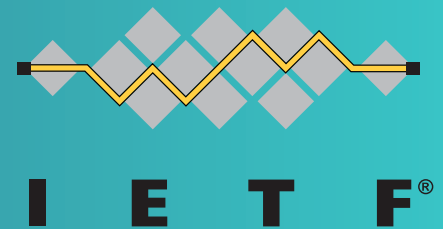


Internet Engineering Task Force and 5G Standardization

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(1) Overview of the IETF

(2) IETF Work Relevant to 5G

(3) Achieving Successful
Collaboration



Overview of the IETF



The mission of the IETF is to produce high quality, relevant technical and engineering documents that influence the way people design, use, and manage the Internet in such a way as to make the Internet work better. (RFC 3935)



IETF principles (RFC 3935)

- Open process
- Technical competence
- Volunteer core
- Rough consensus
- Running code
- Protocol ownership



IETF technical areas



Internet

Packets, packet addressing, mobility

Routing

Selecting paths for packets

Ops & Management

Operating and managing networks

Transport

Use of paths to provide end-to-end experience

Apps & Real-Time

Application protocols and primitives

Security

Security protocols and primitives

Examples of past and current work



Internet

IPv4, IPv6, DNS, DHCP
6LoWPAN, LPWAN

Routing

BGP, OSPF, IS-IS
MPLS, pseudowire
SFC, NVO3, DETNET

Ops & Management

IPFIX, SNMP
YANG, NETCONF
AAA, RADIUS,
Diameter

Transport

TCP, UDP
QUIC, DTN

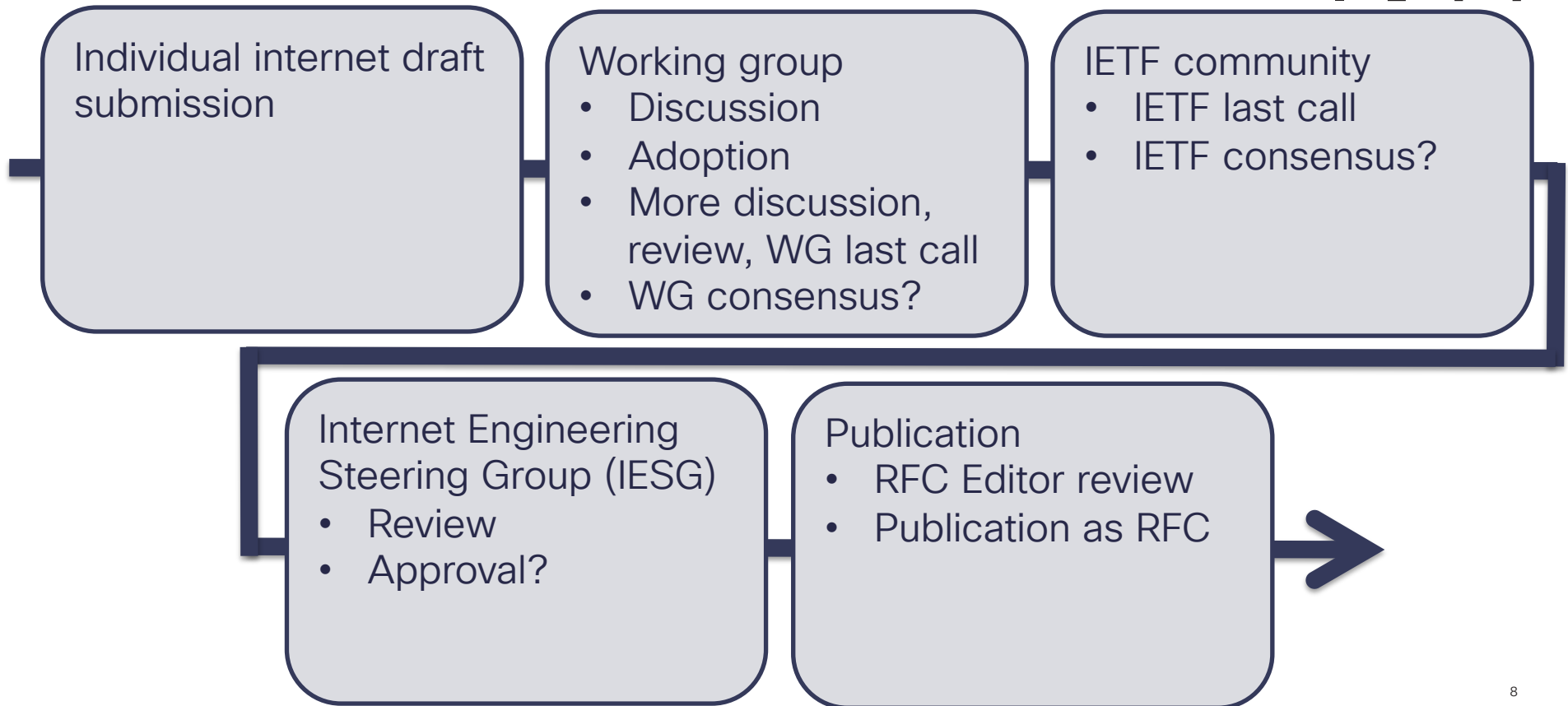
Apps & Real-Time

HTTP, CoAP
SIP, RTP, WebRTC
JSON, URNs, URIs

Security

TLS, IPsec, EAP, PKIX

Typical path to RFC standard



IETF Work Relevant to 5G



Potentially relevant IETF work



- New uses of existing technology
- New technology currently in development
 - Routing-related work
 - Traffic engineering, abstractions, and network management
 - Deterministic networking
 - New transport protocol: QUIC

New uses of existing technology



- Extensible Authentication Protocol (EAP)
 - Framework for network access authentication (RFC 3748)
 - Includes SIM- and AKA-based authentication methods
 - Draft 5G security specification from SA3 includes the use of this framework
 - Likely no new IETF work needed, but if so, new versions can be published (e.g., as EAP-AKA' was published as revision to EAP-AKA)
- HTTP/2
 - Revision to HTTP standard, published as RFC 7540 in 2015
 - Potentially of interest for 5G and IoT applications generally due to focus on reducing latency and conserving network/server resources

New technology currently in development



Routing-related work (1/2)



- Data models as abstractions for consuming topology, proximity, etc., plus APIs/bindings to program the network
 - Relevant IETF working groups: Traffic Engineering Architecture and Signaling (TEAS), Interface to Routing System (I2RS)
- Path computation to meet constraints of 5G radio
 - Path Computation Element (PCE) working group
- Routing protocols for distributed networking, transport of objective functions and metrics
 - BGP, OSPF/ISIS TE metric extensions, PCEP/RSVP
- Encapsulations to provide abstractions and metadata
 - MPLS, Network Virtualization Overlays (NVO3), Deterministic Networking (DETNET) working groups

Routing-related work (2/2)



- Segment routing as means to provide transport slice
 - Source Packet Routing in Networking (SPRING) working group
- Service chaining to transport traffic across virtualized functions
 - Service Function Chaining (SFC) working group

Traffic engineering, abstractions, and network management



- Data models for service delivery
 - Layer 2 Service Model (L2SM) and Layer 3 Service Model (L3SM)
- Data models for network management
 - Network Configuration (NETCONF) and NETCONF Data Modeling Language (NETMOD) working groups
- Traffic engineering tools, including interfaces between service orchestration, SDN controllers, access network, core network
 - TEAS working group

Deterministic networking (DETNET)



- Support for applications requiring controlled latency, loss, jitter, and high reliability within an administrative domain
- Deterministic delivery achieved through:
 - Reserving data plane resources on path for individual flows
 - Explicit routes that do not rapidly change
 - Distribution of packets over time/space for redundancy

New transport protocol: QUIC



- Perhaps not direct dependency for 5G, but still relevant
- UDP-based, stream-multiplexing, always-encrypted transport protocol focused on minimizing application latency
- Work may include considerations for manageability, path MTU discovery, tuning



Achieving successful collaboration

From IETF side, we understand ...



- Rel-15 intended to finish June 2018
- Requirements currently under active discussion in 3GPP
- 5G work spans multiple SDOs and open source projects
 - Can leverage existing relationships with IEEE, BBF, OPNFV, etc.
- Can build on successful past collaborations (SIP/IMS, EAP-AKA, Diameter, etc.)

How can we best work together?



- Have individuals who are actively participating in both 3GPP and IETF
- Conceptualize requests for IETF work as requirements
- Send requirements early
- Be clear about what 5G entails, and what are highest priorities
- Share information about indirect dependencies from other SDOs/ projects
- Target requests to IETF where functionality is expected to be broadly deployable on the internet
- Continue to track IETF dependencies in 3GPP work plan

People who can help



Gonzalo Camarillo
IETF Liaison to 3GPP



Georg Mayer
3GPP Liaison to IETF



IETF working group chairs, Internet Architecture Board (IAB), and Internet Engineering Steering Group (IESG) members can help shepherd new IETF work.

References



- IETF working groups: <https://datatracker.ietf.org/wg/>
- IETF standards process: <https://tools.ietf.org/html/rfc2026>
- IETF mission statement: <https://tools.ietf.org/html/rfc3935>
- IESG members: <https://www.ietf.org/iesg/members.html>
- IAB members: <https://www.iab.org/about/iab-members/>

Thank you.

