rohc
Robust Header Compression

50th IETF March 2001
Minneapolis

Chairs:

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50th IETF: Agenda (from 30000 feet)

- 1. WG chair admonishments
- 2. Real agenda

✓Blue sheets
✓Scribe

Hello! This is an IETF Working Group

- **We are here to make the Internet work (Fred Baker)**
  - **Together! (Harald Alvestrand)**
- **Rough Consensus and Running Code (Dave Clark)**
- **Working Group is controlled by**
  - **IETF Process (RFC2026, RFC2418) – *read it!***
  - **Area Directors (ADs): Alison Mankin, Scott Bradner**
  - **Charter (http://www.ietf.org/html.charters/rohc-charter.html) -- *read it!***
  - **Working Group Chairs: Mikael Degermark, Carsten Bormann**
  - **Technical Advisor: Erik Nordmark**
- **Work is done on email list** rohc@cdt.luth.se
  - And on IETF meetings, interim meetings, informal meetings, …
  - Mailing list is official channel, though

RFC 2026: Internet Standards Process

- Standards track RFCs:
  - WG consensus (as judged by WG chairs)
  - WG last call
  - IESG approval (based on AD recommendation)
    - Quality control!
  - IETF last call
- Informational RFCs
- BCP (best current practice) RFCs

RFC 2026: IPR issues (1)

- (10.2) No contribution that is subject to any requirement of confidentiality or any restriction on its dissemination may be considered […]
- Where the IESG knows of rights or claimed rights […] the IETF Executive Director shall attempt to obtain from the claimant […] a written assurance that upon approval by the IESG of the relevant Internet standards track specification(s), any party will be able to obtain the right to implement, use and distribute the technology […] based upon the specific specification(s) under openly specified, reasonable, non-discriminatory terms.

RFC 2026: IPR issues (2)

- **Contributions (10.3.1(6)):**
  "The contributor represents that he has disclosed the existence of any proprietary or intellectual property rights in the contribution that are reasonably and personally known to the contributor."
- **I.e., if you know of a patent application for a technology you are contributing, you have to tell.**
  Or just shut up entirely!

IPR issues: ROHC WG policy

- IETF IPR policy defined in RFC2026
- For expedience:
  Include IPR statements in the contributions (I-Ds, slides)
  - Upon advancement to RFC, these IPR statements will be replaced by a pointer to http://www.ietf.org/ipr
- Unencumbered technologies facilitate interoperability and are therefore generally preferable
  - Of two roughly equal proposals, select the unencumbered one
  - Desirable: *Default* configuration is unencumbered

ROHC: Charter (1)

- **Cellular links: expensive, limited bandwidth**
- **IP/UDP/RTP and IP/TCP packets benefit considerably from header compression**
- **Existing schemes (RFC 1144, RFC 2508)**
  - **do not perform well over cellular:**
    high error rates and long link roundtrip times
  - **do not compress TCP options such as SACK or Timestamps**
- **Goal of ROHC:**
  - **develop header compression schemes that perform well over links with high error rates and long roundtrip times.**
  - *must* **perform well for cellular links built using technologies such as WCDMA, EDGE, and CDMA-2000.**
  - *should* **also be applicable to other future link technologies with high loss and long roundtrip times**
  - *Ideally*, **it should be possible to compress over unidirectional links.**

ROHC: Charter (2)

- Good performance:
  - minimal loss propagation
  - minimal added delay

And, of course, the size…

- Target:
  - generic TCP and UDP/RTP compression
  - applications of particular interest: voice and low-bandwidth video
- ROHC may develop multiple compression schemes
  - e.g., for specific link layer technologies
  - additional schemes may be added in consultation with the ADs.
- Must:
  - assure that when a header is compressed and then decompressed, the result is semantically identical to the original;
  - perform well when end-to-end path involves more than one cellular link;
  - support IPv4 and IPv6.

ROHC: Charter (3)

- First task: Create more thorough requirements documents
- Maintain connections with other standardization organizations developing cellular technology for IP, such as 3GPP and 3GPP-2
  - ensure that output fulfills their requirements and will be put to good use
- Develop a solid understanding of the impact that specific error patterns have on HC schemes, and document guidelines to L2 designers regarding what L2 features work best to assist L3/L4 HC
- Address interactions with IPSEC and other security implications.

- **Remember: Only IESG can change the charter!**

ROHC: Charter (4) Goals and Milestones

Done
in last-call
Start now
To do

- Mar: I-D on Requirements for IP/UDP/RTP HC.
- May: I-D of layer-2 design guidelines.
- May: I-D(s) proposing IP/UDP/RTP HC schemes.
- May: I-D of Requirements for IP/TCP HC.
- Jun: Requirements for IP/UDP/RTP HC submitted to IESG (Inf.)
- Jul: Requirements for IP/TCP HC submitted to IESG (Inf.)
- Jul: Resolve possibly multiple IP/UDP/RTP HC schemes into a single scheme.
- Aug: I-D on IP/TCP header compression scheme.
- Sep: Layer-2 design guidelines submitted to IESG (Inf.) ➡ TCP g/l
- Sep: IP/UDP/RTP HC scheme submitted to IESG (PS)
- Dec: IP/TCP HC scheme submitted to IESG (PS)
- Jan: Possible recharter of WG to develop additional HC schemes.

IPR approach

- Free implementations can't use licensing process
  - Neither can garage-based companies
- Base spec should be unencumbered
  - IPR players agree to waive license for standard-based implementations
- Examples of acceptable patent licenses:
  - RFC1822 license
  - http://www.ietf.org/ietf/IPR/MOTOROLA-DHCP-AGENT-OPTIONS

50th IETF: Agenda (1)

- 0900 Chair admonishments and agenda (10)
- 0910 WG document status (10)
- 0920 Testing and implementing RTP ROHC
  - 0920 News from ROHC field testing (10)
  - 0930 News from Siemens implementation West (5)
  - 0935 Bay-Cough proposal Price (5)
- 0940 ROHC over PPP Bormann (5)
- 0945 0-byte
  - 0945 3GPP2 report Jonsson (5)
  - 0950 Requirements Jonsson (12)
  - 1002 Solutions Jonsson (3)
  - 1005 WG work item? (3)

50th IETF: Agenda (2)

- **1008 TCP**
  - 1008 Requirements — Jonsson (12)
  - 1020 TAROC update — Zhang (10)
- **1030 EPIC**
  - 1030 EPIC update — Price (5)
  - 1035 TCP (and SCTP) on EPIC update — Price (10)
  - 1045 WG work item? — (5)
- **1050 Signalling compression**
  - 1050 Requirements — Hannu (12)
  - 1102 Solutions — Hannu (3)
  - 1105 WG work item? — (5)
- **1110 Rechartering** — (20)

WG documents in publication: RTP ROHC

- Approved by IESG on Feb 23
  - RTP requirements (draft-ietf-rohc-rtp-requirements-05.txt)
  - Framework and four profiles (draft-ietf-rohc-rtp-09.txt)
- Already part of 3GPP Release 4
  - Change Requests approved by TSG RAN last week
  - Alongside with R99's inclusion of RFC2507 (*not* RFC2508!)
- Adopted by 3GPP2
  - Report at 0945

Lower layer guidelines

- draft-ietf-rohc-rtp-lower-layer-guidelines-01.txt
- Completed WG last-call in December
- Stalled
  - AD input: Prescriptive text not in style for Informational
  - Did not attempt IETF last-call (to avoid stall for RTP ROHC!)
- How to proceed?
  - 0) force the issue :-)
  - 1) submit as BCP
  - 2) edit and submit as informational
  - 3) other?

ROHC over PPP

- draft-ietf-rohc-over-ppp-01.txt
- Son-of-2509 (PPP negotiation in IPCP)
  - Makes ROHC immediately useful in PPP world
  - Also: Example for negotiation needed by other types of links
- Changes from –00
  - Two-byte profile identifiers in negotiation
  - *Two* PPP protocol identifiers (1 small CIDs, 1 large CIDs)
    - Removed LARGE_CIDS flag
- Ready for WG last-call?

EPIC – how to use?

- Do we want to take this up for further ROHC work?
- Need a way to use this in standards
  - Could standardize the output of the EPIC processor (duuh)
  - Define EPIC processor input language?
- Hard to do the all-layers trick here…
  - Will have to cooperate with other bodies
  - Are we the right body to “package” EPIC for them?

ROHC TCP – why develop separately?

- The requirements for robustness may be less stringent
  - Can do retransmission at link layer (see PILC)
- Less stringent time constraints on development
- Different protocol than RTP (obviously)
- New problems: Options like SACK, timestamps
- Solicit wider input wrt next generation TCP compression
  - But is this maybe still a researchy topic?

ROHC TCP Requirements

- Different link properties
  - No residual errors, but may have packet loss
- Robustness:
  - Should not disable [might even help] TCP mechanisms
    - fast retransmit, fast repair, etc
  - MUST NOT generate damaged headers (that can pass TCP chksum!)
  - Must deal with current and future TCPs
    - SACK, timestamp, ECN, Diffserv, Initial TCP negotiation, etc
  - TCP sequence numbers and IP ID less predictable
- Might want it to work well for short-lived TCP transfers?
- Solve known problems with TCP Checksum
  - Window scale option – satellite links (loss of 64K undetectable)
  - window field decrement + seq no increment (rfc1144)

TCP ROHC requirements

- Already on ROHC charter!
  - But we didn't get around to it, yet
- There is no TCP HC out there that does SACK, ECN, …
  - The world is looking at ROHC to fix this
  - Attempt to be future-proof!
- ➡ ROHC TCP *must* be applicable in the wide Internet
  - Encumbered solutions won't cut it!

TCP – way forward?

- **Need requirements document**
  - **How much can you guess about TCP *implementations***
- **Need lower-layer guidelines document**
  - **How much L2 reliability is good for you?**
- **Start work on TCP scheme**
  - **State management**
  - **Assume EPIC for encoding?**

EPIC – make this a WG item?

- **Pro:**
  - Don't have to carve out packet headers by hand any more
  - Provably optimal :-)
- **Con:**
  - Implementation complexity?
  - Run-time overhead?
  - Remember ASN.1 PER?
    - Need interoperable implementations!
  - IPRs?
- **Can decide late in the TCP process…**

Signaling compression – make it a WG item?

- **Pro:**
  - It's needed! (Call setup time will be bad without it)
  - Fits in ROHC framework *if* done hop-by-hop
    - No changes to end systems, more redundancy to look at
  - Hop-by-hop makes it easier to compress between calls
- **Con:**
  - Might be better done end-2-end (or in SIP proxy)
    - What about IPCOMP, TCPFILTER and friends?
  - Not really header compression (do we care?)
  - Is hop-by-hop still useful once SIP gets secure?
  - IPRs?

0-byte – way forward?

- Lots of confusion on what we are doing here
  - Distinguishing element: use synchronous, fixed frame channel
  - Allow for buffering in the compressor
- Architecture
  - (End) system “IP Stack” architecture
  - Protocol architecture
- Does it work in mid-path?
- Document limitations
  - E.g., non-transparent solution may not work with payload compression that uses SN/TS as initialization
  - vector
  - ECN bits, IP-ID, … on downlink side… RTCP…
- It seems we need a requirements delta document

Bay-Cough?

- We have one proposal:
  - Host: Siemens (Roke Manor)
  - Date: The week before IETF-51 (2001-07-30 to 2001-08-03)
- To do: Test sequences
  - Negotiation, mode transitions, state transitions, packet formats
- To do: Infrastructure, reference points
- To do: nail down any IPR issues

Rechartering: Goals and Milestones (1)

- Lower-layer Guidelines: submit for ____ RSN
- ROHC-over-PPP
  - WG last-call April 2001, submit May 2001
- 0-byte IP/UDP/RTP
  - Try for 3GPP2 deadline (September 2001)?
  - Requirements and Assumptions: I-D April 2001
  - WG last-call July 2001, submit August 2001
- UDP-lite profile?
  - Try for 3GPP deadline (December 2001)?
  - Requirements, Specification: I-Ds April 2001
  - WG last-call August 2001, submit September 2001

Rechartering: Goals and Milestones (2)

- EPIC
  - Need to be done before TCP if we want to use it for that
  - Decide: Interoperable implementations by Dec 2001?
- TCP: new dates
  - Requirements and assumptions frozen: August 2001 (London)
  - draft-ietf-rohc-tcp-00.txt: September 2001
  - WG last-call March 2002, submit April 2002
- Signaling compression
  - Focus on call-setup time issue
  - Requirements and assumptions draft: August 2001
  - Start protocol work *if* we decide to go on (August 2001)

Rechartering: Goals and Milestones (3)

- ROHC over reordering channels???
- MIB
  - Initial I-D: October 2001
  - WG last-call Jan 2002, submit Feb 2002
- Draft standard by 1Q2002
  - Separate documents (Framework, 4 profiles): October 2001
  - WG last-call Jan 2002, submit Feb 2002
- SCTP?
  - Leave for next rechartering (look again in London)

Rechartering (4)

- **Remember: This all has to go through the ADs…**