MaRNEW Workshop
24-25 Sept 2015
Post Workshop Update

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Managing Radio Networks in an Encrypted World (MaRNEW) Workshop

Workshop Details

The MaRNEW Workshop is now over. Thanks to all who attended. Workshop minutes and report are being worked on currently and will be released soon. IETF94 attendees are welcome to attend the SAAG meeting for a workshop overview.

Title: Managing Radio Networks in an Encrypted World (MaRNEW)
Date: Thursday 24th – Friday 25th September, 2015
Place: AT&T Atlanta, Atlanta, GA (see "Venue" below for more details)
Time: 9am – 6pm both days

Please sign up to the mailing list to receive up to date information about the workshop. To post a message to all the list members, send email to marnew@iab.org.

Workshop Bio

Mobile networks have a set of requirements and properties which places a large emphasis on sophisticated bandwidth optimization. Encryption is increasing on the internet which is a good thing for consumer and business privacy and security. Many existing mobile bandwidth optimization solutions primarily operate on non-encrypted communications; this can lead to performance issues being amplified on mobile networks. Encryption on networks will continue to increase; and with this understanding

Recent Posts

RFC 7669 on Assigning Digital Object Identifiers to RFCs
RFC 7663 on Report from the IAB Workshop on Stack Evolution in a Middlebox Internet (SEMI)
IAB Comments on Proposed FCC Rules regarding Authorization of Radiofrequency Equipment
IAB appoints Tim Wicinski to ICANN Nomcom
IAB comments on the CCWG accountability 2d draft report

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- Diego Lopez, Telefonica, Spain
- Dan Druta, AT&T, USA
- Brian Trammell, ETH Zurich, Switzerland

MaRNEW Goals

"Mobile networks have a set of requirements and properties which places a large emphasis on sophisticated bandwidth optimization. Encryption is increasing on the internet which is a good thing for consumer and business privacy and security. Many existing mobile bandwidth optimization solutions primarily operate on non-encrypted communications; this can lead to performance issues being amplified on mobile networks. Encryption on networks will continue to increase; and with this understanding ***the workshop aims to understand how we can solve the issues of bandwidth optimization and performance on radio networks in this encrypted world.***"

Sessions

Session Types:

Scene Setting
Network or Transport Solution
Application Layer
Regulation

Scene Setting Sessions

Scope

- In discussion we should assume: **No broken crypto**, Ciphertext increasingly common, congestion does need to be controlled as do other transport issues and Network management including efficient use of resources, in RAN and elsewhere, has to work.
  - **How/why is RAN different for transport**; help us understand the complexities of the RAN and how hard it is to manage and why those matter.
- What are the **precise problems** caused by more ciphertext.
- Identify players, incl. Users, and resulting tensions and how ciphertext changes those.
- Some solutions will be radically changed by ciphertext, it's ok to talk about that
- **As good as possible quality of experience** for end user is a goal.
- Our aim for the next two days is to analyse the situation and identify specific achievable tasks that could be tackled in the IETF or GSMA (or elsewhere?) and that improve the Internet given the assumptions above.
- **We should not delve into:**
  - **Ways of doing interception (legal or not), see RFC2804 for why**
  - **Unpredictable political actions**

Encryption Deployment Considerations

The Effect of Ubiquitous Encryption

- increased encryption impact
- collection of current security and network management function impact

Network Management of Encrypted Traffic

- approaches to help manage encrypted traffic, without breaching user privacy or security

Trust Models and User Choice (Privacy)

- 64% of users said concerns over privacy have increased
- 67% would like to do more to protect privacy

Users want privacy, and the web and internet are responding

- Where does network operators sit in the user experience chain?
- Consent: user, network, endpoints.
- Helping users understand costs and benefits.

Network or Transport Solution Sessions

Sending Data Up / Down for Network Management Benefits

Does it make sense for apps to send data to networks?

Collaborative Frameworks

- Mobile Throughput Guidance
- Meaningful capacity sharing

Transport

- Fix TCP, or use something else?
- TCP feedback to senders and receivers

Solutions?

- Base Station located
- Latency vs. bandwidth
- 0 or 1 bit information

Understanding Mobile Networks

- 3GPP defined PCC-QoS mechanism
- Middleboxes treat data differently according to types

Transport Layer: Issues, Optimisation and Solutions

Collaboration is essential, and the whole path matters.

Transport Innovations

- Congestion Control
- 0 bit
- 1 bit: how and where
- Traffic Classification

Issues

- Resource Optimisation
- Buffer Bloat
- Meta data schemes can be exploited

Need data and metrics.

Application Layer
Session

Application Layer Optimisation, Caching and CDNs

Actors: Application providers, Network, Device. Can (and do... sometimes) work together!

- CDN as a trusted content provider
- Mobile Networks Adhering (or not) to Standards
- Optimisations: network layer or transport layer?

Panelists: One Request?

- Metrics to allow for better Resource Allocation
- Metrics
- Network is calibrated to handle applications best
- Anything that makes it easier for the application to adapt
- Blind cache.

Regulation Session

Technical Analysis and Response to Potential Regulatory Reaction

Understanding

- Typical mobile network regulations
- Penalties
- Effects of Encryption on Regulations

Response

- Differences in IETF and GSMA
- Application Layer
- Scalability
- Transparency reports.

Note: Chatham House Rule.

Ideas

The Ideas

Not confirmed! Just an incomplete list of generated ideas:

- IETF gain an understanding of RAN
- Reviews and comments on 3GPP perspective
- AQM
- **Evolving TCP (or evolving transport)**
  - Congestion Control
  - SPROUT (MIT)
  - PCC (Performance & Congestion Control)
- How to do congestion controlling in RAN
  - Base Station
  - Controller that can adapt to a radio environment and provide a better experience, and preserve E2E
- Identify traffic types via 5-tuple
- Heuristics (for best effort only?)
- CDNs / caches in the network
- CDN improvements
- **Mobile Throughput Guidance**
- **One bit for latency bandwidth tradeoff**
- Small amount of data from network to user (ECN)
- API for app to query network, or vice versa
- **Blind Caching**
- Standard approach for operator to offer services to Content Providers
- **Better Collaboration**
- Sharing information hop by hop
- **Metrics and metric standards**
- Testing / Debugging
- Trust model / framework (e.g. for spud)
- Keyless SSL
- Meaningful capacity sharing; reacting correctly to wireless link layer condition
- 5G

The Ideas

- **Evolving TCP:** TCP inadequate for RAN, needs better congestion control.
- Mobile Throughput Guidance (MTG): IETF draft: mechanism and protocol elements that allow the cellular network to provide near real-time information on capacity available to the TCP server.
- (Zero or) One bit for latency bandwidth tradeoff: Test networks with no network management and then add pieces of metadata to see if network performance improves.
- Blind Caching: Allow the transparent caching of encrypted data.
- Metrics and metric standards: Proper and standardised metrics to insure new solutions are providing a better performance for end users.
- Better Collaboration: between operators and you guys by working through technical solutions together.

What's Next?

Minutes & Report

- Release minutes (Oct 2015)
- Release report (Dec 2015)
- Take “Generated Ideas List”, distill and plan their development on mailing lists (now onwards)
- Work on metrics proposals (now)

Plans could include:

- New drafts and groups
- Supporting existing drafts
- Continuing operator / internet player strong relationship
- Designing complete research projects
- And others...

Final Comments...

Main Observations

- Encryption causes solvable issues
- Identified technical items
- Cooperation is key
- Next generation of mobile networks could mean great collaboration
- Customer experience and privacy as highest priorities.

New Items

- Metrics and testing
- Transport
- Caching mechanisms
- Collaborative exchange mechanisms.

Thank-you!

- AT&T for providing the location (Dan Druta)
- ISOC for sponsoring (Karen O'Donoghue)
- GSMA for sponsoring (Istvan Lajtos)
- SAAG for the speaking slot
- You guys for listening
- And Cindy Morgan for being awesome.