CTC BILT JOB SKILLS ANALYSIS MEETING
Collin College, Spring Creek Campus
November 10, 2011

Attendees

Scott Veibell – Cisco	John Hardesty - Collin
Kurtis Sampson – Phillips Medical	Eliazar Martinez – El Centro
Tina Thibodeaux – Avaya	Bill Saichek – Orange Coast College
Kim Yohannan - EMC	Karl Dietrich – Lansing Comm College
Gordon Snyder – ICT Center	Larry Maughan - Collin
Larry Pereira – Alcatel-Lucent	Deborah Boisvert - BATEC
Ron Halbach – Juniper Networks	Kaye Krueger - Fox Valley Technical
Earl Simpkins - Telecom Electric	Elizabeth Halweg – Fox Valley
Helen Sullivan - CTC	Craig Tidwell – Seminole College
Candy Slocum - InterLink	Timur – Georgia Southern
Tom Jones - Collin	Vickie Wintrich – Volunteer
Pete Brierley – Colin	Ann Blackman - CTC
Corey Kirkendoll – VCE	Mike Harsh – CTC
Marilyn Webster – CTC	Ann Beheler - CTC

AGENDA

I. Welcome & Introductions: **Glenn Wintrich, BILT Chair**

- Glenn explained that curriculum accreditation standards in Texas require community colleges to have a set number of hours.
- Therefore, we have to consider whether any changes will be part of the core curriculum, an elective, a case study or a reading requirement.

II. OVERVIEW of Job Skills Validation Process: **Ann Beheler, CTC**

- Our Mission: making a difference in workforce development.
  Making sure what we teach is in line with what businesses want, so when students graduate they have several job choices to choose from.
- CTC's focus is on Network Infrastructure and Mobile Network and all that is associated with this.
- CTC covers these in conjunction with the BATEC in Boston and the National ICT Center in Springfield, MA.
- Collin College has been awarded a DOL Grant which will focus on 4 areas of IT (7 colleges – w/ 4 Major Centers):
  1. Networking Infrastructure – CTC leads in this
  2. Computational / Business Analytics/ Mobile App Development
  3. Geospatial.
  4. Cyber Security
- The IT industry is in transition, facing a paradigm shift, with new trends always emerging.
- Attendees today are asked to be very critical and help Collin College identify what changes are needed and what is not being covered in the curriculum.

- We are here to do our annual review of the list of skills and knowledge items the CTC which has worked with for the last 10 years; to review the List of CTC Curriculum Disciplines; and to ask the BILT to comment on what is still relevant and suggestions for change.
- With certifications in mind, we want to use the list provided to rank what's important or not important –so we can cover the basic knowledge and skills the BILT wants in future employees.
- Ann Beheler: Collin can offer about 45 credit hours of an AAS degree in Technical courses – approx 10-13 courses.
- Can offer "Advanced Certificates". For example, this could allow a student to complete a degree and then transfer to UNT and complete a degree or come back to Collin and complete an advanced certificate. Or this could apply to high school graduates or professional workers currently wanting to obtain a certificate.
- "Stackable Certificates" is a concept that originated in Ohio. They offer a unique set of courses that hang together to give a person skills to do "x" for example.   Then another unique set of courses can build on this first certificate to allow the person to next do "x" + 1.
- *Comments:* Scott commented that the number of useful courses outnumber what we identify. Glenn said that students take some courses but the college does not get credit. Stackable certificates will help that. For example, a local security company had 26 openings with a minimum of Security + as a requirement, and they couldn't find candidates to fill positions. Ron asked what is the base, and Ann responded that the BILT is defining that.

III. JOB SKILLS VALIDATION – **Ann Beheler**

- The BILT was asked to provide feedback by focusing on how important is the current list of disciplines for the entry-level Technician to have. This based loosely on the PCAL7 process developed by Brent Kesterson of Dallas County Community College District. The BILT ranks what should be covered giving "importance" the most weight. (Taken from the *Knowledge, Skill and Abilities (KSA's) List.*
- The BILT voted on each listed item below.

IV. BILT's Ranking of "Knowledge, Skills & Abilities" For Future Employees (See List)
- Ranking was based on an entry-level position and answering the question: *How important is it to offer each discipline listed to students in a 2-year program?*
*Glenn suggested voting on each section as a group of items and if one particular line item needs pointing out – for a BILT member to address it. *(see Voting tally)*

1. **Knowledge Domains**
   (no change)
2. **Operating System Maintenance**
   - Ann Beheler summarized: Add Android, Apple IOS.
3. **Servers**
   - change title to Servers/Applications
   - Add Share Point
4. **Infrastructure as a Service/Cloud Computing**

Ann Beheler Summary

- Challenge is to go from where we are now and take steps toward building a strong Virtualization foundation and into Cloud Computing.
- An introductory or basic Infrastructure class that cover all the topics in this category is needed. A major part of infrastructure should be compliance.
- It was agreed that opportunity exists for graduate students in entry-level jobs and professionals wanting retraining, but this could depend on the track taken.
- There's a need to examine more deeply the Virtualization topic.
- **Corey:** Students must have an understanding of the physical environment (equipment) prior to taking it to the virtual environment. Corey also said that on "Basic Server" – as you start to teach the basic classes, once you put it in the Cloud, the responsibility goes away.
- It was agreed to make Data Center and Unified Communication separate categories. Security is also a separate topic.
- **Glenn:** Glenn commented that students must be aware of protocols used in Data Centers and that Virtualization is a foundational and emerging area. It is so core to the whole curriculum that it must be separated out as either a course itself or significant part of a course. This is also considered "Blue printing" your environment.
- **Kurtis:** There is broadband knowledge plus specialized skill sets a student must have. We may need to have a bridge course to bring them up to a standard level.
- **Glenn:** Students need to know this when they graduate. They need to know how to build in a virtualization foundation.

5. Mobile Device Integration

- **Ann** – This is not our major focus as a Center; however, we can't ignore it entirely. We are talking about end-to-end communication.
- **Glenn**: With these two items, I would give it a 1 or 2 rating. This is a specialty area at a bachelor degree level. Students graduating from a community college will not have to do anything with Mobile app programming or app platform. What is important is the interaction that is covered under Unified Communications. Fixed mobile communication and convergence is a good example. This will include everything on a laptop including presence and active directory. How does this tie into the core network? We need to include Unified Communications and networking components.
- **Gordon**: This should be covered later.
- **Glenn**: This is not a separate course on mobile networking. How does the mobile network fit in?
- **Tina**: the two category names (Mobile App Programming & App Platform) are not good. We are focusing on what an entry level person needs to know. If you are talking about recent high school graduates, they are fascinated by mobile.
- **Corey**: The buzz in the industry is mobility, including tablets, smart phones and netbooks.
- **Glenn**: The key is graduating with a convergence network degree. It is not how to set up the towers and multi phased-in towers.
- **Ron**: We are covering mobility in wireless. I would get rid of this entire section.

- **Larry**: In the last two years, we've gone through these terms. Mobile applications is an extinct term. Broadband wireless: all those items fall in that category. We need the right name for the domain and the modules that fall underneath. Mobile apps fall under broadband wireless. Analysts say over the next five years that data growth will be 30 times what we are doing today all because of video.
- **Conclusion:** "Broadband Wireless" is where you want to start and add the modules under that. Strike this category and move to "Wireless."
- **Glenn:** This is outside the realm of an infrastructure degree.
- **Bill:** Can you separate the platform versus apps? How does it play into the infrastructure side of it? What is the impact it has on the network? How does it move from one access point to another?
- **Corey**: The infrastructure and the app lays on top of that.
- **Ann**: In the DOL grant, we will work with the computer science people to get mobile apps into the courses. In the Winter Working Connections, the app track filled in two days.
- **Gordon**: There are different types of applications, location-based services, near-field communications. Don't teach to develop apps, but they need to know what it is.
- **Corey**: when you start talking about wireless mobility, it goes up and down. It goes back to how deep into the infrastructure do you want to go?

6. Storage Device Management
- Discussion centered on how important is the whole area of Storage.

- **Kim:** It's still necessary for students to know storage traffic and have a basic knowledge of storage (i.e., environment, business continuity, protection and replicated copies). The course tag should include what makes it up, what are the different types of storage and what is business continuity. Students need to understand the front end of the network before they understand the backend of the network. Collin, Georgia Southern, Orange Coast and Lansing have added storage in the last three years. Virtualization has also become part of the curriculum.
- **Larry:** Do you think this is a high priority?
- **Kim:** You need shared source infrastructure underneath. Teach this and server virtualization together. Students don't understand that there is a backend infrastructure.
- **Timur:** High availability of storage at the data center should be included
- **Tina:** Compliance with the Sarbanes–Oxley Act increases the need for knowledge in this area, not just the backup of data
- **Kim:** Regulations and compliance fit into another category. This course touches on the fact that regulations exist
- **Timur:** Then take out data backup and recovery.

7-8. OTHER HARDWARE & DATA LINK LAYER
- **Scott:** I don't see this as separate items
- Conclusion: Strike the Data Link Layer category

**(9.) Ethernet, (10.) Network Layer, (11.)Transport Layer,
(12.) TCP/IP Protocols and (18.) OSI Model Basics**

Conclusion: It was agreed these categories could be combined, but not voted on at this time.

9. Ethernet

* **Gordon:** This and TCPIP go together as one category.
* **Scott:** You don't need to break out the network layer.
* **Ann:** When we work with a group in Maryland, someone suggested that a student with certification in structured cabling can get a nice job.
* **Corey:** If we call the class OSI Model, we say Ethernet, then that moves TCPIP, and we can't do networking.
* **Ron:** Move Mac addressing to Ethernet.
* **Ann:** We are taking Ethernet, network layer, transport, TCPIP, data link, and OSI model and putting it all together as OSI model.
* **Corey:** We need to cover the physical layer. IPv6 is under network layer.
* **Ann:** It is an evolving thing.
* **Ron:** Are other network protocols with OSI?
* **Ann:** Yes, some things need to be thinned out.

13. **WIRELESS AND WLANs**

* Remove WiMAX, CDMA, TDMA, Encryption – WEP, WPA (outdated)
* Microwave and satellite were determined to be about 15 to 20 minutes of coverage.
* **Ron:** Government uses satellite.
* **Gordon:** Interesting things are going on with DISH, who I think will buy Sprint. They are building their own infrastructure based upon the Apple model.
* **Larry:** They have to fight U-verse.
* **Gordon:** Fixed LTE is in New England. There are no broadband options, no cable, no DSL viable option.
* Also discussed**:** antenna, VVD, 50 gb data, encryption, WPA2, 802.11 and IEEE standards.
* Wireless voice networks not listed.
* Voice over Wi-Fi should be on the list also.
* **Bill**: Take off 5G. There is none. LT is replacement.
* **Tina and Larry**: The new wireless end points Larry.
* **Karl**: Class based on outcomes of network administrator. Is that a good place to be?
* **Gordon**: Yes.
* **Gordon:** Should we replace wireless with mobile?

14. **NETWORK ADMINISTRATION**

* **Glenn:** There isn't going to be network, storage and server administrators. There will be one administrator.
* **Kim:** Over time, yes, but right now we still have domain experts.
* **Ann Conclusion**: Skip *Network Administration* and put it under *Operating Systems.*

- ACL could be moved to Network Security
- DOS Command Line: Don't need. CompTIA A+ has a subset of command lines.
- **Bill:** We still have to teach that.
- **Karl:** CLI is a separate component of that.
- **Craig:** Did a search on job website. There are 2391 jobs called network administrator.

15. **Other Network Protocols**
- Make sure SIP is there.

16. **Network Security-**
- Discussion Conclusion: A company must have rules on security.
- Is ethical hacking part of security or additional?
- **Bill:** We've offered it and modeled after Sam Bowne's class at City College of San Francisco. The class fills great. It does serve a purpose.
- **Ann:** Should it be an option or required?
- **Scott:** I don't think everyone needs to be trained in it?
- **Larry:** This is not a module but a specialized topic.
- **Glenn:** Add border controllers.
- **Craig:** Do students need to know security policies or is this more a managerial function:
- **Scott:** Every organization has a polity. A new employee needs to understand it but they do not set it.
- **Ron:** I agree up to a certain point.
- **Scott:** My company has a policy and I need to adhere to it.
- **Ron:** They need to know more in depth of what you need to do to set up a security policy.

17. **Electronics Basics**
- It was agreed to remove this section.

19. **TELECOMMUNICATION BASICS –** (Not voted on)
- **Larry:** They need to understand the concepts. A lot of items like government regulations is half a chapter.
- **Ron:** You can merge the two.
- **Tina:** VoIP and SIP need to be called out.
- **Larry:** Merge the topics and offline people can work and redefine.
- **Glenn:** Not sure that you need to be deep.
- (Re: Echo), **Larry:** Merge with PSTN into one. PSTN is important but basic.
- **Ron:** Mixed converged network technologies into the telecom section. And with PSTN.
- **Conclusion:** A Tiger Team needs to be formed to work on this.

20. **CABLE MEDIA**

- **Glenn**: Do students learn from cabling?
- **Karl:** Too expensive
- **Gordon:** Maybe separate laser optics course. Traditional course? No.
- **Ann:** Expose, but not hands on.

- **Larry:** Special courses that teach that.
- **Ron:** Cable media could be broken up and added into other things.
- **Glenn:** where is cable media coming in to play?
- **Larry:** Helps with your job prospects. Install and configure. Cable modems.
- **Larry:** Infrastructure is PSTN and should go into telecom.
- **Gordon:** Broadband modulation. Very good jobs with Comcast.
- **Glenn:** keep as a separate category. Need to have an understanding.
- **Ron:** I'm an outlier. Can be contained in telecommunications.
- **Ann:** You want them to know it?
- **Tina:** Need to understand SIP in this area.
- Conclusion: comments were this section is broadband modulation and need to be with Telecommunications Basics.
- **Ron:** Telephone companies and cable companies can be looked at in the same way because they are basically providing some services.
- **Ron:** Quality of Service. I'm surprised to see this. Can take it off.

21. **BROADBAND ACCESS METHODS**

22. **SERVER NETWORK DEVICES AND SERVICES**

- Conclusion: Not necessary to teach "mainframe computers" much anymore.
- This category is covered in a lot of the other areas.

23. **NETWORK DEVICES-CONNECTIVITY COMPONENTS**

- This is an important topic.
- Remove - RJ45, Wireless Repeater, etc.
- **Ann** Conclusion: Use a Tiger Team to decide what to include and what to get rid of for this section.

24. **TROUBLESHOOTING & EQUIPMENT REPAIR**

- Conclusions: Troubleshooting is critical. But Equipment Repair could be separated.
- It needs to be standardized by the curriculum.
- **Corey**: Needs to be pushed back into specific technologies.
- **Glenn**: Troubleshooting is mostly diagnostic.
- **Scott**: If you are a technician you need trouble shooting skills.
- **Larry**: It is based more on the instructor. Leave it up to the instructors how to design the course.
- **Ron**: Need to break this up.
- **Glenn**: In the business world we expect it.
- **Scott**: Kepner teaches you how to troubleshoot. You have a thought process and can take those skills and apply to other technologies.
- **Corey**: Teach this at the physical layer. Need to be taught in the class where the network is built/configured.
- **Tina**: included elsewhere?

25. **Safety & Environment Requirements**

- **Larry:** This is a chapter.
- **Corey:** Needs to be split and put into other areas.
- **Ron:** Yes, some is important as to how requirements came into it.
- **Gordon:** CompTIA as part of the A+ exam.
- **Larry:** Create a chapter then a certificate on compliance.
- **Glenn:** Compliance is out of our scope.
- **Larry:** I meant safety.
- **Glenn:** Hazmat, etc., is good stuff but not needed.

26. **Public Switched Telephone Network**

27. **MAN & WAN TECHNOLOGIES**

28. **NETWORK INFRASTRUCTURE MONITORING & RESTORATION**

- Re: NOC – **Gordon:** This came from Verizon
- **Scott:** There are a lot of NOCs.
- **Larry**: NOCs are moving off shore
- **Glenn**: Move back to Network Administration.
- **Ron**: Troubleshooting and network repair.
- **Glenn**: Make sure you have systems troubleshooting.

29. **CONVERGENT NETWORK TECHNOLOGIES**

- Conclusions: It was agreed upon to form a Tiger Team to work with revising this section.
- **Tina:** Need to talk about communication (CPV and web services). Also there's nothing about contact centers. There's a lot of convergence technology in Contact centers. 80% of centers now – require ACD.
- **Ron:** Covered under Unified Communications?
- **Corey:** Challenge is the official voice for Cisco has been created. Challenge in teaching is whether we have a product to demonstrate in the lab. This generation wants to see, touch and feel the devices. It's easier to create with Google voice.

30. **NETWORK DEVICE BACK-UP & RECOVERY, FAULT TOLERANCE**

- **Timur:** DR and VC.
- **Corey:** Network storage high availability and there is a network component to high availability. There are two levels – there's Network Storage and then a "Network "component. One for data store and one for the actual network piece.
- **Glenn:** High availability vs. redundancy. Two pipes and two routers. It's redundancy. When you get into storage, it is a different kind.
- **Glenn:** Voice quality monitoring seems out of place.
- **Ron:** Do you move that into another area?
- **Ann:** Monitoring and restoration. Restoration should be moved into this area.
- **Kurtis:** Some of what you are talking about is in the cloud.
- **Craig:** This is covered in network administration class.

- **Bill:** It is in almost every class.
- **Gordon:** Need to add video. It is important to remember what is core – TCPIP.
- **Corey:** We're thinking across the whole thing because of resources, time, etc.
- **Tina:** Seem to be focused on technology, but when I work with analysts they go to the business to get needs and requirements. Students will struggle if they are taught technology only. Need to be able to do a simple return on investment and communication basics.
- **Glenn**: Don't combine or remove this section.

31. **OTHER TOPICS ADDED BY BILT**

- Video Conferencing is missing.
- **Ann:** Certifications do cover many of the KSAs, but that could be done in email with the objective list and rank in order of importance.

WRAP UP BEFORE LUNCH (Ann Beheler):
- Stopped before the "Certifications" list.   Ann suggested sending this out by email for them to rank by 3 areas: (1) Large Enterprise (2) Small-Medium Enterprise (3) Overall. We will work more on this in February.
- And to include comments on "Core," "Specialty" – as to how important the certifications are.

TIGER TEAM AREAS & VOLUNTEERS
1. **DATA CENTERS** – Corey, Kim, Ron, Tina will get someone from Avaya, Timur and Ann Br.
2. **TELECOM, PSTN, Convergence** – Larry, Gordon, Tina
3. **UNIFIED COMMUNICATIONS** – Ron, Tina, Scott, Glenn