Introduction to the Applications and Realtime (ART) Area

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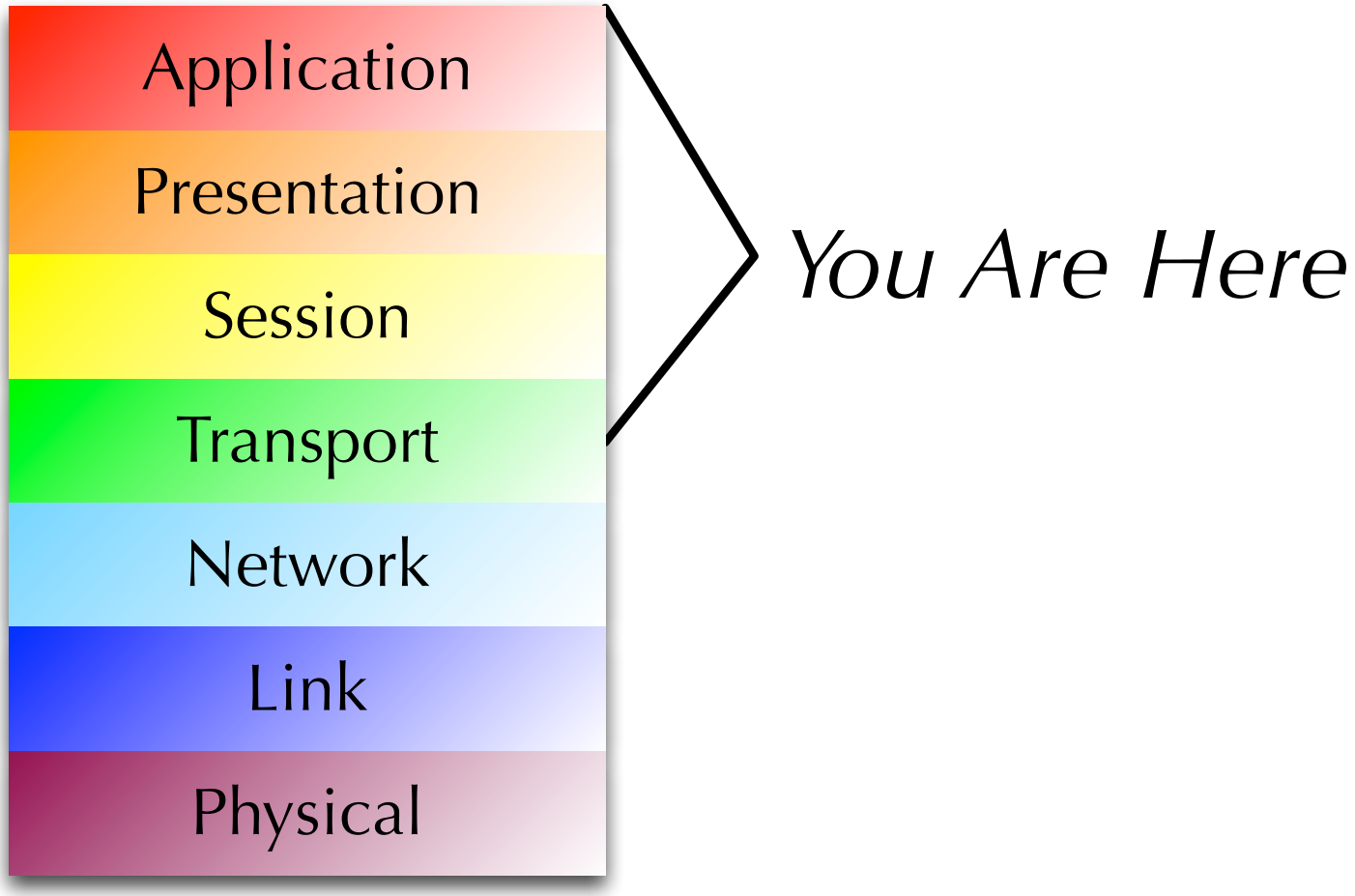
What is ART?

The expression or application of human creative skill and imagination, typically in a visual form such as painting or sculpture, producing works to be appreciated primarily for their beauty or emotional power.

Current:	ART Argentina Time
Current Offset:	UTC/GMT -3 hours
Difference:	2 hours ahead of Dallas

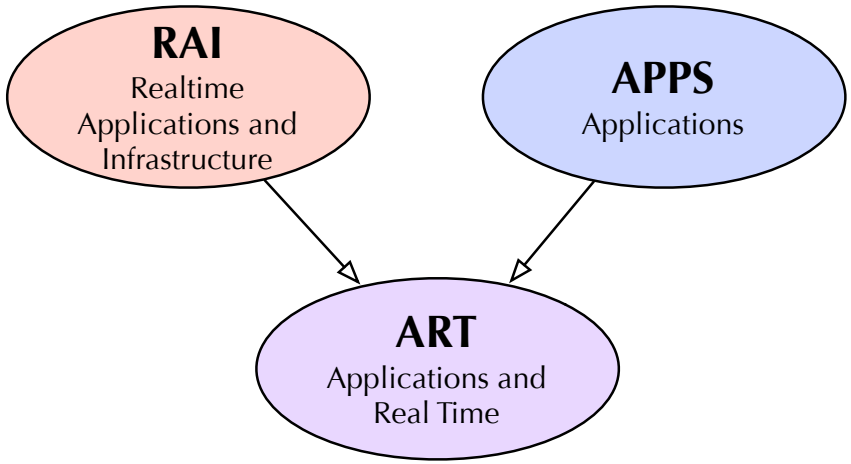
Acronym for “Area Review Team” (e.g. “GEN-ART” for “General Area Review Team”)

What is the ART Area?



What is the ART Area?

- The result of merging RAI (Realtime Applications and Infrastructure) with APP (Applications)
- Protocols and Formats for Applications



What Were APPS and RAI?

APPS

- Long-established application protocols, like HTTP, FTP, and email protocols
- Application-layer infrastructure, like IDNA and EPP
- Application building blocks like LDAP, OAuth, i10n, and URNs

RAI

- Voice and Video over IP Signaling, like SIP, XCON, and RTSP
- Voice and Video media, like RTP
- Instant Messaging and Presence, like XMPP and SIMPLE
- Time-sensitive supporting technologies, like GEOPRIV and ECRIT

The Meaning of "Real Time"

- ~~Real-Time *Computing*: of or relating to a system in which input data is processed within milliseconds so that it is available virtually immediately as feedback, e.g., in a missile guidance or airline booking system.~~
- Real-Time *Communications*: pertaining to telecommunications in which participants can exchange media (including voice and video) with sufficiently low latency as to allow conversations (typically, RTT < 100ms)

ART Work

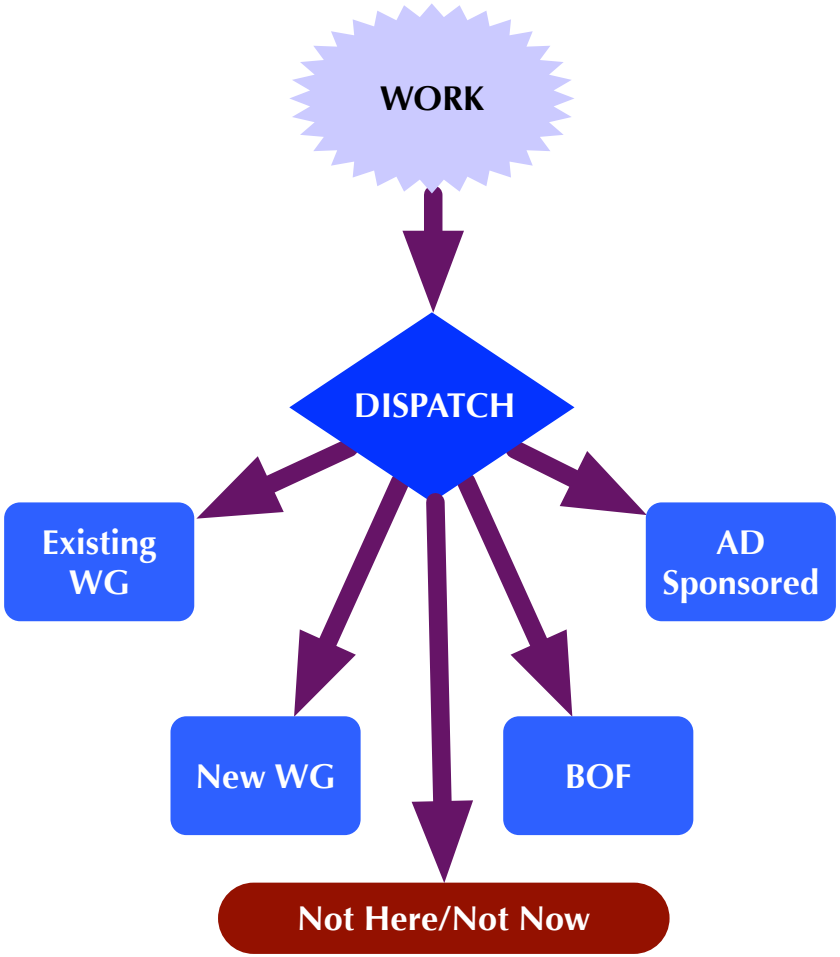
ADMINISTRATIVE

What is DISPATCH?

DISPATCH is Routing of Work

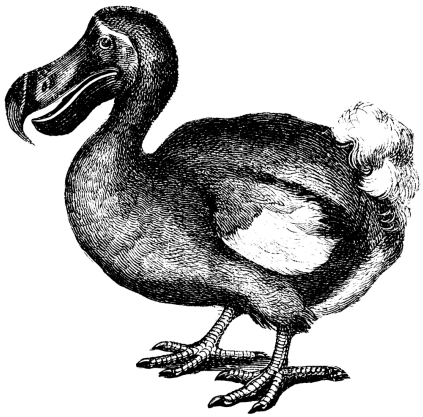
- Determines which Venue is best
- Does no technical work*

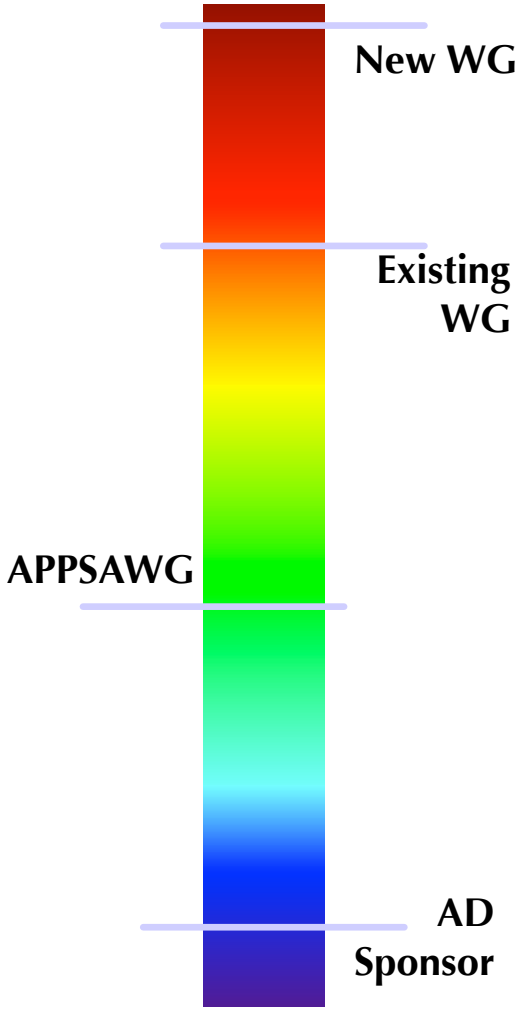
**Handles IANA Actions*



What is APPSAWG?

- Work that Needs a Working Group, but:
  - Doesn't need its own WG
  - Doesn't fit in another WG
- CLOSING



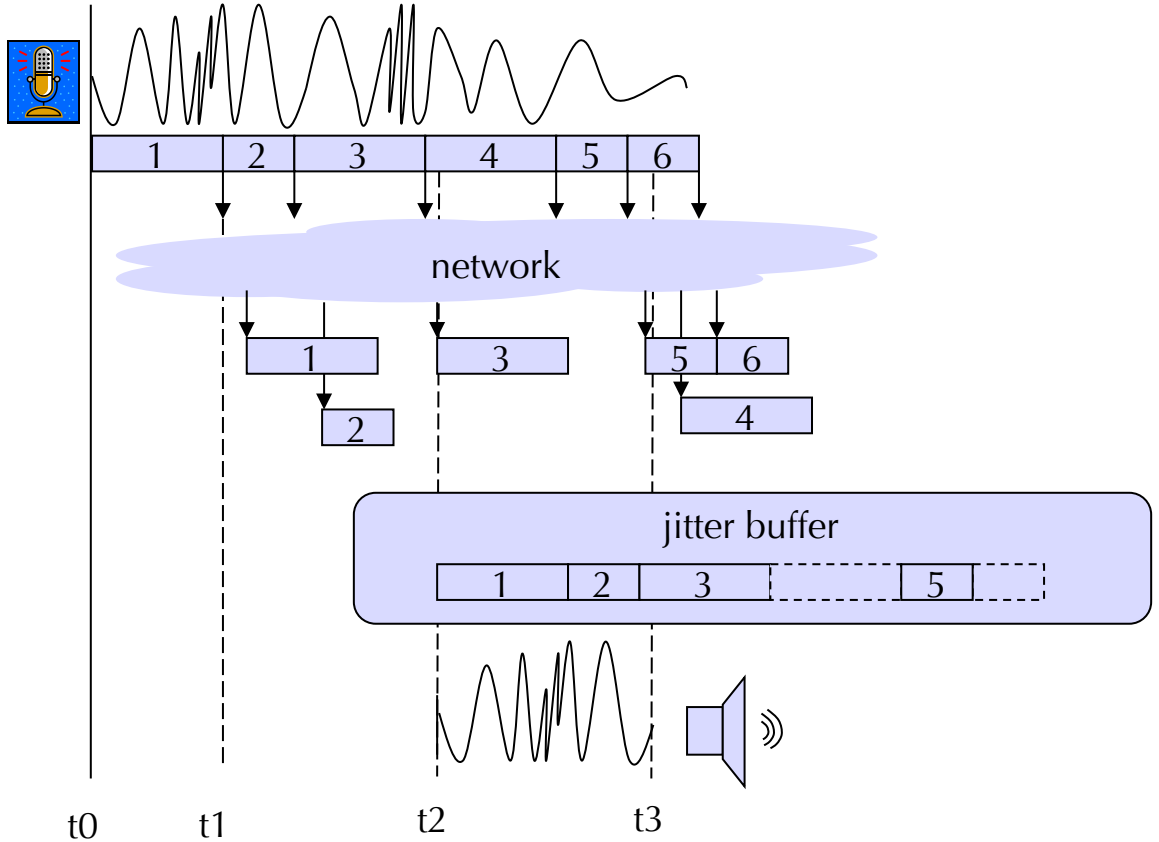


ART Work

MEDIA TRANSPORT AND SIGNALING

What does the Realtime Transport Protocol (RTP) do?

Carries a time-dependent signal through a packet network, preserving the timing information



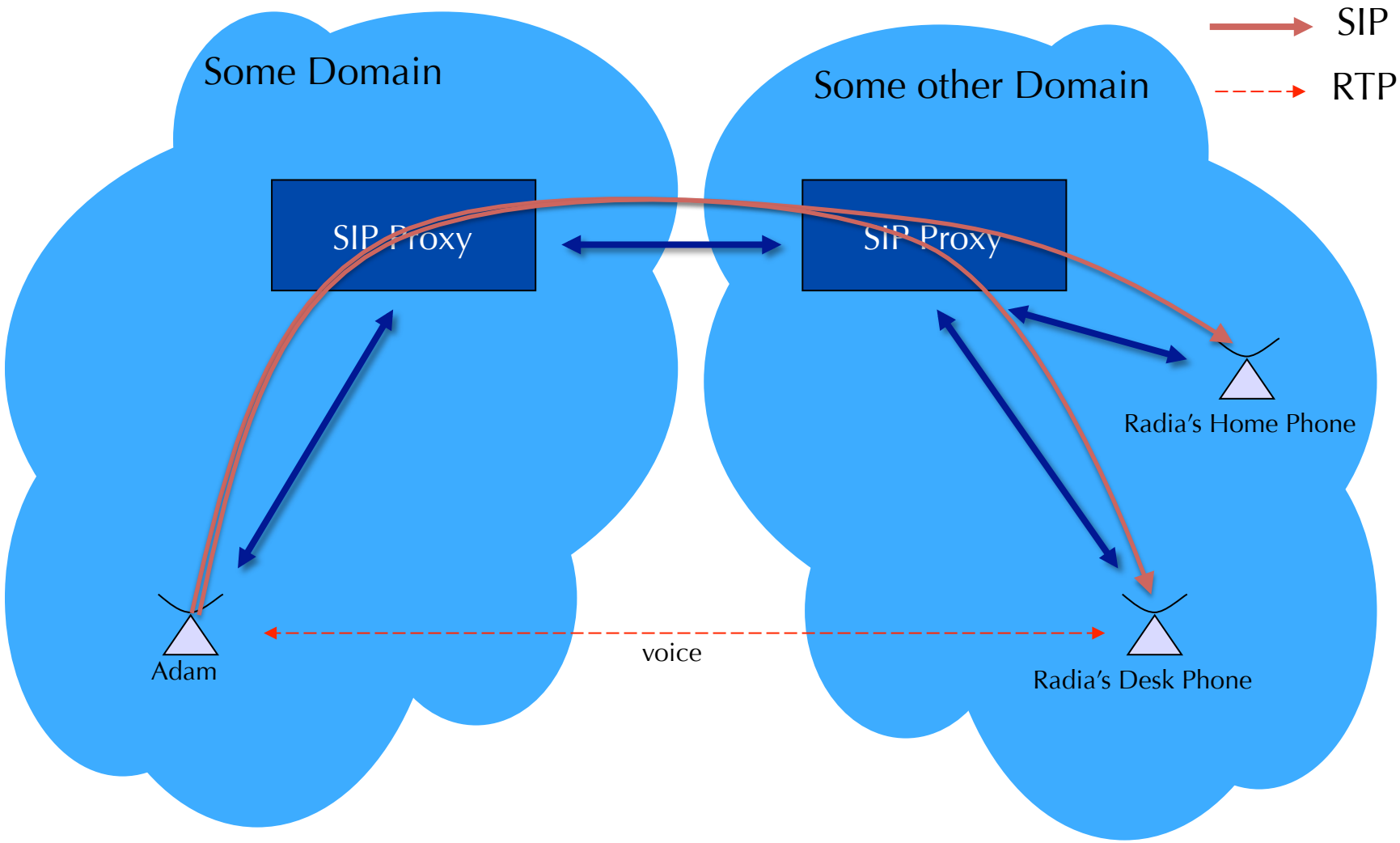
Realtime: Transport

- Standing groups to work on RTP/RTCP and related technologies (formerly AVTWG):
  - **AVTCORE**: Audio/Video Transport Core Maintenance *(e.g., multipath RTP)*
  - **AVTEXT**: Audio/Video Transport Extensions *(e.g., layer refresh request messages)*
  - **PAYLOAD**: Audio Video Transport Payloads *(e.g., payload format for VP9 video)*
  - **XRBLOCK**: Metric Blocks for use with RTCP's Extended Report Framework *(e.g., metrics for RTCWEB)*

What does SIP do?

- Adam wants to talk to Radia. SIP (the Session Initiation Protocol) helps with two things
  - Rendezvous: It helps Adam's device *find* the right device of Radia's to work with on the network
  - Negotiation: It lets Adam's and Radia's devices determine the technologies they will use to carry the conversation between Adam and Radia.

What does SIP do?



Realtime: Signaling (SIP and friends)

Standing (Maintenance) Groups:

- **MMUSIC**: Multiparty Multimedia Session Control
- **SIPCORE**: Session Initial Protocol Core

Goal-Oriented Groups:

- **ECRIT**: Emergency Context Resolution with Internet Technologies
- **ICE**: Interactive Connectivity Establishment
- **INSIPID**: Intermediary-safe SIP Session ID
- **MODERN**: Managing, Ordering, Distributing, Exposing, & Registering telephone numbers
- **RTCWEB**: Real Time Communication in Web Browsers
- **STIR**: SIP Telephony Identity Revisited

Realtime: Signaling (SIP and friends) Groups Concluding Soon

- **BFCPBIS**: Binary Floor Control Protocol BIS
- **CLUE**: Controlling Multiple Streams for Telepresence
- **DRINKS**: Data for Reachability of Inter/tra-Network SIP
- **P2PSIP**: Peer-to-Peer SIP
- **SIPREC**: Session Initiation Protocol Recording
- **STOX**: SIP to XMPP
- **STRAW**: SIP Traversal Required for Applications to Work

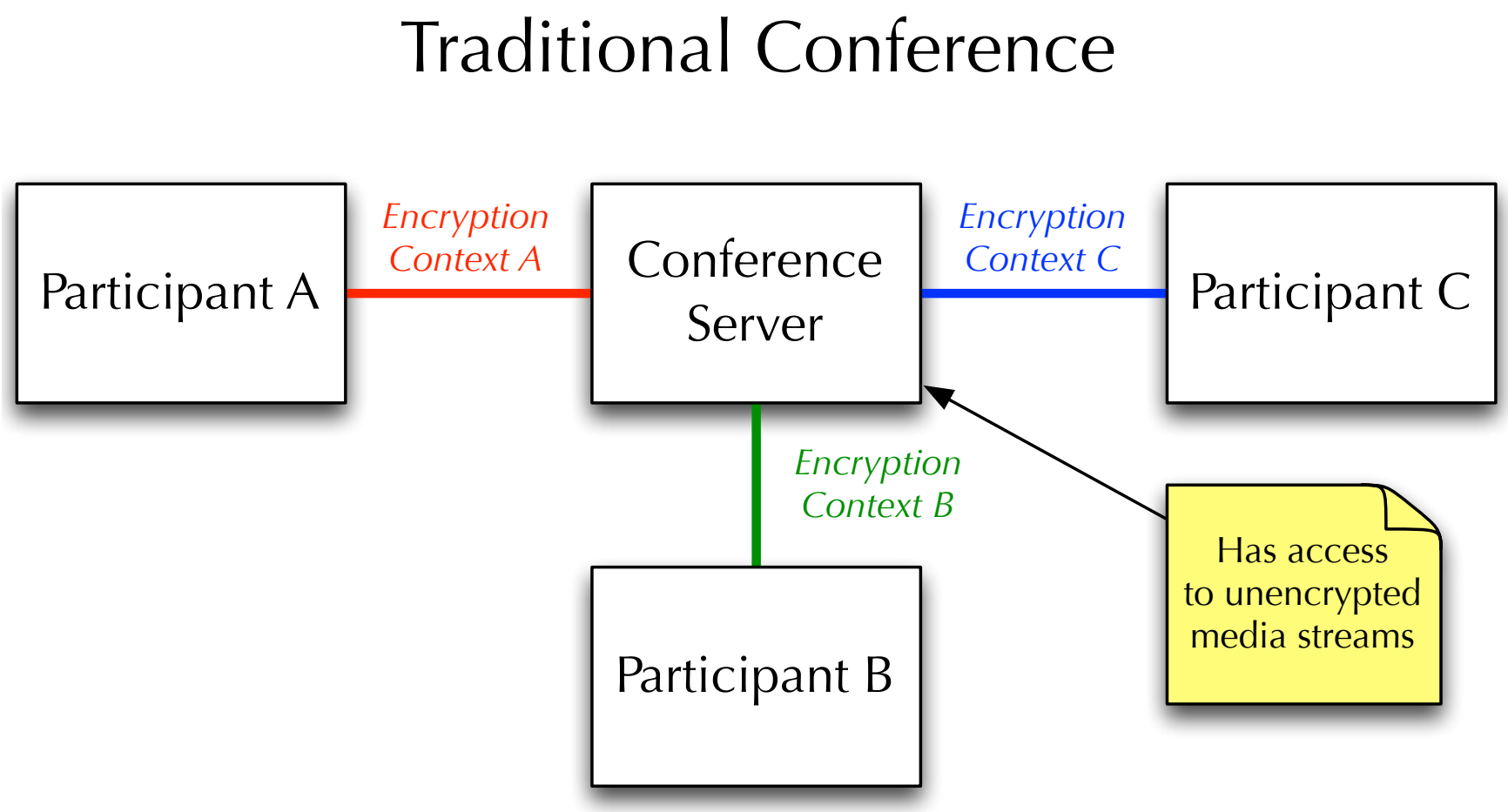
Realtime: Codecs

- **CELLAR**: Codec Encoding for LossLess Archiving and Realtime transmission
  - *Working on standardizing FFV1, FLAC, and Matroska*
- **CODEC**: Internet Wideband Audio Codec
  - *Mostly complete; developed Opus audio codec*
- **NETVC**: Internet Video Codec
  - *Developing next-gen video codec, with goal of being royalty-free.*

Realtime: PERC (Privacy Enhanced Communications)

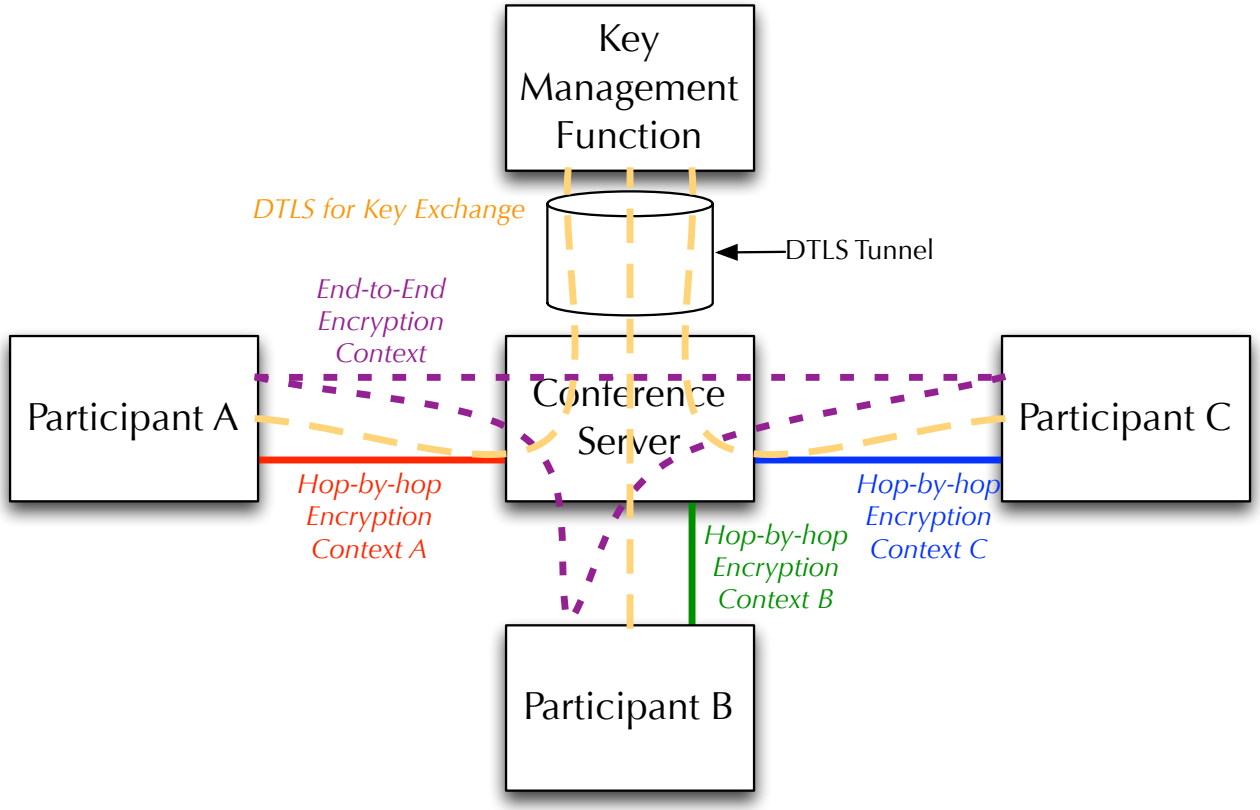
- PERC Working Group chartered to develop protocol extensions that allow multiparty conferences to be encrypted end-to-end
- Will define how to use the defined protocols/techniques with SIP, WebRTC, and CLUE.

Realtime: PERC



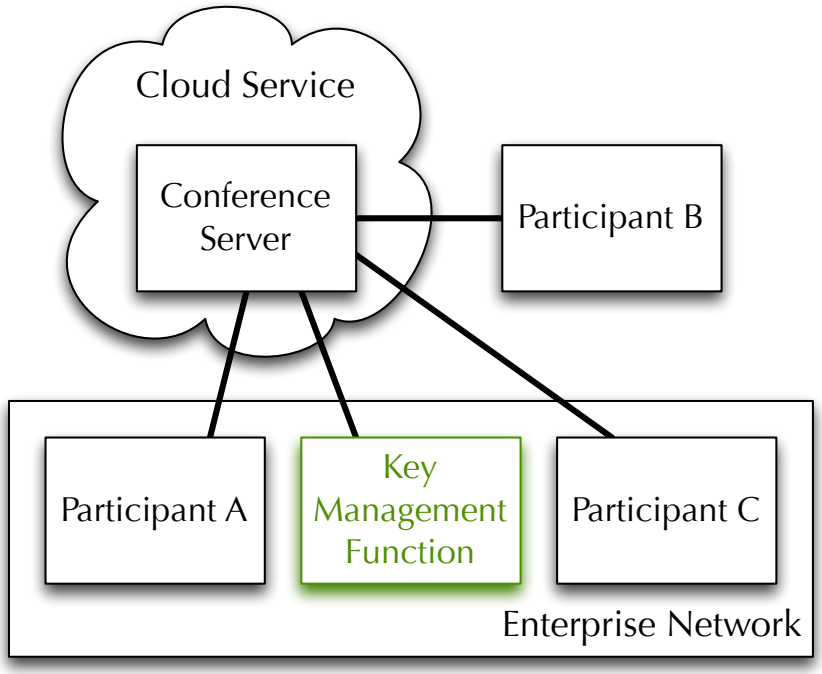
Realtime: PERC (Simplified)

Privacy-Enhanced Conference

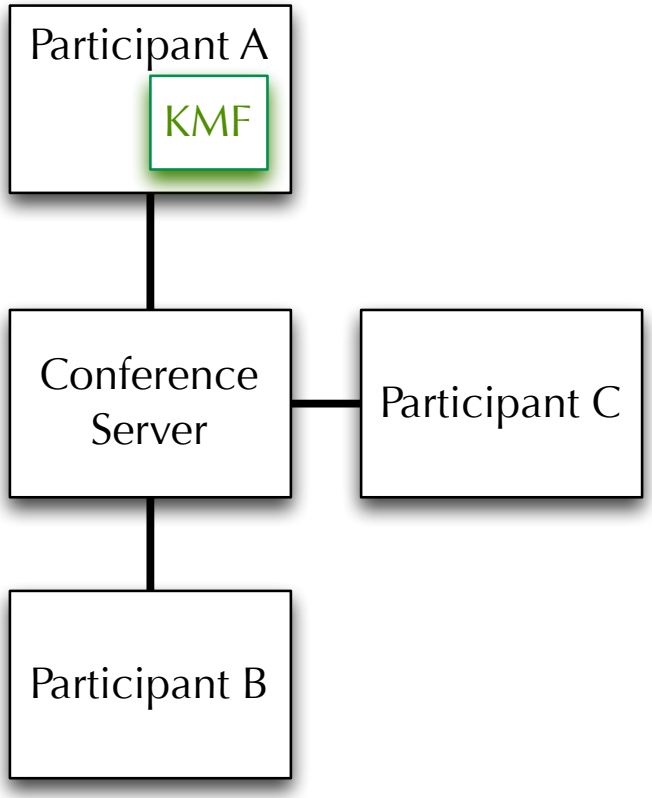


PERC: So What?

Enterprise Cloud Services

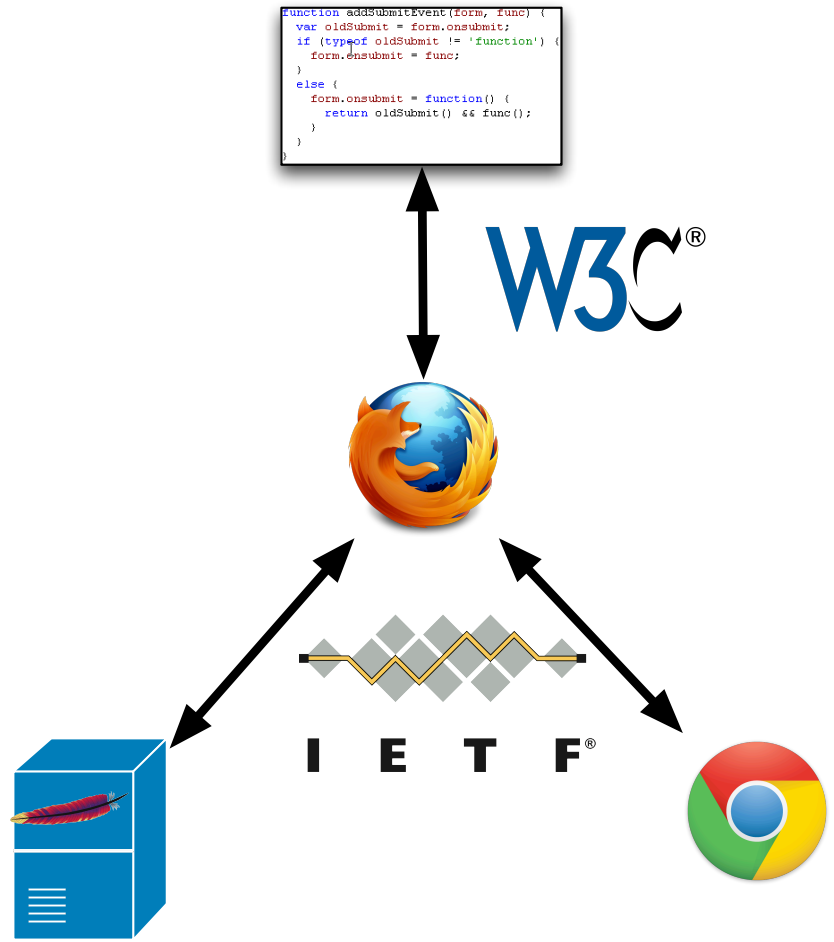


Public Internet Services



Realtime: WebRTC

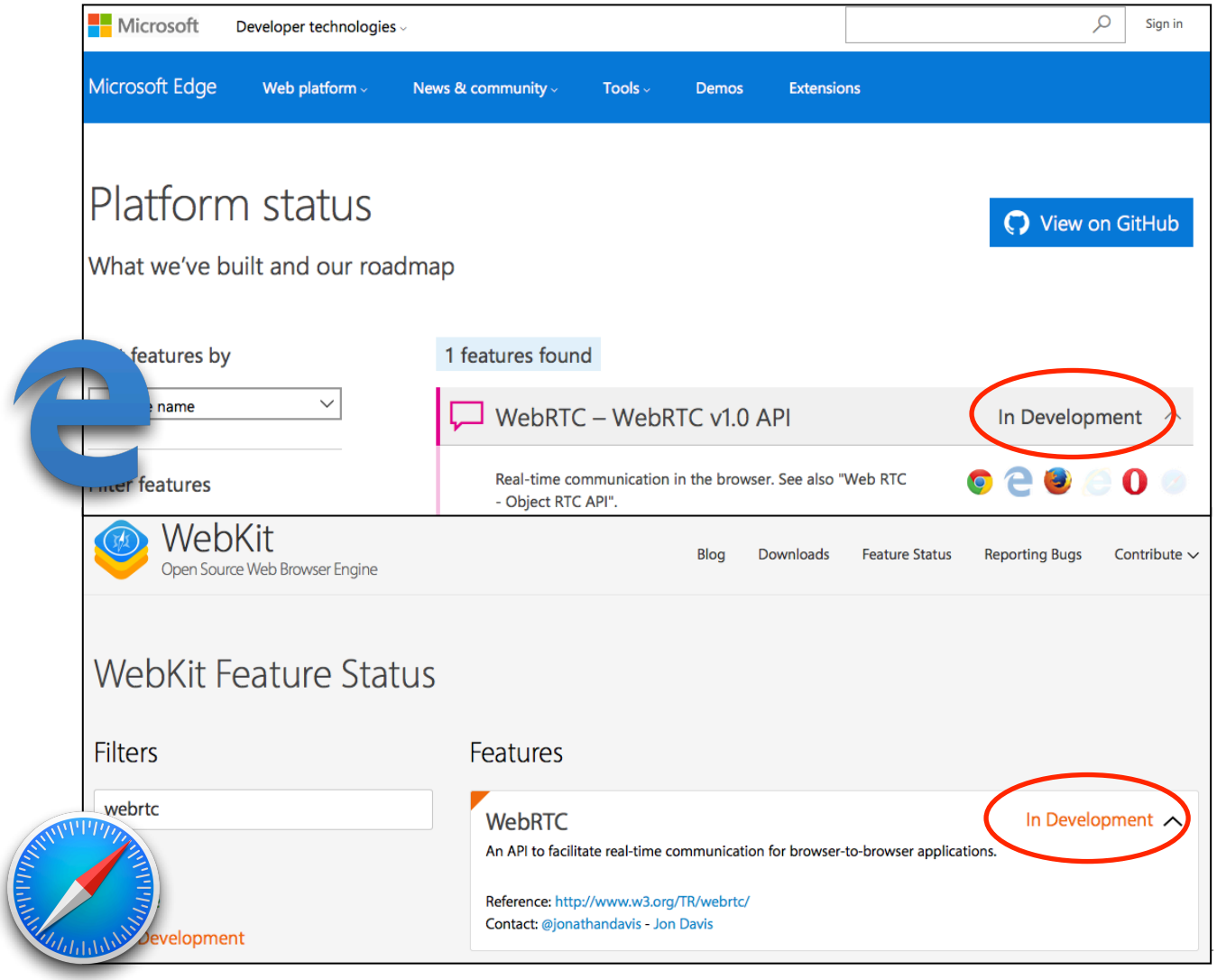
- **RTCWEB** working group, in conjunction with *W3C WebRTC* working group, defining protocols and API for Real Time Communications in web browsers
- W3C defines API between web apps and browser
- IETF defines protocols between browsers and the network:
  - Session negotiation
  - Codecs
  - DTLS and SRTP
  - NAT Traversal
  - Consent
  - SCTP



Realtime: WebRTC

- Allows web pages to embed audio/video clients
- Allows for direct, low latency peer-to-peer data connections (e.g. for multiplayer games)
- Incorporates several "best current practices"
  - Security is not optional: DTLS-SRTP mandated
  - ICE is required for NAT traversal and consent

WebRTC: Adoption

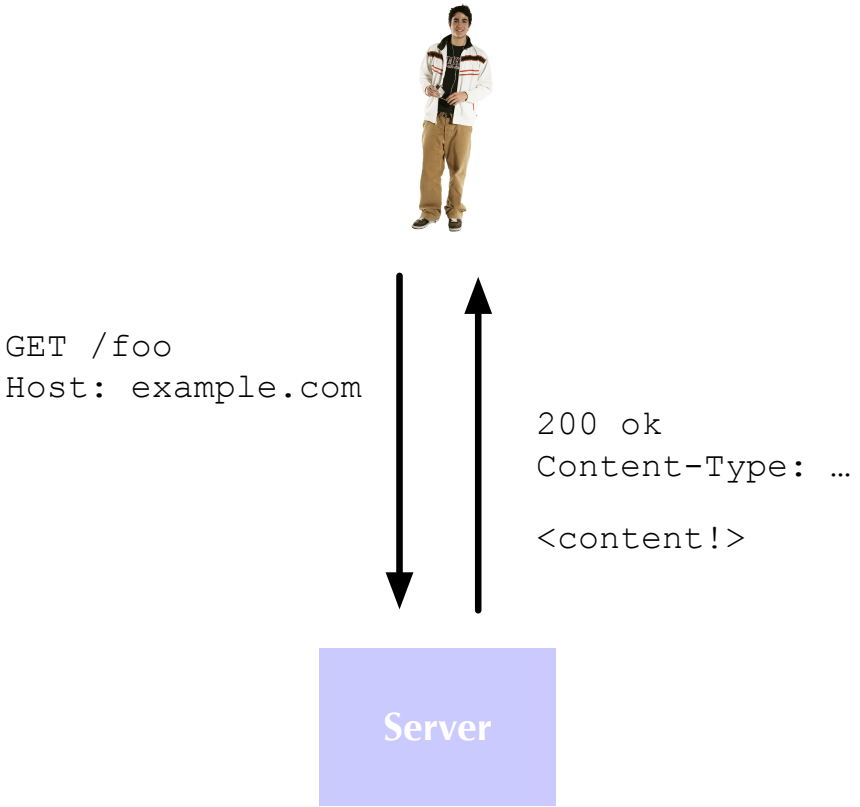


ART Work

APPLICATION INFRASTRUCTURE: HTTP

What does HTTP do?

- Request/Response protocol for exchanging content (usually over port ~~80~~ 443)
- Transport for (almost) **EVERYTHING***



*(new, except RTP)

HTTPbis

- Define the base protocol
  - http/1.1
  - http2
    - http with multi-ball
- Works closely with TLS WG

Protocols about HTTP

- **CDNi:** Content Delivery Network Interconnect
  - Scale delivery of content
  - How CDNs talk to each other
- **WEBPUSH:** Web-Based Push Notifications
  - Efficient notifications for HTTP
  - Subscribing for notifications
  - Publishing notifications

MORE Protocols about HTTP

- **CORE:** Constrained RESTful Environments
  - IoT over HTTP-like
- **SCIM:** System for Cross-domain Identity Management
  - User/group directories over HTTP
- **TZDIST:** Time Zone Data Distribution Service
  - Time zones over HTTP

ART Work

DATA FORMATS

What are Data Formats?

- How to represent tags
  - *URI, URN, labels*
- How to represent context
  - *Type, language*
- How to represent data
  - *JSON et al*

JSON-Related

- **JSONbis:** Javascript Object Notation Update
  - Update RFC 7159
    - Include reported errata
    - align with ECMA-404
- **GEOJSON:** Geographic JSON
  - Geographical information as JSON
  - Ratifying geojson.org

Language-related

- **PRECÍS:** Preparation and Comparison of Internationalized Strings
  - Rules for handling strings from other places
- **LAGeR** Label Generation Rules
  - Format for rulesets on how to generate DNS names
- **SLIM:** Selection of Language for Internet Messages
  - Negotiating what language to use

More Formats

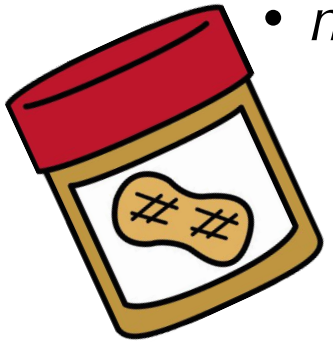
- **JUSTFONT:** Font Top Level Media Type
  - Define new media type “font/*”
  - Register well-known subtypes
- **CALEXT:** Calendaring Extensions
  - Define extensions to iCal / CalDAV / iTIP
- **URNbis:** Uniform Resource Names, Revised
  - Update URN docs to Standards Track

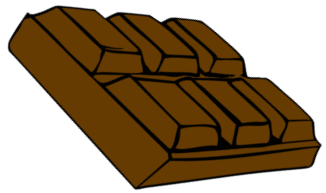
ART Work

APPLICATION SECURITY

Apps and Security

- **UTA:** Using TLS in Applications
  - Best practices and Guidelines for app protocols
    - *Minimum Version, Dealing with STARTTLS*
- **DMARC:** Domain-based Message Authentication, Reporting & Conformance
  - Updates to RFC 7489 for indirect flows
    - *mailing lists, forwarding services*





DBOUND: Domain Boundaries

"Is the administrator of `foo.example.com` *the same as* `example.com`*?"*

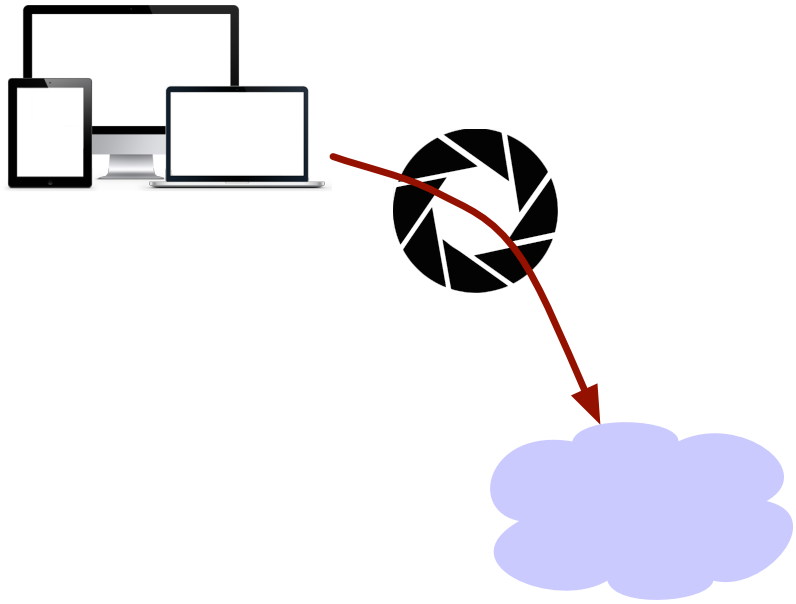
example.com

- Important to clients!
  - HTTP Cookies, TLS certificate verification
- Protocols to determine boundaries

foo.example.com

CAPPORT: Captive Portal Interaction

- Restricted network that requires user interaction before granting access
  - *Hotel network*
  - *café wireless*
- looks like **Man-in-the-Middle Attack**



- Protocols to discover and interact with captive portals

ART Work

TRADITIONAL APPLICATIONS

Protocols for Email

- **IMAPAPND:** IMAP APPEND Extensions
  - Extensions to improve uploading messages
  - CLOSING?

TLD Registry Provisioning

- **EPPEXT** (Extensible Provisioning Protocol Extensions) just became **REGEXT** (Registration Protocols Extensions)
- Coordinates extensions to EPP
  - *e.g., atomic allocation of related domain names*
- EPP is the protocol used for Domain Name Registrars to interact with top-level Domain Name Registries

For More Information

https://datatracker.ietf.org/wg/#art

Credits

This deck contains material from earlier presentations prepared by Ben Campbell, Robert Sparks, Gonzalo Camarillo, and Richard Barnes.