National BILT Meeting Minutes

CHAIRPERSON: Matt Glover, Le-Vel

MEETING DATE:
Tue, February 11, 2020
MEETING TIME:
8:30am-10:00am Central
MEETING PLACE:
Zoom

RECORDER: Mark Dempsey
RECORDING:
Available upon request
PREVIOUS MEETING:
November 19, 2019

MEMBERS PRESENT

BILT:
Phil Andrews, Biz Smarter
Amy Arnold, City of Lewisville
Curtis Burchett, NetApp
Aaron Burciaga, HCL
Susan Coefield, VMware
Carolyn Corbin, Center for 21st C
Vincente D’Ingianni, Raytheon
Ivor Flannery, Red Line
Matt Glover, Le-Vel
Tu Huynh, ComERICA
Karen Jensen, Saaby
Corey Kirkendoll, 5K Technical Services
Grace Kungu, Infosys
Kurtis Sampson, Philips
Candy Slocum, InterLink
Scott Veibell, Cisco
Glenn Wintrich, RDM Innovation Training

CCN educators:
Shakour Abuzneid, Univ of Bridgeport
Nisheeth Agrawal, Athens State Uni
Terryl Bailey, Allison Group
Ericka Bernhardt, Gateway Tech
Laura Berry, North Ark
Skip Berry, Riverside
Pam Betts, San Jacinto
Ronda Black, Gallatin
Yvonne Blakshae, Texas State
Rick Brunner, Collin
Bruce Caraway, Lone Star
Julian Carranza, El Centro
Felix Davis, College of DuPage
Mike Eilerman, Rhodes State
Rafat Esharef, Milwaukee Area
Kathy Fant, Collin College
Patrick Feder, Milwaukee Area
Ernie Friend, FSCJ
Mike Eilerman, Rhodes State
Richard Grotegut, Bay Area CCC
Douglas Hamm, Lakeshore Technical
Susan Hoggard, Tulsa CC

Kyle Jones, Sinclair CC
Glenn Jones, Tulsa
Chris Kadlec, Georgia Southern
David Keathly, UNT
Brian Kirsch, Milwaukee Area
Deb Kutrieb, Wisconsin Indianhead
CyndiKaye Lambach, Waukesha
Dante Leon, Daytona State
Xintao Liu, Herzing
Rebecca Marschner, Gateway
Jim Maxson, Tulsa
Ryan Murphy, Sinclair
Brian Nelson, Lansing
Ryan Pierce, Louisiana Delta
Susan Randall, Cleveland CC
Adam Rocke, Seminole State
Roshani Shrestha, Eastfield
Susan Svane, North Central Texas
Frank Yildiz, Sam Houston State
Saad Yousef, Gateway
Solomon Zewde, Houston

CTC staff: Ann Beheler, Mark Dempsey, Christina Titus, Debbie Miller, Amy Garrison

Agenda items

Trends format
(BILT members)
Using a new format when discussing the trends
* Define the trend
* Discuss the ramifications for educators
* Look at the trend’s timing/adoption
* Identify the mashups needed to make the trend successful
* Project possible risks

Trends/IoT, security, digital twinning, and the “mash up”
(Glenn and Matt)
Glenn discusses edge computing. The biggest area this will be used is with IoT devices.
Blockchain will become an important feature to address the lack of IoT device security.
IoT and blockchain will be “mashed up” with 5G and the concept of “digital twinning.”
Digital twinning is the equivalent of creating the biggest and most accurate sandbox, but all done virtually without any real equipment. Digital twinning is an old concept. GE
Trends/IoT curriculum (BILT members)

has long had the practice of creating a digital twin of any new wind turbine or jet engine to test changes and modifications. In IoT, digital twinning will serve the same purpose: the rapidly test solutions like in an oil field full of thousands of IoT devices. This could become common in the next two years (2021-2022). It’s advances in storage, computing, and AI that is bringing this trend into the mainstream. The business advantage is that it reduces your processing and implementing cost 10%-30%. You can test a lot of iterations rapidly and concurrently. Capgemini and Autodesk have both launched cloud-based software for digital twinning. Glenn recommends setting Google alerts on this topic to watch how it develops.

Matt notes the way technologies are “mashed up” is giving us a great capability to change paradigms. Some cities use urban microphones to sense gunfire, then triangulate the sound to send police without having to receive a 911 call. As 5G and IoT proliferates, more and more of these applications will emerge. It’s the power of how these technologies are pooled together. It’s not just the one, it’s the many. It’s the creation of new applications that will create the paradigm shift. Students need to be thinking about this kind of “mashup” approach.

Glenn says this has long been the capstone approach: students mash up firewalls and networks to build a specific solution set. More and more, blockchain is touching the networking space because it’s helping secure IoT devices. Students will need to know more about blockchain.

Glenn recommends faculty look at this paper on “next gen” IoT devices, which can help them consider ways it might fit into the curriculum:

Ann wonders if IoT is a separate job cluster. Glenn says no – it’s no different than an IP phone and we’d never consider creating an IP phone cluster. It’s just a device tied to the internet. The critical thing is that IoT is interacting with the cloud and/or edge computers without any interaction with humans or data centers. This is why architecting and security are so important.

Matt gives the example of a delivery drone that follows a series of on-the-ground IoT sensors during flight and uses internal IoT sensors to monitor propeller performance. If any sensor fails, the drone turns around and flies home immediately. Many technologies are “mashed up” here together, connecting networking engineers and software engineers and mechanical engineers. Note also that with so many “dumb sensors” transmitting so much data, you don’t want hackers getting involved and hijacking drones. Locked-down security is essential.

Glenn agrees: the only thing slowing down IoT right now are the security concerns. Once the security gets stronger, the IoT solutions will become more viable.

Chatbox question: what should we teach in IOT curriculum? Glenn says the first thing is to consider how IoT fits into the network architecture. Looking at thousands of IoT devices in the oil fields, how does the data go back and forth? What are the real-time requirements? How do you secure it? For now, students can look at the high-level elements, but soon we’ll have to start teaching the skills needed to maintain an IoT network. Matt urges students to learn about real use cases of how IoT is being implemented and how so much of it is “mash up” technology. Dare them to dream. Ask what they would do with 5G and IoT.
| Trends/Programming language (BILT members) | Rick recommends the Phil Koopman’s book Better Embedded Systems Software. It’s a big change for how we prepare people for embedded computing and real-time OS.

From the BILT chatbox: the IOT discussion would not be complete without including risk assessments. Glenn agrees that students should understand that any network has risks. Every time you architect a solution you need to assess the risks. Rick notes more and more merging of security and safety, especially with autonomous vehicles. Matt agrees that technology is only adopted once it’s considered safe. If a delivery drone ever falls and hurts someone, the drone business will be shut down.

What programming languages should students be learning? Matt says that he has a hard time finding people highly skilled on “front end” technology, which means HTML5. It’s not a language but a solution stack that includes HTML (describes the web page and provides structure), CSS3 (presentation and interaction), and Java script (allows for responsive, interaction to enhance user experience). Matt pays big salaries to people who are talented at HTML5. When a developer says “I am a full stack developer from front to back” Matt says they usually hate doing the front-end stuff.

Matt lists these as important languages:
- Java
- C#
- Python
- C++
- .NET
- PHP

The big difference is just between Microsoft people and non-Microsoft people.

Matt asked several developers what they think about certifications. Most of them didn’t think anything about certs. To get jobs, they had to go through a series of interview questions. It could be an eight-hour interview when they must use a whiteboard to solve specific coding problems. It’s not “Do you know Java?” and you’re hired if you say yes. Applicants must demonstrate the skill to the employer.

Ann notes that Microsoft and others have tried to create development certifications – and spent millions trying – but none have caught on, likely because you have to prove the ability. Another strategy for students is to post code on GitHub, which can catch the eye of employers.

Matt says the certifications that developers found important had nothing to do with developing: AWS (38 out of 40) and Azure (18 out of 40) certifications. These are important because of the DevOps concept – rather than waiting for the infrastructure people to do the work for them, the developers can do it themselves. These extra cloud skills are more attractive to hiring managers. Cross-trained developers that know multiple languages are in high demand.

Scott offers another perspective from the TAC center. While his employees are all technical support phone people, they do need to know Python. Those who take customer service calls on the phone use automation tools to do the job more efficiently. So even if you have someone who doesn’t want to be a developer, Python and scripting are still important skills and will get them hired. |
| CTC updates – Summer Working Connections (Ann Beheler and Mark Dempsey) | Summer Working Connections will run July 13-17 in Frisco. Registration will launch at the end of March. Seven tracks currently in the works:
1. Wireshark
2. Mobile App Development
3. Python
4. AWS Architecting (last summer we offered AWS Cloud Foundations)
5. Azure
6. vSphere
7. Leadership Academy workshop, which is a best-practices track that will teach the BILT model and KSA process, plus feature 1.5 days with Carolyn Corbin on her “Indi-preneur” life skills

Summer Working Connections offers faculty a deep dive into a single-track IT topic with the goal of taking that it back to their home school and implementing it in an existing course or creating a new course.

Ann asks about the value of AWS developer certificates. Matt says that cert is valuable mainly for developers. AWS Architecting is more on the infrastructure side. Matt says again that his team isn’t a “one trick” group. They have multiple skill sets.

Ann notes that just as Cisco did a good job getting CCNA adopted across the country, AWS is trying to do the same thing by investing money and resources. AWS is developing even more courses that will be launched soon.

There is no clear answer to the chatbox question “What AWS certs are in demand outside of development?” Ann believes certification popularity waxes and wanes based on the availability of trained people in the marketplace.

Matt would be interested in seeing a report on AWS certifications to compare who’s taking which cert to who’s putting which cert on their resume to who’s getting hired. |
|---|---|
| CTC updates – BILT training and dissemination (Ann Beheler and Mark Dempsey) | The CTC presented sessions on the BILT at the WASTC conference in San Jose (Jan 2020) and has been accepted to present at HITEC in Portland (July 2020) session. The CTC also always has a exhibit hall booth presence.

The CTC presented a session at the NCNP conference last fall and was asked to convert that talk into an article for their January 2020 newsletter.

The “Day in the Life” video series – interviews with six BILT members about workplace realities – is being edited down into shorter clips that focus on single questions. The hope is that these will be more useful in the classroom.

The CTC will be producing short “break time” videos on specific BILT best practices and strategies plus also testimonial videos from administrators talking about the importance of the BILT to encourage others to adopt the model.

Ann continues to train entire college campuses to implement the BILT model and notes how the NSF continues to stress to grantee the importance of the BILT. Some who claim a BILT, however, are not necessarily following all of the tenets of the model and need further training. Ann will be participating in an NSF “office hours” online session on the BILT this spring. |
Each Wednesday, Amy posts to Twitter and Facebook a short #BILTwednesday tip. In 2019, 40 #BILTwednesday posts earned 10,867 impressions on Twitter. [https://twitter.com/search?q=%23BILTwednesday&src=typed_query](https://twitter.com/search?q=%23BILTwednesday&src=typed_query)

Last fall, the CTC introduced a new way to handle the KSA vote using free Google forms that automate the tabulation. This could be a “game changer” that overcomes resistance to the KSA voting process. Some complain the hand count takes too long. With the Google system, more time can be spent talking rather than counting. At least ten CCN schools are testing it with their local BILTs. The CTC also created a detailed process document and a 20-minute video on how to set up the Google system: [http://bit.ly/KSAgooglevideo](http://bit.ly/KSAgooglevideo)


Ann was recently named one of the “Future 50 Innovators and Disruptors” by Dallas Innovates, calling her a “connector” that bridges education and business. Ann remembered being interviewed, but was surprised to learn she made the list. [ow.ly/HRxM50yejhS](ow.ly/HRxM50yejhS)

Looking ahead to 2020, the CTC will begin publishing short “BILT Notebook” quarterly newsletters to share best practices, news, and trends for the BILT to encourage adoption. The primary audience will be the 145 emails of attendees from the last two years of BILT conference sessions. The CTC is also considering a two-day, in-person “BILT Employer Engagement Summit” for the CCN in the fall 2020 to further provide training for the BILT model.

**Finalizing draft “hosted cloud KSAs” (Ann Beheler and Mark Dempsey)**

A “Tiger Team” (educators and BILT members) was assembled to fulfill the BILT’s request to address workforce demand for hybrid/multi/hosted cloud skills. The idea is to create a hands-on student group project (using industry SAFe methodology) that mimics the real-world workplace. The project would either form the basis of a capstone or be implemented into an existing class. The goal is to pilot the project in the classroom Fall 2020.

The “Tiger Team” is developing the KSA outcomes for the cloud project. A pro forma list of estimated KSAs has been created and the CTC needs the BILT’s help verifying and finalizing that list. At the last “Tiger Team” meeting, there was concern that the current KSA list was missing items; we are supplementing that original list with KSAs from other sources. Once the KSA list is confirmed by the BILT, educators can then identify which of the skills will be “new” for the project (and must be taught alongside the project) and which might have been covered in previous classes. This list will go out soon to the BILT via email.

Ann thanks Rick Brunner for his help listening to the many Tiger Team meeting conversations and creating a companion KSA list. It’s been hard to get traction on this project, likely because the landscape is changing.

**“Future Studies Search Approach” (Glenn Wintrich)**

The chart below shows some of the most important steps in research and are especially relevant for researching the future of IT. You must narrow and refine your search or else you’ll get millions of articles.
Create a “tripwire” surrounding an emerging technology trend challenge or bottleneck so you’ll be notified when certain conditions are met that suggest the trend is going to enter the mainstream.

For educators, Glenn recommends three tripwires:

- A competitor has joined a new technology partnership or alliance (for example, if IEEE starts a group on a topic or publishes a standard)
- Early adoption has started (could be startups and adoptions in other industries)
- Underlying IT products and services are now commercially available (remember that just because technology has advanced doesn’t mean a business solution exists; only after the solution solves a clear business challenge will the technology enter the mainstream)

When the trend is getting closer to mainstream adoption, you need to set a “call to action.” Glenn likens it to a smoke alarm that’s going off. It’s not enough to have one; what are you going to do when it sounds? He suggests...

- Assign someone to become knowledgeable on the tech and become an SME
- Look for potential partners or alliances in marketplace (i.e. get a vendor to come in and talk to you about it)
- Bring technology into IT sandbox

See Appendix A for Glenn’s “necessary conditions for technological success.”

When it comes to getting Google search criteria, Glenn suggests these strategies:

- Search images to speed up the process (you can scan images faster than text)
- Go wide (one year) for your custom search at first to get a handle on the topic, then narrow it down to three weeks or so
- Use search operators (i.e. a hyphen before a word will exclude that term; a tilde before the word will return synonyms which can be valuable in forecasting because sometimes you don’t know the right word)

Whatever narrowed search you eventually settle on can drive the settings of your Google Alert (google.com/alerts).
Another alert tool Glenn uses is Talkwalker (talkwalker.com/alerts), which searches news, blogs, and Twitter in addition to Google. He also recommends shapingtonorom.com which uses AI to scan technology news.

Ann signs up for newsletters and feeds. In most cases, you’ll see only a one-line summary that you can click open to learn more or ignore and delete. Matt suggests Cheddar.com that provides leading-edge news and articles and helps him see how existing trends are getting mashed together.

Other suggestions for ways to keep current in IT came from educators in the chatbox:
- edX
- Coursera
- Attending free seminars from technology
- Meetup groups
- Udemy (offers course sales sometimes)
- LinkedIn Learning

For those who might start following these guidelines and researching IT trends, Glenn urges them to consider contacting the CTC to schedule time on a BILT meeting agenda to share with the larger group. Glenn would like to see more people participate and engage in the regular trend discussions.

**ITSS project update**

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<th>(Ann Beheler and Christina Titus)</th>
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<td>Next step is to send out results from the “Infrastructure,” “Technical Support,” and “Project Management” cluster meetings to the meeting attendees for comment and validation. (The “Infrastructure” list is mostly done – the final step is to include the cloud KSA as mentioned earlier.) Once the meeting attendees provide their feedback via customized spreadsheets, the revised KSA list will be posted online. Then the team will begin experimenting with ways to manage a curated crowdsourcing approach to keep the list current and up to date.</td>
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<td>Recruiting has started for the next set of cluster meetings for “Data Analytics and Predictive Modeling” – March 12 meeting in Virginia, March 31 in Texas, and another in California with the date TBD.</td>
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<td>The “thought leaders” who identified the clusters will be re-convening soon to identify the final 2-3 clusters.</td>
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**LinkedIn poll responses**

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<td>The monthly poll on the BILT’s LinkedIn group page offers a good way to connect businesses and educators outside of the quarterly meetings. If you’re not a member, send us a request and we’ll approve you. LinkedIn BILT group page: <a href="https://www.linkedin.com/groups/5106773">https://www.linkedin.com/groups/5106773</a></td>
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<td>One recent poll question: “BILT members and educators, what’s the one technology or trend you believe will present the biggest change for IT curriculum in 2020?”</td>
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<td>The answers included:</td>
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<td>- Multi and hybrid cloud</td>
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<td>- Cloud is huge. Also, virtualized networking [NSX, Guardicore, etc] has become something I’m seeing a lot of as well…</td>
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<td>- Cloud and the new CCNA curriculum will be a challenge.</td>
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<tr>
<td>- We are working on Cloud at this moment. Getting instructors certified is a challenge. Also, getting involved in the advanced topics such as Docker and Kubernetes, automation, machine learning and data science is a big change in</td>
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mindset for our staff. It will take time, which we do not have, and a lot of effort.

- We are in the "getting instructors certified" phase ourselves, which is very labor intensive for them alongside their current class loads.
- 5G is going to bring a whole new generation of applications and end devices - vehicles, manufacturing, health, education, etc, feeding the cloud and communicating device to device. 5G will require backbone updates to optical and the optical network will continue to be pushed out closer to the end devices. This means more small-cell 5G antennas - people are talking an antenna every 150 feet on highways as an example. High speed, low power and low latency is going to spawn a whole new generation of end devices and applications.

| HITEC update  
(Ann Beheler) | Ann announces keynote speakers for the HITEC conference (July 27-30) in Portland:  
1. Laura Chappell (Wireshark University) will discuss the inter-plenary internet  
2. Richard Bliss, a high-demand social media consultant, will talk about 5-6 things you can do to strengthen your LinkedIn profile so attendees can teach their students; the last section of Richard’s keynote will focus on ways to use LinkedIn to track graduates which is always an ongoing challenge  
Ann also notes the CTC is hosting a special one-day workshop on Monday, July 27 at HITEC covering a number of IT and cyber topics and trends; “Level 1” CCN members will be able to receive some travel reimbursement help  
HITEC: https://www.highimpact-tec.org/ |
| InterLink news  
(Candy Slocum) | Candy thanks the BILT members who participated in the “Expert to Expert” panel in Fort Worth in November 2019.  
InterLink will soon be sending out its annual labor market survey and hopes Ann will forward it along to the CTC BILT; Ann notes that InterLink has been a partner since the CTC’s inception  
InterLink: http://www.interlink-ntx.org/ |

**Next Meeting:** annual KSA voting/discussion - Tuesday May 5, 2019 (8:30am-2pm Central) – in-person for locals to DFW; via Zoom for others

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**Appendix A**

### Necessary Conditions for Technological Success

- Functionality is as advertised
- Reliable
- Attractive price point for purchase, integration, maintenance, & support
- Dependent technologies are in place
- Integrates well with existing technologies
- Secure
- Minimal to no unintended consequences or social/economic issues
- Standardized and interoperable
- Competitively superior to alternatives to satisfy “Jobs to be Done”