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NCPACA

New Technology Impact Fall 2018

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Subtitle

Who Stole My Lunch???

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Your Asks

- Artificial Intelligence
- Data Analytics
- Update on Technology

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My Outline

- Technology Update
- Artificial Intelligence
- Data Analytics
- Cybersecurity

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My Singular Goal & Gift

- Understanding New Technologies & Situations that will impact Us and Our Clients
- Recommendations

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Old, New, Newer, Newest Technology

- Old
- New
- Newer
- Newest (the *bleeding* edge)

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Technology

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“Accounting Tech” 2018

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Old Dependable

- **Accounting Systems – ERP** (Enterprise Resource Planning)
 - Run Our Client’s Businesses
 - Aren’t glamorous but gets the job done (arguably)
 - Exception – Technology Companies
 - Source of Our Accounting/Audit Numbers
- **Tipping Point – SAP R/3** (Early 1990s)
 - Integrated Business/Accounting System – Monolithic
- **Newest**
 - Cloud Accounting Systems & Cloud Apps
- *NEXT?*

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Old Dependable

- **On-Premises Computing**
 - Advantages:
 - Under Business’ Control
 - Buy Once – Use ‘til Death (of equip)
 - Shift Away from On-Prem:
 - Shrinking IT Depts – Decreasing IT Skills
 - Orientation – “Break Fix” & Desktop
 - Outsource Infrastructure Support
 - Ramification
 - Unable to Manage IT

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“Postmodern ERP”

– Gartner, *Integration is Key to Postmodern ERP*, Nov 15 2016.
 See also *Adopt a Strategic Approach to Application Integration for Postmodern ERP and Business Applications*, ID: G00279622, July 28, 2015.

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What’s This Look Like?

Accident rather than Design

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New Challenges & Opportunities

- **Big Themes in IT**
 - Use Someone Else’s Computer (Cloud)
 - Recurring Revenue – “Monetize”
 - Computerize Everything (IoT)
 - Computers that “Think”
 - Cybersecurity Challenges

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The Sales Pitch

- **Cloud Computing**
 - Expandability (“Scale”) – Flexibility
 - Dependability
 - Reduce Customer Responsibility
 - Collaboration
 - Better IT Security
 - Reduce Cost – Cost Predictability?
 - Disaster Protection
 - More for Less

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Driving Our Suppliers

- “Monetize”
- **Recurring Revenue**
 - Rent Don’t Own
- **Single Vendor – “Ecosystems”**
- **Dominant Market Segments**

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Old Meets New

- **Ramifications**
 - Vendors have More Control
 - Vendor “Lock In”
 - Increasing Costs
 - **Management:**
 - “IT’s Invisibility”
 - Have Less In-House IT Skill; Need More IT Skill
 - **Concentration – Control**
 - **Customers More Dependent on Suppliers**

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Technology Evolution – Revolution

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Gartner Hype Cycle

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Figure 1. How Emerging Technology Trends Move Along the Hype Cycle

Source: Gartner (July 2017)

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The Take Away

- IT
 - Constant Change
 - Dramatic Change – Maybe Traumatic
 - As a Center of Innovation
 - Businesses More Reliant on their Systems to Do Business

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What's No So New?

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Not So New Anymore

- Virtualization
 - Enables Resource Sharing
 - Cloud Building Block

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Not So New Anymore

- CRM
 - Contact Managers → CRM → Customer Platforms
- Social Media
 - What's Happening?
 - Catches/Makes the News ... Occasionally
- Online Retailing
 - “Bricks” and “Clicks”
 - Amazon does Bricks; Retailers do “Clicks”
- Digital Businesses

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Not So New Anymore

- **Cloud**
 - **Three Models:**
 - Infrastructure as a Service (IaaS) – (AWS)
 - Platform as a Service (PaaS) – (Salesforce.com)
 - Software as a Service (SaaS) – (Google/Facebook)
 - **Differences are Important Because**
 - Nature of Service
 - Control & Responsibility
 - **Resellers & Managed Services Providers**
 - Another Layer

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Newer – Newest

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Newer

- **Evolving Technology**
 - **Convergence (HyperConvergence)**
 - Digital & Analog
 - Physical & Digital
 - Bots, Chat, Integrated Voice Response (IVR) and Auto Attendant Systems
 - **Software Defined**
 - Software Abstracting Hardware
 - Cloud Infrastructure Foundation
 - Provisioning – Scaling

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Newest – Bleeding Edge

- **Subscription (Rent/Lease)**
 - Long Term Cost?
- **Internet of Things (IoT)**
 - Self-Driving Vehicles
 - Customer Experience
 - Exploit Vector – Krebs on Security & DDOS
- **Edge Computing**
- **Quantum Computing**

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Newest – Bleeding Edge

- **Artificial Intelligence – Machine Learning**
 - Learning – Deep Learning
- **Blockchain**
 - More than Cryptocurrency
 - Distributed Encrypted Ledger
- **Augmented/Virtual Reality**
- **No-Code Low-”Code**
 - “Citizen Programmers”

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Newest – Bleeding Edge

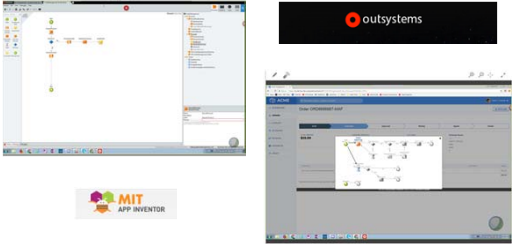
- **Artificial Intelligence – Machine Learning**
 - “Early adopters of artificial intelligence (AI) are finding positive return on investment and cost certainty, according to the *Computer Economics Technology Trends 2018* study. AI, along with the Internet of Things, is the newest technology to be added to the study, and it appears that despite current low adoption and investment rates, AI will have a growing role in business in the years to come.”
 - Computer Economics, 3/21/2018
- **Machine Learning**

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Newest – Bleeding Edge

- No-Code Low-Code



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The slide features two screenshots. The left one shows the MIT App Inventor interface with a visual programming canvas. The right one shows the OutSystems low-code development environment with a visual workflow designer. The OutSystems logo is also displayed in a black box between the two screenshots.

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Newest – Bleeding Edge

- No-Code Low-Code
 - Visual Programming
 - Software Objects Build Apps (Lego)
 - Experimental Approach
 - “Citizen Developers”
 - IT Audit Perspective – *Yikes*
- Renewed Interest in Open Source
 - Post Windows World
 - Open Source – Not Thoughtless Development

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Newest – Bleeding Edge

- Digital Transformation
 - More than “Going Paperless”;
“Information Based Decision Making”
 - New Solutions to Traditional Problems
 - For Accountants – Spreadsheet,
Then Automated Accounting Systems
 - New Types of Innovation
 - Artificial Intelligence – Machine Learning

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Gartner Predictions - 2018

1. Consumers Favor Visual/Voice Search
2. Digital Giants Self-Disrupt
3. Legitimized Cryptocurrencies
4. Increased Fake News
5. Counterfeit Reality Overtakes Reality
6. Bots Take Over
7. Versatility Wins Over Specialization
8. AI Creates More Jobs Than It Takes
9. IoT in Everything
10. Assume IoT Security Vulnerabilities

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Newest

- **GDPR (EU)**
 - General Data Protection Regulation
 - Data is Person's Right/Asset; Stronger ways to control that Right
 - US: Firms Monetize their Data
 - Rights:
 - Data Erasure – "right to be forgotten"
 - Implications
 - Data Collection – What
 - Data Access – Who

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Newest

- **GDPR (EU)**
 - Breach Notification
 - Within 72 hours (in contrast to Equifax)
 - Financial Services
 - EU Investors
 - Representative Offices in EU
 - Employees in EU
 - Marketing/Solicitation Aimed at EU (language or euro-denominated)
 - EU residents touched in any way/shape/form

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EUGDPR.org The Regulation The Process More Resources Our Partners

The EU General Data Protection Regulation (GDPR) is the most important change in data privacy regulation in 20 years - we're here to make sure you're prepared.



TIME UNTIL GDPR ENFORCEMENT
UTC
65:00:50:54
Days Hours Minutes Seconds

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Newest


- **GDPR**
 - Facebook, Google, Apple, Amazon, LinkedIn Sued
 - \$8.8 billion in GDPR related lawsuits on day one
 - Filed by Austrian Privacy Activist Max Schrems
 - Websites loading faster in Europe because third-party software removed
 - The Verge, IDG, MartechToday

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Newest

- **California Consumer Privacy Act of 2018**
 1. The Right
 - to know what personal information a business collected about us
 - where it came from (source),
 - what it is being used for,
 - whether it is being disclosed or sold,
 - to whom it is being disclosed or sold;
 2. To "opt out"
 3. To have personal information deleted
 4. To equal service and pricing even if we exercise own privacy rights



– www.caprivacy.org –

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Accounting & Auditing

- **Internal Controls**
 - Embedded in The System
 - Correct? – Appropriate?
 - Reliable? – Dependable?
 - How Know This?
 - Impact on Business; Business Impact on Controls
- **Connotes a Sample**
 - Didn't Look at Everything
 - Switch from Sampling to Entire Universe
 - Analytic Tools Identify Transactions/Situation for Audit
 - Less Need for Rote – Need for Critical Analytical Thinking Skills

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Blockchain




- **Durable Record**
 - Distributed Ledger
 - List of Records/Blocks (data) linked using cryptography
 - Block contains cryptographic hash of previous block
- **Examples**
 - Farm to Table – Drugs to Patient)
 - Foreign Currency
 - Cryptocurrency

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Blockchain




- **First Hacks**
 - June 2011 Allinvain – Stolen Bitcoins from his hard drive
 - August 2011 – MyBitcoin disappeared
 - March 2012 – Linode vulnerability exploited
 - ...
- **Attacks**
 - Human Error Entering Blockchain Transactions
 - 51 Percent Attack
 - Implementation Errors
 - Compromised Smart Contracts
 - Using Undetected Blockchain Vulnerabilities
 - Maria Korolov, "5 Ways to Hack Blockchain Int eh Enterprise", [CSO](#), July 16, 2018.

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Blockchain  


- **Data Integrity**
 - Initial Integrity
- **Mining**
 - Solving complex mathematical problems, Generating unique cryptographic hash, Creating Value (cryptocurrency)
- **Cryptography – Encryption**
 - Essential
 - Quantum Computers – Potential to Break Cryptography

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Blockchain 

- **Cryptocurrency**
 - Accepted Store of Value?
 - Remember Derivatives (CDOs) and 2008
- **Credentials (Wallet)**
 - Don't Loose Your Credentials

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Artificial Intelligence 


- **Automation Evolution**
 - Machinist → CNC → Lights Out Mfg

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Artificial Intelligence

- Automation Evolution
 - Machinist → CNC → Lights Out Mfg



→

- Unable to Measure Variation in Wing Skin

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Artificial Intelligence

- Automation Evolution
 - Machinist → CNC → Lights Out Mfg
 - ERP Systems Business Rules
 - Determine When to Buy (Replenishment), When to Build (Schedule)
 - Processing Large Amounts of Data, Suggest an Action

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Artificial Intelligence



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Artificial Intelligence

Person of Interest:
Q: What Would "Root" Do?
A: Collected a Lot of Data
93% Probability
that Root would do _____
to 95% Confidence

- Cause and Effect → Inference → Learning

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Artificial Intelligence

- Four Components:
 - Gather Large Amounts of Data (examples)
 - Process Vast Amounts of Data
 - Do Something with The Data
 - Propose an Outcome or Intervention
 - Remember What You Did ("Learn")

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Artificial Intelligence

- "We've trained the tool using over 1 billion journals, and now, using advanced algorithms, it can analyze billions of data points in milliseconds and apply judgment to spot items of potential error or fraud," said Gilly Lord, head of audit strategy and transformation at PwC."
-- Sooraj Shah, "How Accounting Firms Can Tap into Benefits of AI," Journal of Accountancy, May 17, 2018

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Business Analytics

- Business Analytics
 - Capturing
 - Evaluating
 - Finding

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Business Analytics

- Business Analytics
 - Capturing & Organizing
 - Enormous Volumes of Data
 - Internal and External Data
 - Evaluating
 - Tools & Methodologies
 - Finding
 - Exceptions
 - Trends
 - Relationships – Correlations
 - Insights – Learnings
 - Displaying
 - Reports
 - Visualization

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Artificial Intelligence

- **Person of Interest - Root**
- **“The Machine”**

“The Machine: ‘I was built to predict people. But to predict them, you have to truly understand them. So, I began breaking their lives down into moments. Trying to find the connections, the things that explained why they did what they did ... And what I found was, that the moment that often mattered the most, the moment when you truly found out who they were, was often their last one.’

Root gets to live on through the Machine, which could only be considered the highest of honors for her.”
- <https://www.youtube.com/watch?v=hRu2HtQSaRw>
- https://www.youtube.com/watch?v=f9rY1GH3_zk

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Accounting – Auditing

- **Accounting**
 - Complete, Accurate Record
- **Auditing**
 - Representational – “Fairly Represents”
 - Reductionism

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Accounting – Auditing

- **Accounting**
 - Complete, Accuracy Record
 - Automated Business Process Software Designed to Ensure Accuracy
- **Auditing**
 - Representational – “Present Fairly”

“In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of ..., and the results of its operations and its cash flows for the year then ended in conformity with accounting principles generally accepted in the United States of America.” – AU §508.08
 - End of Sampling

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Accounting – Auditing

- From “Tick & Tie” to Analysis
 - From Record Keeping To Thoughtful Application of Accounting Principles
 - Auditor’s Opinion will be Based on a Complete Examination (Not Partial)
 - Implications for Fraud Detection

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Who Stole My Lunch???

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Cybersecurity

- **Why?**
 - Internet – Interconnection
 - A Boom
 - A Curse
 - Motivation:
 - Money To Be Made
 - Chaos to be Sown

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Cybersecurity

- **Traditional Bad Actors:**
 - Curious Techies
 - Unhappy Ex-Employees
 - Quick Bucks
- **New Breed of Bad Actors**
 - Cybercriminals - Cybercartels
 - Cyberwarfare

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Cybersecurity – How?

1. **Know**
 - Where Data Is
 - What What's Going On

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Cybersecurity – How?

2. Implement:

- Cybersecurity Training
- Segmentation
- Firewall (Industrial Strength)
- VPN
- Endpoint Protection
- Replace Defaults Passwords and Settings
- Design Systems/Apps for Security

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Cybersecurity – How?

2. Implement:

- Encrypt Data
 - At Rest
 - In Motion
- Turn Off Everything You Can Turn Off
 - “Least Privilege” – Least Function
- Limit Public Facing Apps and Data
- Avoid Storing Privacy Data

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Cybersecurity – How?

2. Implement:

- Don't Trust
- Isolate – Segment
- Backup, Backup, Backup
 - Restore
- Offline
- Don't Copy Bad Over Good

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Cybersecurity – How?

3. Email:

- Phishing
 - Spear Phishing – Whale Fishing
- Don't Trust
- Check All Links
- Read Email Headers
- Warning Signs
 - Urgency
 - Conflicting Email Addresses
 - Superlatives (Unless the Sender is into Superlatives)

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Cybersecurity – How?

4. Assume Something Bad Will Happen

- Plan to Continue Operations

5. Don't Become a Target

- Oops, You Already Are

6. Consider Standby Systems

- Physically Offline Data
- Physically Offline System

7. Have Excellent Technical Support

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Final Thoughts

- **Technology**
 - Pervasive
 - Shift from Purchasing to Consuming
 - New Affordable Approaches
 - High Availability Systems
 - Elastic Systems (scale up/down quickly)
 - AI as a Service
- **Service Level Agreements (SLAs)**
 - Technically Performance metrics (99.999%)
 - Confirm Responsibility (Who Responsible What)

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Final Thoughts

- **Thinking – Different**
 - **Basic Assumptions – Different**
 - Consumption replaces Ownership
 - Access may replace Ownership
 - What Entitles Us to Own or Access?
 - All Devices will have Chips
 - Maybe People too
 - Ability to Process Data and Send for Storage
 - Will Privacy exist as a Concept?

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Final Thoughts

- **Understand Technology**
 - Have a Reliable Sage
- **Understand New Environment**
 - For Yourself – For Your Clients
- **Explore New Opportunities & Challenges**
 - Be Inquisitive
- **Be Cybersecurity Aware**
 - Take Appropriate Cybersecurity Measures

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Final Thoughts

- **Where Is Your Data?**
 - Why Rob Banks?
“That’s where the Money is.” – Attributed to Willie Sutton
- **Where is Your Data?**
 - Databases
 - SQL and NoSQL
 - Suggestion – Learn SQL

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Thank You

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