WHO SHOULD ATTEND

Telecom Analysts
Telecom Specialists
Voice and Data System Admins
Data Communications Staff
IT Business Analyst / Program Manager
Technical Project Managers
Telecom Field Installers / Engineers
Telephony Sales Representatives / Account Managers
Administrative and Support Staff from Telecom Industry Organizations

POST-COURSE WORKSHOP

Telecommunications Pricing and Billing Workshop for Utilities

FRIDAY, AUGUST 2, 2019
OVERVIEW

This 1.5 day course for non-engineering professionals will provide an overview of the history of the telecommunications industry and the application of that industry to utility communication networks. Attendees will discuss the new technologies, regulatory impacts, and market trends regarding utility telecommunication technologies. This is a basic course designed for anyone new to the world of telecommunications or for those who have traditionally supported the utility side of the business, which now includes telephony. We will define industry buzz words and acronyms, explore case studies about public and private networks for utility communication, and the emergence of new technologies like the application of 5G network equipment to existing utility infrastructure.

What are utility options for both wholesale and retail communication services? Consumers and employees are demanding new and faster ways of communicating. The focus on application integration for communication technology and the impact of the “cloud” is changing the way electric utilities do business and the technology required to support it. Who’s responsible for what? Why and how is “real-time communications” different from data communications? Join us to gain clarity on today’s confusing landscape and prepare to set your sights on the Next Generation Technologies.

In addition to the knowledge gained in this course, attendees will depart with valuable resources and industry links that will provide the opportunity for ongoing research and increased knowledge. This course is designed to encourage questions from the participants. It will be fun and interactive; however, no individual will be called upon or singled out. PowerPoint slides will be used to illustrate important points; however, it will not be death by PowerPoint and full of dry bullets.

The course will also cover the following:
- The history of the telephone industry and telephony regulation, for example the Bell System, and why it still matters
- Understanding the Public Switched Telephone Network (PSTN) and underlying technology
- The fundamental transmission concepts and physical networks needed to support real-time communications
- Cyber and physical security solutions for utility telecommunication networks
- Premises-based systems vs. cloud technology
- SIP trunks, Web-RTC, and Software Defined Networks
- Contact centers and self-service technologies
- What is going on in today’s marketplace and who are the key players?

LEARNING OUTCOMES

- Define the basic elements of telecommunications and their impact on today’s communication trends
- Build utility business case for implementing new technologies and collaboration processes to improve both internal and external utility communications networks
- Apply knowledge of infrastructure fundamentals to support advanced technologies such as Fiber to the Premise (FTTP), Wave-Division Multiplexing, and the latest in wireless technologies such as 5G, small cell applications, and future next generation networks
- Define and differentiate between network types like LANs, MANs, and WANs and the role in connecting users and services
- Explore the current technology options such as the application of EVs, IoT, AR, VR and SaaS solutions for data management, cyber security and operational functions
- Identify the FCC actions and other local and state regulatory impacts on utility telecommunication networks
AGENDA

THURSDAY, AUGUST 1, 2019

8:00 – 8:30 am  Registration and Continental Breakfast

8:30 am – 5:00 pm  Course Timing

12:00 – 1:00 pm  Group Luncheon

Introductions, Course Plan, and Expectations

Telephony Fundamentals

• Historical Viewpoint
  o Earliest Technologies and Inventions
  o The Bell System and Long Distance
  o Local Exchange Carrier (LEC)
  o IXCs, ILECs, and CLECs
  o Regulation and Competition
  o Comparing the PC Industry to the Telephone Industry
  o Resellers and Broadband Carriers
• Public Switched Telephone Network
  o Basic Model of the PSTN / Central Offices
  o Trunks and Circuit Switching
  o Voice Bandwidth
  o Digital Subscriber Line (DSL)
  o Synchronous Optical Networking (SONET)
  o Passive Optical Networking (PON)
  o Ethernet Over Copper
• Basic Telephony - Analog
  o Analog Signals & Circuits
  o Attenuation and Amplifiers
  o Interference and Crosstalk
  o Telephone Service Elements
  o Tip and Ring and Circuit Signaling
  o Loop-Start Signaling
  o E&M Signaling
  o In-Band and Out of Band Signaling
  o Supervision and Call Progress Tones
  o North American Numbering Plan
  o Interconnection and Point of Presence
  o ANI and Caller ID
  o E911 Routing
• Digital Telecommunications
  o Baseband vs. Broadband
  o Digital encoding / decoding
  o Time Division Multiplexing (TDM)
  o Digital Carrier Standards (DS0, DS1, etc.)
  o Multiplexers and Channel Banks
  o Integrated Services Digital Network (ISDN)
THURSDAY, AUGUST 1, 2019 (CONTINUED)

Telephony Fundamentals (continued)
- Voice over IP (VoIP)
  - Packetized Voice
  - VoIP Transmission
  - Quality of Service (QoS) Impact
  - Vocoder Comparisons
  - Codec Standards
  - VoIP System Components
  - Channels versus Packets

Physical Networking
- LAN Cables and Categories
  - Unshielded Twisted Pair (UTP) and Shielded Twisted Pair (STP)
  - Shielding Types
  - Twisted-Pair Copper Cabling Standards
  - TIA-568A vs. TIA-568B
- Fiber Optics
  - Light Pulses
  - Fiber Optic Basics
  - Multimode and Single-Mode Fiber
- Wave-Division Multiplexing: CWDM and DWDM
- Metropolitan Area Networks (MANs)
- Fiber to the Premise (FTTP)
- FTTN & Broadband Coax to the Premise
- Cable Modem Termination System
- DSL Access Multiplexer
- Wireless
  - RF Spectrum
  - Wireless LANs
  - WiFi Generations
  - Mobile / Cellular Technologies
  - 4G Cellular: LTE
  - 5G Cellular and small cell technology
  - Communications Satellites
  - Free-Space Optics
AGENDA

THURSDAY, AUGUST 1, 2019 (CONTINUED)

Switching
- Telephone Network Architecture
  - Transmission Network
- Legacy Telephony Systems and Key Features
  - Key Systems
  - PBX and PBX Trunks
  - Analog PBX - Switch Matrix
  - Analog vs Digital Telephony
  - Switching Evolution
  - Data, Voice, and IP
  - Direct Inward Dialing (DID)
  - Line Hunting and Call Forwarding
  - Attendant & Automated Attendant
  - Automated Call Distributor (ACD)
  - Interactive Voice Response (IVR)
  - Centrex
- VoIP Service, Hosted/Cloud Solutions
  - Session Initiation Protocol (SIP)
  - SIP Signaling
  - SIP Trunks
  - Session Border Controller
  - Multi-Tenant and IP-Centrex
  - Hosted / Cloud PBX Systems
  - VoIP Service Level Agreements (SLAs)

Key Network Concepts for Telephony
- ISO OSI Reference Model
- Wide Area Networks (WANs)
- Asynchronous Transfer Mode (ATM)
- MPLS Networks and Traffic Profiles
- IP Networks
- Virtual Circuit Technologies
  - Virtual Private Network (VPN)
  - Internet VPNs
  - VoIP Encryption

The IP-PSTN
- What is Cloud Telephony?
  - Consumer-grade Cloud Telephony
  - Enterprise Hosted Telephony
- VoIP Service Reliability
- Private Cloud
- Cloud Fit: Public vs. Private
- Web-RTC
- Software Defined Networks (SDN)
AGENDA

FRIDAY, AUGUST 2, 2019

8:00 – 8:30 am  Continental Breakfast

8:30 am – 12:00 pm  Course Timing

Recap of Day One and Questions from Attendees

Unified Communications
  • The Fuzzy Definitions
  • System Architecture and Convergence
  • UC beyond IP Telephony
    o Peer-to-Peer Video
    o Audio and Video Conferencing
    o Mobility
    o Instant Messaging
    o IM and Presence
    o Unified Messaging
    o Personal Assistant & Speech Access
    o Collaboration Players
  • Enhanced Systems
    o Contact Centers
    o Interactive Voice Response (IVR)
    o Communications Enabled Business Processes
  • Analytics and Reporting
  • Speech Analytics
  • Leading UC Manufacturers
  • Leading Network Services Providers/ Carriers
  • Leading UCaaS Providers

Latest Generation Technologies and Developments
  • Marketplace Trends
  • SD-WAN
  • The Internet of Things (IoT) and 5G Wireless
  • Communications Platform as a Service (CPaaS)
  • Virtual Reality Impacts and Applications
  • Intelligent Low-Voltage Lighting
  • Expansion of the Internet Cloud
  • Artificial Intelligence
    o Machine Learning
    o Deep Earning
  • Security Challenges and Tools
  • FCC Actions and Pending Issues
    o Net Neutrality
    o Automatic Location Information (E911 ALI)
  • Next Generation E911 Systems
  • The Future of Telecom

Course Recap and General Questions
  • Career Opportunities
  • High-quality Industry Resources
POST-COURSE WORKSHOP
Telecommunications Pricing and Billing
Workshop for Utilities
FRIDAY, AUGUST 2, 2019

12:30 – 1:00 pm  Workshop Registration
1:00 – 5:00 pm  Course Timing

OVERVIEW

This half-day course will provide insight on how the telecommunications industry charges for services and how that applies to utility communication networks. Attendees will discuss the new historical approach, service categories, pricing trends, and regulatory requirements regarding telecommunication services.

This workshop is designed to encourage questions from the participants. It will be fun and interactive; however, no individual will be called upon or singled out. PowerPoint slides will be used to illustrate important points.

LEARNING OUTCOMES

• Review the historical approach to telecommunications billing and its lasting impact
• Define the various billing service categories and the pricing trends
• Compare the approach to wholesale rate setting to the retail pricing options, including the impact of contracts, discounting, and bundles
• Determine regulatory requirements and related fees
• Identify tools and systems that support the provisioning, tracking, and invoicing of telecommunications services

WHO SHOULD ATTEND

• Telecom Analyst
• Telecom Specialist
• Voice and Data System Admins
• Data communications staff
• IT Business Analyst / Program Manager
• Technical Project Managers
• Telecom Field Installers / Engineers
• Telephony Sales Representatives / Account Managers
• Administrative and support staff from telecom industry organizations
## WORKSHOP AGENDA

**FRIDAY, AUGUST 2, 2019**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:30 – 1:00 pm</td>
<td>Workshop Registration</td>
</tr>
<tr>
<td>1:00 – 5:00 pm</td>
<td>Course Timing</td>
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</tbody>
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### Telecom Service and Invoicing Concepts
- History and Changes Over Time
  - Telcos, Tariffs, Rate of Return, and PUCs
  - Universal Service Mandate and Subsidies
  - USOCs and Pricing Components
- Impact of Competition
  - CLECs
  - Cellular Providers
  - Alternative Providers, Including Utilities
  - Number Portability

### Service Types / Classes and Rate Trends
- Basic “Dial-tone” Services, Including Analog
- Digital and IP Dial-tone for Businesses
- IP Dial-tone for Residential & Small Business
- Long Distance (North America and International)
- Toll-Free Services (800 Number)
- Service Add-Ons (Conferencing, Voicemail, etc.)
- Private Line and Data Network Services
- Internet Access and ISP Services
- Multi-media Services, Including CATV

### Wholesale Pricing
- Determining Costs
- Establishing Margins
- Wholesale Competition
- Benchmarking

### Retail Pricing
- Determining Market Pricing and Benchmarking
- Installation Fees versus Monthly Service Charges
- Contract Terms
- Discounts
- Bundling Concepts
- Taxes, Fees, and Surcharges

### Regulatory Requirements
- Federal
- State
- Local
- Funding Programs (Fees / Contributions)

### Supporting Systems
- Customer Service Records
- Call Detail Records
- OSS Systems

### Impact of Future Technology
INSTRUCTOR

J.R. Simmons
Principal Consultant/ COMgroup, Inc.

J.R. Simmons has over 40 years of experience in the telecommunications systems industry, including over 30 years as a consultant providing strategic planning, design, analysis, and implementation management skills. He is considered a thought leader in unified communications and collaboration technologies. J.R. is the owner and Principal Consultant of COMgroup, Inc., which is located in Kirkland Washington. COMgroup is one of the most widely respected independent telecommunications consulting firms in the nation and a recognized leader for telecommunication systems design and communications infrastructure consulting projects.

As an industry expert J.R. has provided expert testimony in several legal cases. He contributes to two of the most respected industry web sites (No Jitter and BC Strategies) and frequently gives speeches on a wide variety of telecommunications management and technology subjects. He taught advanced telecommunications courses for a Community College Certificate program and continues to teach via independent seminars, and educational programs such as this one offered by EUCI.

J.R.’s experience includes work on complex telephone systems and call centers, cabling infrastructure and layer one electronics, and both local and wide area networks. His current projects tend to focus on strategic planning and business process analysis, but also include data networking design, systems analysis, unified communications, and contact centers.

COMgroup works with organizations of all sizes with increasingly complex technical environments. As a teacher at heart, J.R. has a passion of sharing his knowledge of trends and emerging technology in an effort to educate others and assist his customers in making the best decisions. J.R.’s team are experts in all facets of voice and data communications; they provide professional services that incorporate multiple technology disciplines including:

- Strategic planning
- Functional and technical requirements definition
- System design
- Infrastructure communication design and cabling coordination
- Contact Center design and operational improvements
- Carrier services including Telecom Expense Management
- Telecom facility/utility audit
- Project management services
IACET CREDITS

EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the AN-SI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the AN-SI/IACET Standard.

EUCI is authorized by IACET to offer 1.0 CEUs for the course and 0.4 CEUs for the workshop.

REQUIREMENTS FOR SUCCESSFUL COMPLETION

Participants must sign in/out each day and be in attendance for the entirety of the course to be eligible for continuing education credit.

INSTRUCTIONAL METHODS

PowerPoint presentations and open discussion will be used during this course.

EVENT LOCATION

EUCI Conference Center
4601 DTC Blvd., B-100
Denver, CO 80237

NEARBY HOTELS

Preferred Hotel
Hyatt Place Denver Tech Center
8300 E. Crescent Parkway, Greenwood Village, CO 80111 (0.9 miles away)
Call Central Reservations at 1-888-492-8847 and ask for the corporate rate under the Group Code: EUCI
(Hot Breakfast included and Free Shuttle to and from EUCI)

Other Nearby Hotels
Hyatt Regency Denver Tech Center
7800 E. Tufts Ave
Denver, CO 80237
Phone: 303-779-1234
0.3 miles away

Hilton Garden Inn Denver Tech Center
7675 E. Union Ave
Denver, CO 80237
Phone: 303-770-4200
0.6 miles away

Denver Marriott Tech Center
4900 S. Syracuse St
Denver, CO 80237
Phone: 303-779-1100
0.7 miles away

REGISTER 3, SEND THE 4TH FREE

Any organization wishing to send multiple attendees to this course may send 1 FREE for every 3 delegates registered. Please note that all registrations must be made at the same time to qualify.
SPECIAL BUNDLE PRICE: TELECOMMUNICATIONS 101 FOR NON-ENGINEERS COURSE AND TELECOMMUNICATIONS PRICING AND BILLING WORKSHOP FOR UTILITIES POST-COURSE WORKSHOP
AUGUST 1-2, 2019: US $1795
Early bird on or before July 12, 2019: US $1595

TELECOMMUNICATIONS 101 FOR NON-ENGINEERS COURSE ONLY
AUGUST 1-2, 2019: US $1395
Early bird on or before July 12, 2019: US $1195

TELECOMMUNICATIONS PRICING AND BILLING WORKSHOP FOR UTILITIES POST-COURSE WORKSHOP ONLY
FRIDAY, AUGUST 2, 2019: US $595
Early bird on or before July 12, 2019: US $495

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

Print Name
Job Title
Company

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Billing City Billing State
Billing Zip Code/Postal Code

OR Enclosed is a check for $ to cover registrations.

Substitutions & Cancellations
Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before June 28, 2019 in order to be refunded and will be subject to a US $195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. In case of course cancellation, EUCI’s liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices at 303-770-8800. EUCI reserves the right to alter this program without prior notice.