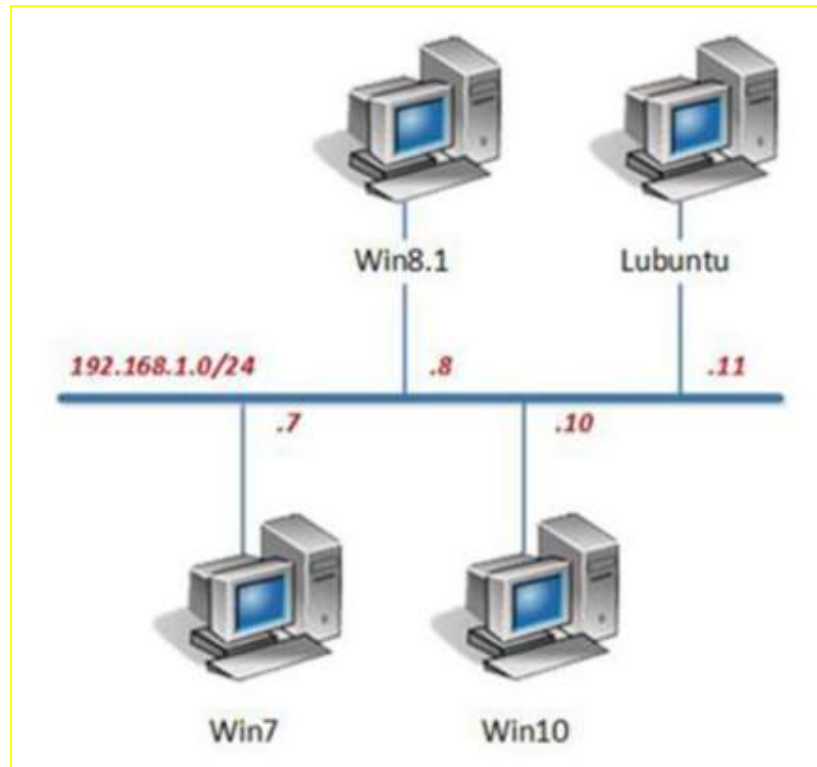
[00:34:22]

RICH WEEKS: All right, we're coming out with an A+ lab update that should be out any time now. That's ready! Kathleen on this call from North Idaho actually supported it. So, Kathleen, thanks for being the subject matter expert. Those labs are almost ready—they're in final QA review right now.

PAN 210 Updating Labs to Latest Version 9.0
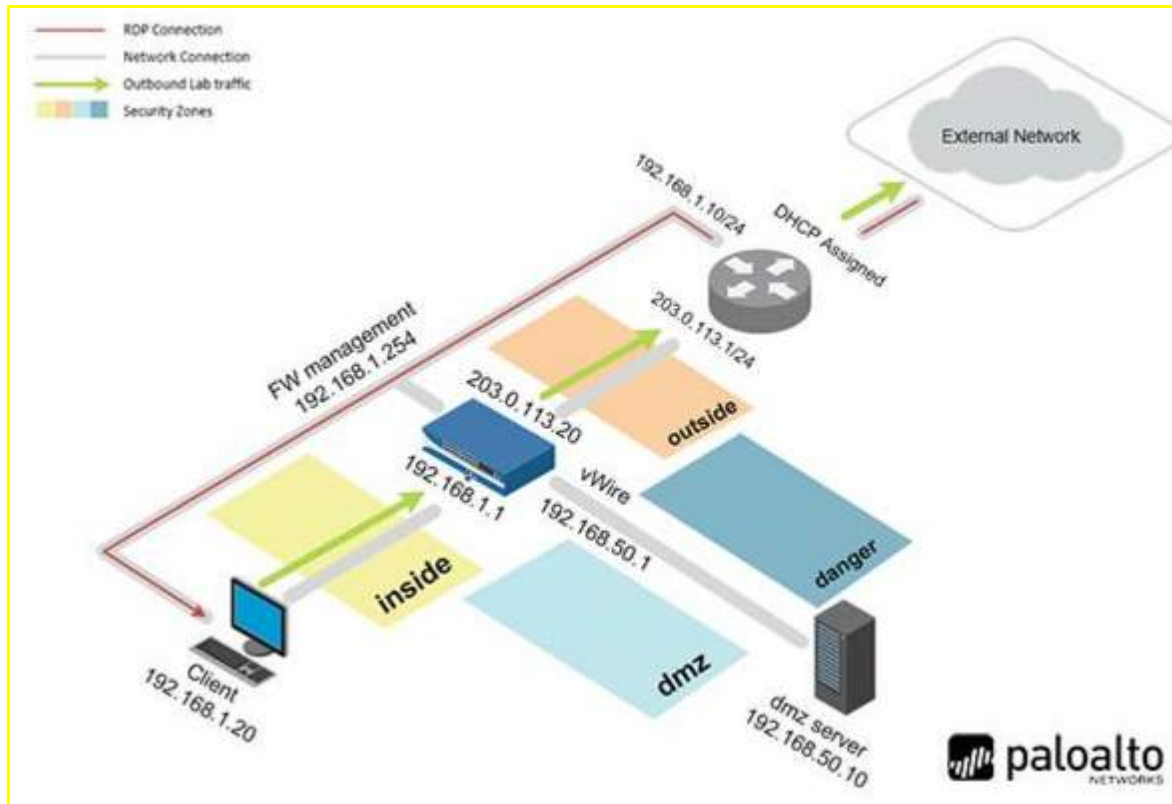
[00:34:41]

RICH WEEKS: Then, Palo Alto has got a really nice lab library called 210. I've got Gateway & Essentials, which we'll host for free, and we give you, obviously, everything we do, if you're a NETLAB host site, and let you share with any school.

210 we have to charge a fee for—it's pretty intensive. Right now, we have version 8 out to you, but we're getting ready to release version 9.0 to you, which is the latest labs. The delta is not big, so don't work really hard to add it because the delta is not huge, but there is some new information in the labs.

Red Hat Academy Labs = New Version 1 Bundle
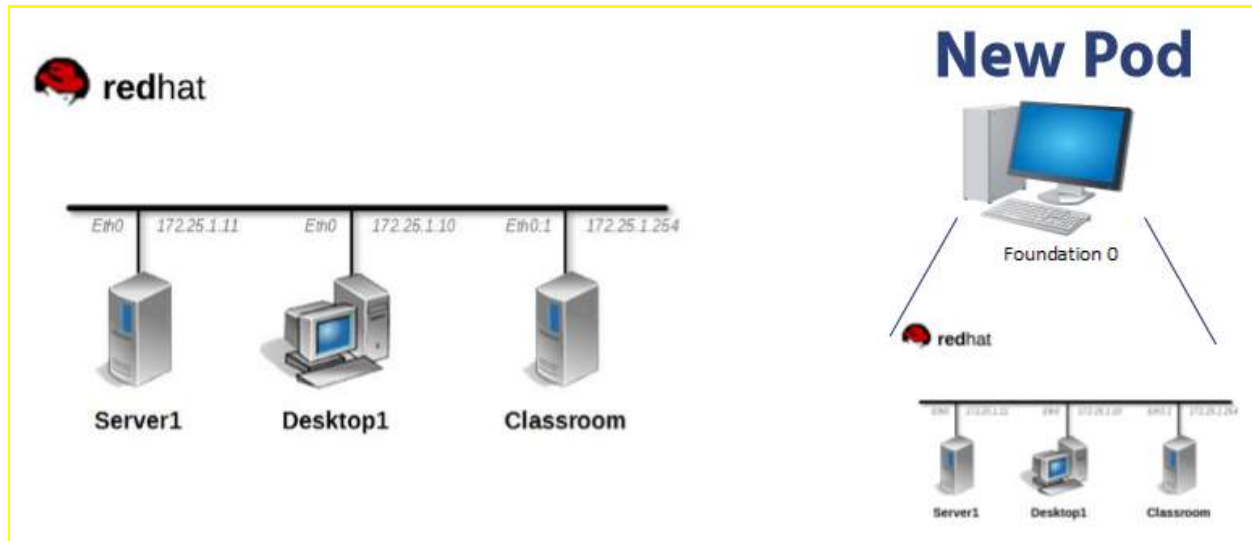
[00:35:13]

RICH WEEKS: All right, this one has been a hard one for me, Red Hat Academy Labs. We put in a lot of work into making a lot of extra screenshots and helpful hints, and Red Hat just released RHEL 8, which is their latest version. If you're familiar with our courses, we use a lot of Ubuntu. Red Hat, of course, would use a lot of Fedora.

We really like the fact that we're partnered with Red Hat because Red Hat is well known in enterprises and corporations. Canonical would be the keepers of Ubuntu, if you will. They would probably consider each other competitors. We love both because they help your students get job skills.

There's going to be a change when we release this. Now, what we did last time is we edited every single lab. We did helpful hints, screenshots… It's just not viable to sustain that, so what we're going to do is we're going to give you access to the VM as Red Hat releases it and ask you to just use the content from the Red Hat portal.

Well, what that means is, instead of having a pod with separate virtual machines, you're going to get the VM just like Red Hat does it. Now, the reason I had to do that is the amount of labor hours that it was taking to try to redo all the Red Hat content—it's just unsustainable—and the fact that we couldn't get the speed to market. So, we're going to try to get this out to you quickly.

We're going to hire some students to do a quick QA, and then we're going to release, as is RHEL 8. I know many of you on this call may value RHEL 8 because Red Hat has really good skills for your students. If you do our Linux courses, I would encourage you to give your students a pathway to Red Hat. IBM recently bought them. When enterprises value open source, they will often go to Red Hat because it's supported—a very good program.

High Speed Networks Project

[00:36:59]

RICH WEEKS: All right, moving forward, we're doing a research project that I really think is cool. If you're not familiar with it in the financial industry, especially where you're doing a lot of trading, high-speed networks are a huge deal. In the government, high-speed networks are really big. Many of you may have read about Internet2. Many of the tier-one research universities are deploying high-speed networks. The National Science Foundation and the Department of Energy really want to see high-speed network and infrastructure implemented across the U.S.

So, we started working with the University of South Carolina on some high-speed network offerings. This is not for a beginning student—this would be an add-on for your Cisco Networking Academy student that maybe is working towards CCNP, but they can be introduced to high-speed network.

And you're going to get a lot of things around how to fine-tune because, when it comes to high-speed networks (and I bet Steve knows this from his days working in the Telco industry, where they deploy things like this), just a little bit of jitter can be a nightmare. You can lose 80% of performance on a high-speed network just because you've got a little bit of jitter or something like latency.

So, these labs are designed to teach an existing networking professional or someone that knows networking how to fine-tune a high-speed network. Steve, you may want to add comments to this because I know this is a big deal in the industry. It's kind of hidden unless you work in that sector, but this is a huge deal. Any comments, Steve?

[00:38:24]

STEVE WRIGHT: No, I'm just glad to see you're offering it. Thank you, Rich.

Opensource Network Monitor Labs

perfS◉NAR

perfSONAR is a widely-deployed test and measurement infrastructure that is used by Science networks and facilities around the world to monitor and ensure network performance.

1 Configuring Admin Info
2 Metric and Tools
3 Configuring Regular Tests Using perfSONAR GUI
4 Configuring Regular Tests pScheduler CLI Part I
5 Configuring Regular Tests pScheduler CLI Part II
6 Bandwidth-delay Product and TCP Buffer Size
7 Configuring Regular Tests Using a pSConfig
8 perfSONAR Monitoring and Debugging Dashboard
9 pConfig Web Administrator
10 Configuring pScheduler Limits

[00:38:27]

RICH WEEKS: Oh, you bet. All right, on top of that, because of high-speed networks, it's really important to worry about performance. We're adding labs to that for open-source network monitoring labs. Now, all this is being done by a PhD professor from the University of South Carolina. We're working with them, with intention, to release these labs to you. We ran a workshop this summer, and it was extremely well received. Therefore, we're going to pass this out to you.

Zeek – Network Security Monitor

The Zeek Network Security Monitor

Why Choose Zeek? Zeek is a powerful network analysis framework that is much different from the typical IDS you may know. (Zeek is the new name for the long-established Bro system. Note that parts of the system retain the "Bro" name, and it also often appears in the documentation and distributions.)

Adaptable
Zeek's domain-specific scripting language enables site-specific monitoring policies.

Efficient
Zeek targets high-performance networks and is used operationally at a variety of large sites.

Flexible
Zeek is not restricted to any particular detection approach and does not rely on traditional signatures.

Forensics
Zeek comprehensively logs what it sees and provides a high-level archive of a network's activity.

In-depth Analysis
Zeek comes with analyzers for many protocols, enabling high-level semantic analysis at the application layer.

Highly Stateful
Zeek keeps extensive application-layer state about the network it monitors.

Open Interfaces
Zeek interfaces with other applications for real-time exchange of information.

Open Source
Zeek comes with a BSD license, allowing for free use with virtually no restrictions.

1   Introduction to Capabilities of Zeek
2   An Overview of Zeek Logs
3   Parsing, Reading and Organizing Zeek Files]
4   Generating, Capturing and Analyzing Network Scanner Traffic
5   Generating, Capturing and Analyzing DOS and DDoS-centric Network Traffic
6   Introduction to Zeek Scripting
7   Advanced Zeek Scripting for Anomaly / Attack
8   Preprocessing logs for Machine Learning
9   Developing Machine Learning Classifiers for Anomaly Inference and Classification
10 Profiling and Performance Metrics for Zeek

[00:38:54]

RICH WEEKS: And then I don't know if any of you are into intrusion detection systems, but there's an open-source product that used to be called Bro—it's been around a long time. It's now called Zeek, probably because 'Bro' was not really cool as the industry started adopting this, and Zeek was a cooler brand name.

But it's open source, and it's intrusion detection. You can write scripts, and you can automate it—if you look in there, there are even labs about machine learning and how to use your logs in machine learning.

This is going to be released out to all our NETLAB sites, and I know Shawn was asking for cybersecurity stuff—I think this is really cool stuff to give to your advanced students. You may have a student who is really motivated or a group of students that are going to go from CCNA and really work in the industry. This would be a cool thing to expose them to, and you may find that some of the local employers that value networking really care about this stuff. They'll be really into seeing that your student learns this.

BACCC Summer Camps

RICH WEEKS: All right, with that shared, Kelly was going to present, but Irvin was kind enough to present for us, so I'm going to hand it over to Irvin. Irvin, I'm going to stop sharing and let you have the time.

[00:40:03]

IRVIN LEMUS: Well, thank you. Hello, everyone. Rich asked me to talk about the summer camps and what we did with NETLAB. I'll be happy to share.

So, in the last three years, we've been using the Air Force's summer camp material. They covered hardening operating systems and a small introduction to Cisco networking. What we found is it was tough to implement because we had to fight with IT at the many colleges to get the approval to install software to get these virtual machines. To them, they were completely foreign, and they didn't know what kind of a risk they brought to their networks, along with everything else that came with running an Air Force camp.

So, this year, we decided to make our own, and this was the result…

We created a camp that didn't require IT and the colleges to figure things out because it was all going to be done on NETLAB. It would give students the chance to see different areas of the industry, because maybe they don't want to be systems administrators, but maybe they really love Wireshark or love digital forensics. We wanted to give them availability to see the different areas of cyber and, hopefully, pique their interest.

We wanted to give also plenty of time for colleges to talk about their programs and have that as part of the camp, and also give students access to a resource that they can access at any time. Out of that came this camp.

Introductory Camp

This past year, we had 38 camps throughout the Bay Area. In the first week, what we call 'Introductory Camp,' we walked students through what we call a digital footprint—basically, what information is out there about you—and they had things like looking at threat maps, looking at Social Sleuth activities, phishing, and securing their phones.

On the second day, they went into NETLAB. We had a malware activity… We actually let the students work with the WannaCry ransomware. Again, we had a Windows XP machine on NETLAB, completely blocked out of the internet, so they could infect it and disinfect. We gave them the tool to undo the damage. So, we're not just talking about malware—they're actually doing it! They're actually working with it. Then, we did a short lecture on how to secure Windows 10, and then we went right into Linux Unhatched and had a CTF for them based on the content of Linux Unhatched.

We did digital forensics, working in Autopsy, working in Packet Tracer. Again, the school sites didn't have to install Autopsy or Packet Tracer. It was all in a VM hosted on NETLAB, same with Wireshark.

Advanced Camp

IRVIN LEMUS: In the Advanced Camp, we did content out of the National Cyber League, we did cryptography, we did the OWASP Juice Shop and Splunk, again, giving students various areas of cyber, what it looks like, what it could potentially leave for them—you know, what will pique their interest, so they start thinking career-wise, 'Where can I go?' and that would be the perfect fit for colleges to start talking about it. "Oh, you want to go into cryptography? Well, this is what we have." Or "you want to go into data analysis, like with Splunk? Well, these are the classes that we have, and these are the next steps." And so on…

Lessons We Learned

[00:44:04]

IRVIN LEMUS: The lessons that we learned… Number one, on our scale of this…
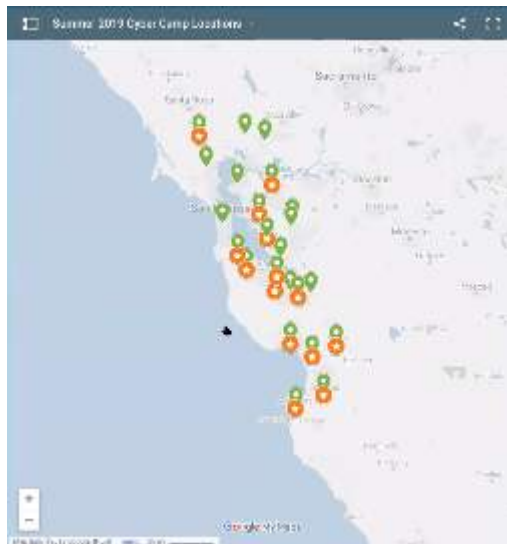
Actually, it was these, plus we did a camp at Butte College at Hesperia High School and Valencia while we did this. The big first lesson that we learned was NETLAB needs to have SSDs. If, like us, you have everybody connecting to Cabrillo to access NETLAB, mechanical spinning drives are not the way to go.

A huge thanks to Rich Weeks and Jason Zeller. They let us use their Fort Hayes server that is full SSDs, so I was able to send a number of camps their way and balance out between our NETLAB and theirs, so the load was less, and all of the students loved it.

Again, working with NETLAB as our foundation, it allowed us to do all these different programs, all these different pieces of software, and not have to fight the local IT. Which, the local IT is completely right—I mean, who really wants Wireshark running on their school network? Not many places. Or having a vulnerable web application? I mean, that can open some holes and cause some problems, but doing it all on NETLAB? No problem. Nobody had a complaint because it's all in the browser, and it's not happening there.

The other lesson that we learned is working with our NETLAB admin to be OK with opening pods out to the internet. One of the big things that you see here is we did a lot of Capture the Flag because we wanted the students to get a feel for how to do that, since the industry is doing a lot of Capture the Flags right now. There's a company whose name is slipping out of my mind—in order to get an interview, you have to pass their CTF, so we really want to ingrain that. "This is what industry is doing right now, so let's get you acclimated with that." Again, we didn't want the students to download files to the local machines, so they had to access the CTF through NETLAB out to the internet.

Questions

[00:46:28]

IRVIN LEMUS: Any questions on the summer camp?

SHAWN MONSEN: Hey, Irvin—it's Shawn.

IRVIN LEMUS: Yes?

SHAWN MONSEN: So, yeah, I had a couple of questions, actually. NDG didn't have any problem giving you internet access from their locally hosted pods?

IRVIN LEMUS: Correct.

SHAWN MONSEN: OK. That's good because, as you mentioned, that's been a trouble spot with our community colleges in the past. The other thing I wanted to find out is… This looks like a great program, by the way. I can tell you guys did a lot of work on this. Is this something that is leverageable to our other NETLAB host locations? So, is this something that we might be able to use at our other NETLAB locations and other community colleges that might be able to leverage it?

IRVIN LEMUS: Yes. For example, in the Intro Camp, these three days, the students are working on the same virtual machine. In the Advanced Camp, it is also one image. It's Kelly with the Juice Shop already loaded, and then for the Friday CTF, we had a separate image. So, in total, you're looking at about four… Well, plus the WannaCry VM. So, yeah, about four to five images that are easy to redeploy.

SHAWN MONSEN: Well, so again, the cool part of this is that it's hosted at NDG in the cloud versus at the local community colleges. Rich, is this something that NDG could offer for other community colleges as well, and maybe offer it as a service to California community colleges in general? I don't want to put you on the spot right here, and it's probably something that you might want to think about, but I do find value in this, and I'm sure that other community colleges in California would find value in a cloud-based solution to their week-long cybersecurity camps.

RICH WEEKS: We should schedule a meeting with you and Steve and some influential contacts like Richard, because, yes, technically, we can pull it off, but here's my big problem, Shawn. The Linux courses, the VMware courses, your vision for us hosting it… What I find is that the funding available by charging individual students will not aggregate it and sustain it. In other words, there's so much labor cost and so much infrastructure cost that we can only carry so much for free.

So, technically, we can do it, but from a budget perspective, it just crushes us because we're doing so much stuff for free that every new project we add, how do we sustain those other projects? We can only rob from Paul so much to pay Peter! That's been the challenge in this sector, and I hope no one is offended by that, but we're actually already in the process of filing to be a nonprofit because we just can't see how to sustain in this sector the way we've done for 20 years, trying to give everything we can for either free or low cost.

So, I share that openly with everybody on the call not to be difficult but just to tell you, yes, technically, we can pull it off. Budget-wise I'm not sure we can.

Now, we've got some new technology we've deployed that allows us to turn a site into a regional hub and then aggregate those hubs into a cloud, which sounds sexy. It is, but it's technically basically creating an academic cloud. So, again, technically viable. Budget-wise is the problem in this sector, and I hope that doesn't surprise anyone.

I'll share with you that I get calls from companies that see the prices we offer to schools and ask me if we can sell it to them, and I have to say, "No, we can't because we're subsidizing it." I hope that makes sense, Shawn.

[00:50:45]

SHAWN MONSEN: Yeah, absolutely. We have a regionally based budget model that we could look at in terms of offering these kinds of services to regions. I think it's absolutely something we could look at. If a region decided they wanted to take advantage of these, there's probably funding there that could be made available to work on a regionally based model, if that makes sense.

RICH WEEKS: It does. What I love about NETLAB is, once you set up that lab, your students can do all kinds of programs and never pay another fee. That's what I really like about it. If we go to host it, you know, you've got to pay the data center we put it in, you've got to pay the cloud provider, and then the dirty little secret is it costs you more… You actually could pay for the server and host it in a rack cheaper than you can buy it out of the cloud for some of these learning modules, if that makes sense.

[00:51:50]

STEVE WRIGHT: I think it's a real opportunity. Shawn, maybe you, Rich, and Irvin could identify kind of what that package might look like. We can certainly play a role statewide with the ICT sector to get the word out, promote it, and endorse it as a wise use of Strong Workforce program funds, and I could get this going, but we have to have something to kind of show to people and say, "Here are the three flavors," or whatever and do that. So, I think it would be great to follow up on that.

SHAWN MONSEN: Yep. Sorry to interrupt, Irvin. This is great stuff—I know you've got more stuff to share.

[00:52:26]

IRVIN LEMUS: Not a problem. I like fielding in questions. But yeah, on the backend, it's really fortified virtual machines with only one of them disconnected from the internet, the WannaCry one, and everything else is connected out to the internet.

Other BACCC Projects

[00:52:44]

IRVIN LEMUS: The other things that we're doing with NETLAB is competitions. We have two regionals this year, Bug Bounty and what we're calling Disaster. All the contests that we tell students to participate in, we always point to NETLAB as a training source just because of the labs, and it's easy for anybody and everybody to play. We're developing…

We're going to run our first Community College Competition. Again, we're going to host it up on NETLAB. This is not a red team/blue team but purple team because the school teams have three defenders and three attackers on each side, so they need to attack each other, and the points are given by uptime for resources.

Yeah, I had my team look at Google Cloud and look at Digital Ocean as possible places to host, and we just keep coming back to NETLAB just because, yeah, it's cheaper, number one, and we have control over what we can do, so we can put routers and extra resources into a pod and have the systems attack each other and not have other issues because we can see everything that's happening.

We're going to do this in a couple weeks, actually, we're going to start this competition.

I don't see any questions in the chat, but yeah! I'm open to any questions about the Summer Camp content. Like I said, on the backend, it was very easy. We just had to duplicate it 64 times for each—that way, we could have enough pods at enough computers… Enough virtual machines for every student at all the camps.

[00:54:42]

RICH WEEKS: Hey, Irvin, can you share with everybody how many students you impacted? How many camps you ran? And what was the exposure for the community colleges because I believe it was an articulation model to encourage students to realize their community college was a great resource? Can you share that?

IRVIN LEMUS: Well, we have 38 camps. We impacted 1200 students without counting the Butte College, Hesperia, and Valencia students. Just a case in point, Santa Rosa really loved the digital forensics section. They spent way more time than they should have on it because their students loved it. As far as the impact, it's definitely paying off—we're seeing more students come in to play the competitions this year.

We don't have to teach them how to use NETLAB. That was one of our early struggles last year. This year, a lot of the students were already connected to it, so when I gave them new NETLAB logins, they just ran right in and started working away.

It's been awesome, to say the least! It's been awesome to be able to use NETLAB and impact these students and show them that they have options, that they can see themselves in one of these areas go from there and be able to have that hands-on work with things like Wireshark, Splunk, and all the other tools.

Wrapping Up

SHAWN MONSEN: Steve, if it's OK with you, I know we're about to end here in a few minutes, and I'll stay online for ten minutes, if that's OK with you and Nicole, to answer any questions. I know a lot of the folks on this list, and they may want to chat.

STEVE WRIGHT: That's perfectly fine. In wrapping up, the observation I keep coming back to is how these competitions are one of the most passionate and engaging things for students to do, and we look at how to train people and keep that cohesiveness, the cohorts, the focus on the future, and that engagement going, and these competitions just do it well. I've looked at a lot of other competitions, too, whether it's robotics or Maker or whatever, and there's just something about these cyber-related competitions that have really hooked people.

And Irvin, what you guys are doing in terms of advancing the sophistication of it and making it more complex… I mean, this had to happen—I'm glad you guys are leading the charge on that. And what you've told us today about the value of the NETLAB solution and doing that answers a key problem: How do you offer it on a campus with the IT folks having their logical objections? Thank you so much for working that out and sharing with everybody here what that is.

I'm going to go ahead now and leave it to Shawn to close up, if you have any other comments, and we'll go ahead and leave this open for about ten minutes for anyone to get in touch with Rich or Irvin, and I want to thank Susan Coefield as well from VMware for her contributions. It's been a great session. Anything other final thoughts, Shawn?

[00:57:58]

SHAWN MONSEN: Just a couple things. Thanks, Irvin and Rich, for kind of cracking the code on this. We appreciate the work that you've done, and I'm hoping that it can be used as a model in some of our other regions around the state. I would like to work with the two of you to see if we

might be able to package this as a concept and be able to leverage it in some of our other regions. I think you've done really great work here.

[00:58:32]

IRVIN LEMUS: Thanks to Rich Weeks for creating the product and Richard Grotegut for letting me run with this crazy idea and make it a reality.

RICH WEEKS: Hey, you guys, I want to be really clear: I don't deserve that much credit. Gentlemen like Rich Lucas, Jason Zeller, Jason Jedd—I could go on… There are 17 or 18 people that worked for us, so don't give me the credit, but thank you so much, Irvin. I'm blessed to get to talk to you guys regularly. Thank you, Irvin, but I want to give my coworkers a lot of credit—they work really hard.

[00:59:03]

STEVE WRIGHT: OK, well, that ends the official part of the meeting. I want to thank you all for attending. Remember, next week, we'll be looking at other cyber competition alternatives, our focus on the K-12s, as well as the National Cyber League. It's important that you be aware of all the options and find out what works best for your campus. We'll just continue to try to be a source of information on all the alternatives. Thank you very much.

Additional Resources

- Visit www.ictdmsector.org for the complete ICT Educator Webinar Series fall schedule.

- See some cybersecurity examples:

  o Stanly.edu/IT-Academy – Kelly Caudle

  o Baycyber.net – Irvin Lemus

- Check out the three new micro-courses at ndg.tech/vmware

- Request your LTI key here: https://netdevgroup.com/ioc_request_form

- Visit VMware's IT Academy

- Get in touch with Susan Coefield at scoefield@vmware.com

- Linux Course Updates -- www.netacad.com/courses/os-it/ndg-linux-unhatched