Constrained RESTful Environments
WG (core)

Chairs:
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Carsten Bormann <cabo@tzi.org>

Mailing List:
core@ietf.org

Jabber:
core@jabber.ietf.org

http://6lowapp.net
• We assume people have read the drafts

• Meetings serve to advance difficult issues by making good use of face-to-face communications

• Note Well: Be aware of the IPR principles, according to RFC 8179 and its updates

üBlue sheets
üScribe(s)
Note Well

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Agenda Bashing
Monday (120 min)

- 13:30–13:40 Intro, Agenda, Status
- 13:50–14:20 Post-WGLC: OSCORE (GS)
- 14:20–14:45 Post-WGLC: SenML (AK)
- 14:45–15:15 Up for WGLC soon: RD/DNS-SD (CA)
- 15:15–15:30 Up for WGLC soon: COMI (AP)

All times are in time-warped WET (UTC+00:00)
Tuesday (150 min)

- 09:30–09:35 Intro, Agenda
- 09:35–10:00 Post-WGLC: CoCoA (CG)
- 10:00–10:15 Getting ready: ERT (CA)
- 10:15–10:25 Getting ready: OSCORE-Group (MT)
- 10:25–10:40 New response codes (AK)
- 10:40–10:55 Pending for EST (PV)
- 10:55–11:05 Pubsub (MK)
- 11:05–11:15 Dynlink/Interfaces (BS)
- 11:15–11:25 Negotiation, AT (BS)
- 11:25–11:35 dev URN (JA)
- 11:35–12:00 Flextime: OPC/UA (CP), Time scale (LT), …
Draft-ietf-coap-tcp-tls
→ RFC 8323

Published 2018-02-15
Supporting: RFC 8307 (2018-01-03)
Advertisements

- T2TRG Coexistence (see draft-feeney-t2trg-inter-network-01): Mon 17:30..18:00 Waterloo
- 6TiSCH stateless-proxy option (in draft-ietf-6tisch-minimal-security-05): Wed 13:30..15:00 Viscount
- DNSSD: Thu 09:30..12:00 Buckingham
RIOT Summit
September 13 – 14, 2018
Meet in Amsterdam!

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 RIPE NCC
 RIPE NETWORK COORDINATION CENTRE

wolfSSL
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draft-ietf-core-links-json: Status

- Started Feb 2012 as a JSON version of 6690-to-be
  - Avoid the need for another parser
- Added CBOR variants mid-2015
- Focus: roundtrippable with RFC 6690
  - Inherit limitations of RFC 6690 (e.g., percent-encoding)
- Submitted to IESG on 2017-04-02
  - Lots of feedback
  - Related concepts in OCF spec
- Proposed Re-focus:
  - Still cover all of RFC 6690
  - Don’t inherit the limitations
Web Linking: RFC 5988 vs. RFC 8288

- RFC 6690 was based on RFC 5988
- Has since been updated to RFC 8288
  - More conscious use of ABNF
  - Clearer approach to Unicode and language tags
  - Clarifies role of serialization (of which RFC 6690 is one)
- RFC 6690 not updated to RFC 8288
- Links-json should use RFC 8288 as a base
Language tags

• RFC 5988 (and this 8288) defines “starred” attributes
  • Encoding Unicode content, language tag
• RFC 6690 supports “title*”, but doesn’t do much with that
• JSON/CBOR should not be concerned with weird encoding issues
• Language tags are useful for human readable values
• So: do support them, but get rid of the “*” hack:

```json
{"href": "…", "rel": "…",
 "title": {"de_AT": "Übergrößenträger"}}
```
Is this the right way forward?

• Rebase on RFC 8288
  • Clean up “title*” etc.
• Explain how RFC 6690 documents become Links-json documents
• Otherwise, keep Links-json generally applicable and free of RFC 6690 idiosyncrasies

• Do not change the mandate that “/.well-known/core” is RFC 6690 link-format (!?)
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OSCORE

draft-ietf-core-object-security-11

Göran Selander, Ericsson
John Mattsson, Ericsson
Francesca Palombini, Ericsson
Ludwig Seitz, RISE SICS

IETF 101, CoRE WG, London, Mar 19, 2018
Status (v-11)

› Several implementations
  - Java (Californium): https://bitbucket.org/lseitz/oscoap_californium
  - C (Contiki, Erbium): https://github.com/Gunzter/contiki-oscoap
  - Python (aiocoap): https://github.com/chrysn/aiocoap
  - Python (CoAP for openwsn): https://github.com/openwsn-berkeley/coap
  - Java (Californium, v-03) https://github.com/lukadschaak/oscore

› Several interops done
  - Spec and reports: https://github.com/EricssonResearch/OSCOAP
Status (v-11)

› IETF Last Call ended: IESG evaluation

› Some post-Last-Call reviews

› Up-to-date handling of review comments on the wiki: https://github.com/core wg/oscoap/wiki

› All but a few specific review comments addressed.
Review Comments

› “The document needs a security analysis section”

› "implications of modifications of unprotected fields"

› Proposal: Add an appendix describing the security properties of the protocol:
  - Assumptions on intermediaries
  - Protected header fields, security guarantees
  - Unprotected fields, consequences
Review Comments

› "Nonce construction: Why is Sender ID included in the nonce?"

› Answer: Designed for supporting notifications and interchange of client and server roles

› Proposal: Prove (key, nonce) uniqueness in the new appendix
Review Comments

› “But this design actively works against any involvement of intermediaries.”

› Answer: The design supports intermediaries e.g. performing forwarding and translation

› In the general case, proxies can read but not modify without being detected.

› Proposal: Clarify this in the new appendix.
Review Comments

› “neglecting to address important and difficult parts of the problem like key exchange”

› Answer: Key establishment is addressed.
  – The ACE/OAuth 2.0 framework may be used.
  – Some IoT deployments require PSK.

› Key exchange for OSCORE is discussed in ACE since IETF#95.
Review Comments: HTTP 1(2)

› “This protocol abuses HTTP by tunneling over it”
  Answer: Yes. This was requested.

› "Missing [A]BNF"
  Answer: Agreed, included

› "Does the COAP-HTTP gateway understand the significance of the new header field and insert the media type when translating?"
  Answer: Yes
Review Comments: HTTP 2(2)

› "A new media type is defined, but I don't see any mention of a codepoint for use with COAP"

› Proposal: Not needed for this draft, but will include that for other potential use

› "What if the request is redirected by a server that doesn't understand OSCORE?"

› Question for WG: shall we support HTTP redirects?

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› Question for WG: Rename HTTP header field:

› 'Object-Security' → 'CoAP-Object-Security'
Reviews Comments: Summary Proposal

› Clarifications of the points brought up
› Editorials
› New appendix:
   - D. Overview of Security Properties
     › D.1. Supporting Proxy Operations
     › D.2. Protected Message Fields
     › D.3. Uniqueness of (key, nonce)
     › D.4. Unprotected Message Fields

› Details on the CoRE WG Github Commits
Monday (120 min)

• 13:30–13:40 Intro, Agenda, Status
• 13:40–13:50 Post-WGLC: Links-JSON (chairs)
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Media Types for Sensor Measurement Lists (SenML)

IETF 101, London
draft-ietf-core-senml-13

Ari Keränen
Status

• Done!
  • IETF LC ongoing
  • IESG Telechat April 19\textsuperscript{th}

• Since -12: "+exi" -> "-exi" & editorial fixes

• Still: could add expert guidance clarification for new values: must have "Value" in the long name
Early assignments

• Suggested CoAP Content-Format IDs
  • XML IDs in 2-byte range

<table>
<thead>
<tr>
<th>Media type</th>
<th>ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>application/senml+json</td>
<td>110</td>
</tr>
<tr>
<td>application/sensml+json</td>
<td>111</td>
</tr>
<tr>
<td>application/senml+cbor</td>
<td>112</td>
</tr>
<tr>
<td>application/sensml+cbor</td>
<td>113</td>
</tr>
<tr>
<td>application/senml-exi</td>
<td>114</td>
</tr>
<tr>
<td>application/sensml-exi</td>
<td>115</td>
</tr>
<tr>
<td>application/senml+xml</td>
<td>310</td>
</tr>
<tr>
<td>application/sensml+xml</td>
<td>311</td>
</tr>
</tbody>
</table>
Early assignments

• How about SenML Fields?
Media types for FETCH & PATCH with SenML

IETF 101, London

draft-keranen-senml-fetch-00

Ari Keränen & Mojan Mohajer
SenML IPSO SO example

[ {
"bn":"2001:db8::2/3306/0/",
"n":"5850", "vb":true},
{"n":"5851", "v":42},
{"n":"5852", "v":1200},
{"n":"5750", "vs":"Ceiling light"} ]
SenML IPSO SO example

[ {"bn":"2001:db8::2/3306/0/", "n":"5850", "vb":true},
 {"n":"5851", "v":42},
 {"n":"5852", "v":1200},
 {"n":"5750", "vs":"Ceiling light"} ]

• Want to retrieve/change only 5850 and 5851
• And want to avoid exchanging full representations or doing multiple requests
CoAP FETCH / PATCH (RFC 8132)

- CoAP methods, FETCH, PATCH, and iPATCH, which are used to access and update parts of a resource
- Needs payload format; dependent on the resource representation format
SenML FETCH format

• Modeled after SenML JSON format: simple parsing on constrained things with SenML support
• Just indicate names, and potentially times, of the SenML records to fetch

[ {"bn":"2001:db8::2/3306/0/, "n":"5850"},
{"n":"5851"} ]
SenML PATCH format

• Same as FETCH format, but with the value(s) to set
  • Essentially a subset of the JSON Merge Patch format

```json
[ {
  "bn":"2001:db8::2/3306/0/",
  "n":"5850",
  "vb":false
},
{
  "n":"5851",
  "v":10
} ]
```
Wild cards

• Optimization for selecting many SenML Records with one FETCH/PATCH Record
• Useful with large amounts of SenML Records (e.g., many IPSO objects on a device)
  • "Get all temperature sensor values"
  • "Dim all lights to 10%"
Proposed format

• New SenML Field "ff" ("fetch filter")
  • Used instead of the name field and concatenated to base name like the name field
  • Contains wild card characters "*"
  • Matched to SenML Record Names

• Wild card matches all characters until next "/" or ":"

```json
[ {"bn":"2001:db8::2/", "ff":"3306/0/58*"} ]
```

(This matches all records in the example except "3306/0/5750")
(Wild Card) Considerations

• Need something **simple** now: constrained devices
  • Wild card **seemed** most suitable

• Using new Field(s) enables easy extensibility
  • Alternative: re-purpose "n" and "bn" fields

• Should wild card support be MUST?
  • How to indicate "not supporting wild cards"? Now suggesting "4.00 Bad Request" but doesn't seem right

• Regular expressions? New field probably

• PATCH operation codes needed (append, delete, ...)?
• Can just re-use SenML content format IDs?
• Interest in CoRE WG to work on this?
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Resource Directory

draft-ietf-core-resource-directory
draft-ietf-core-rd-dns-sd
draft-amsuess-rd-replication

Zach Shelby, Michael Koster, Carsten Bormann,
Peter van der Stok, Christian Amsüss
Kerry Lynn

2018-03-19
pretty much ready
Issue tracker / pull requests

107 down, 1 to go 2 to go
Issue #91

plug test upcoming

contact me: c@amsuess.com
Changes since -12

- Cleanup and clarification
  - Clarified observation behavior
  - Refer to t2trg-rel-impl for server metadata / versioning
  - Reduced the significance of domains (removed from figure 2)
- Added ”all resource directory” nodes MC address
- Resolve RFC6690-vs-8288 resolution ambiguities
  - Require registered links not to be relative when using anchor
  - Return absolute URIs in resource lookup
- Work with replication without really changing the RD
  - Multiple RDs can be found, and can have absolute addresses
  - Endpoints from other RDs can be members of a group
rd-replication

- Different registration addresses
- Different lookup addresses
- Eventually consistent results
rd-dns-sd

-01: updated with introduction
rd-dns-sd

hooks into RD extension points
Next steps for resource-directory

reviews

plug test
Monday (120 min)

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CoMI – update

draft-ietf-core-comi-01

Andy Bierman
Michel Veillette
Peter van der Stok
Alexander Pelov <a@ackl.io>
## Draft status

<table>
<thead>
<tr>
<th>Draft</th>
<th>Version</th>
<th>Status</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ietf-core-yang-cbor</td>
<td>6</td>
<td>Stable since IETF 97</td>
<td>Ready for WGLC</td>
</tr>
<tr>
<td>ietf-core-sid</td>
<td>3</td>
<td>Stable since IETF 98</td>
<td>Need to add YANG Template WGLC afterwards (April)</td>
</tr>
<tr>
<td>ietf-core-comi</td>
<td>2</td>
<td>Stable since IETF 99</td>
<td>Minor editions/check – need to check YANG Template, YANG attach, NMDA YANG Push is OK</td>
</tr>
<tr>
<td>veillette-core-yang-library</td>
<td>2</td>
<td>Stable since IETF 98</td>
<td>CoMI model introspection In scope for Core? Normative reference in CoMI</td>
</tr>
</tbody>
</table>

**Actions from last time:**
- Official Hackathon @ II
- Improve interop (simplify!)
- SID registry
Implementations
CoMI with YANG-CBOR

Existing implementations
– GoLang: server + client
– C: server + client
– 2 more partial proprietary implementations

Virtual interop @ Hackathon IETF100
– FETCH with ietf-system

Hackathon 101 – Semantic interoperability
– YANG -> Thing Description (W3C)
– CoMI bindings to TD
  • GET is a MUST
CoMI test on F-Interop

- interop
- Environment for executing an online and remote interoperability test session (VPN-like setup)
- Coordinate the interop test
- Sniff the traffic (generate PCAP files records)
- Dissect the messages (include Wireshark-like view)
- Analyze the exchanged traffic (automatically issue PASS/FAIL/INCONCLUSIVE verdicts)

- interop reference implementation of CoMI published
- CoMI Server
- CoMI Client
- GET, FETCH, PUT, IPATCH and DELETE

CoMI - CoRE – Mar 19 2018 - M. Veillette, A. Bierman, P. van der Stok, A. Pelov <a@ackl.io>
le comi-interop {

  container interface {
    leaf ip-address {
      type string;
    }

    leaf name {
      type string;
    }

    leaf throughput {
      type int64;
    }
  }
}
Test file

-interop@2017-12-12.yang

```plaintext
module comi-interop {

  container interface {
    leaf ip-address {
      type string;
    }
    leaf name {
      type string;
    }
    leaf throughput {
      type int64;
    }
  }
}
```

comi-interop@2017-12-12.sid

```json
{
  "namespace": "data",
  "identifier": "/comi-interop:interface",
  "sid": 70001
},
{
  "namespace": "data",
  "identifier": "/comi-interop:interface/ip-address",
  "sid": 70002
},
{
  "namespace": "data",
  "identifier": "/comi-interop:interface/name",
  "sid": 70003
},
{
  "namespace": "data",
  "identifier": "/comi-interop:interface/throughput",
  "sid": 70004
}
```

EXPERIMENTAL RANGE (see draft-ietf-core-sid)
Test file

```yang
module comi-interop {
  container interface {
    leaf ip-address {
      type string;
    }
    leaf name {
      type string;
    }
    leaf throughput {
      type int64;
    }
  }
}
```

```json
comi-interop@2017-12-12.sid
{
  "namespace": "data",
  "identifier": "/comi-interop:interface",
  "sid": 70001
},
{
  "namespace": "data",
  "identifier": "/comi-interop:interface/ip-address",
  "sid": 70002
},
{
  "namespace": "data",
  "identifier": "/comi-interop:interface/name",
  "sid": 70003
},
{
  "namespace": "data",
  "identifier": "/comi-interop:interface/throughput",
  "sid": 70004
}
```
ol uses compact YANG Schema Item iDentifiers (SID) instead of names or paths. able to CoMI developers to register and share SIDs.

Plan to implement a YANG model using CoMI should first check this site to verify sid files are not already available. For new YANG models or those without a e, developers are invited to create an account to obtain an SID range that can be he missing .sid files.

.sid files, update them when releasing a new revision, and check the consistency yang files using one of the links in the Tools section below. When your work is and register the resulting .sid file(s).

n

n

YANG models

valiable

60

1

'Y check
SID registry

YANG modules available

<table>
<thead>
<tr>
<th>Account</th>
<th>YANG module</th>
</tr>
</thead>
<tbody>
<tr>
<td>ietf</td>
<td>ietf-yang-types@2013-07-15</td>
</tr>
<tr>
<td>ietf</td>
<td>ietf-inet-types@2013-07-15</td>
</tr>
<tr>
<td>ietf</td>
<td>iana-crypt-hash@2014-04-04</td>
</tr>
</tbody>
</table>
SID registry

.YANG models

.yang check
Next steps

etf-core-yang-cbor
  – Start WGLC?

etf-core-sid and ietf-core-comi
  – Shepherd, reviewers?
  – TODO Check all OK for YANG Template, YANG attach, NMDA
  – WGLC in April

Adoption of veillette-core-yang-library as WG item?

In the mean time – do the Interop
Thanks!
Tuesday (150 min) → Monday

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- 11:25–11:35 dev URN (JA)
- 11:35–12:00 Flextime: OPC/UA (CP), Time scale (LT), …
Secure group communication for CoAP

draft-ietf-core-oscore-groupcomm-01

Marco Tiloca, RISE SICS
Göran Selander, Ericsson
Francesca Palombini, Ericsson
Jiye Park, Universität Duisburg-Essen

IETF 101, CoRE WG, London, March 20th, 2018
Updates from -00 (1/2)

› Major updates and restructuring to address reviews
  – Thanks to Esko Dijk and Peter van der Stok

› Section 1.1 – Terminology
  – Added definition of group as “security group”
  – Not to be confused with “network group” or “application group”

› Section 2 – Security Context
  – Clarified establishment/derivation of contexts
  – Added table for additional elements wrt OSCORE
Updates from -00 (2/2)

› Section 3 – COSE Object
  – Examples or request and response (before and after compression)
  – CounterSignature0 is used rather than CounterSignature
  – ‘external_aad’ includes also the signature algorithm
  – ‘external_aad’ does not include the Group Identifier (Gid) any more

› Section 6 – NEW
  – List of responsibilities of the Group Manager

› Appendices
  – Appendix A: assumptions and security objectives (former section)
  – Appendix B: additional details on considered use cases
  – Appendix C: added actual example of Gid format (prefix + epoch)
  – Appendix D: join description aligned with draft-palombini-ace-key-groupcomm
Points for discussion (1/2)

› Independence of Security Group from IP addresses
  – Requests may be multicast or unicast (e.g. selective retransmissions)
  – Current context retrieval based on Gid and multicast IP address
  – Change to use only the Gid as kid context for context retrieval ?

› Fixed part of the Gid
  – Currently random and large enough to avoid global collisions
  – Change to neglect randomness and large size ?
  – Tie-breaker can be trying the keying material from multiple contexts
Points for discussion (2/2)

› Current terminology explicitly points at multicast
  – Replace “Multicaster” with “Sender”?
  – Replace “(Pure) Listener” with “(Pure) Recipient”?
  – This would simplify request/assignment of roles upon joining

› Current description of the join process
  – Appendix D.1: exchanged information
  – Appendix D.2: provisioning/retrieval of public keys
  – Appendix D.3: pointer to the ACE-based approach
  – What should be kept in this document?
  – Should we keep a general description in case ACE is not used?
Implementation

› OSRAM Innovation
  – Developed in C
  – MediaTek LinkIt Smart 7688
  – Aligned with individual submission at IETF99

› Proof-of-concept for Contiki OS
  – Wismote (MSP430; TI CC2520)
  – SmartRF (MSP430; TI CC2538)
  – Aligned with individual submission at IETF99
  – https://github.com/tdrlab/mcast

› Next steps
  – Move forward to interoperability tests
  – Is it feasible already at IETF102?
Related activity

› *draft-tiloca-ace-oscoap-joining*
  – Referred by Appendix D.3

› Join an OSCORE group using the ACE framework
  – Joining node ➔ Client
  – Group Manager ➔ Resource Server
  – Message formats aligned with *draft-palombini-ace-key-groupcomm*

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› Leverage protocol-specific profiles of ACE
  – CoAP-DTLS profile  *draft-ietf-ace-dtls-authorize*
  – OSCORE profile  *draft-ietf-ace-oscore-profile*
Thank you!

Comments/questions?

https://github.com/core-wg/oscore-groupcomm
Support for group comm.

- **draft-ietf-core-oscore-groupcomm-01**
  - The Sender Context stores the endpoint’s public-private key pair
  - The Recipient Context stores the public key associated to the endpoint from which messages are received
  - Recipient Contexts are derived at runtime

The Sender Context stores the endpoint’s public-private key pair. The Recipient Context stores the public key associated to the endpoint from which messages are received. Recipient Contexts are derived at runtime.
Tuesday (150 min) → Monday

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- 11:25–11:35 dev URN (JA)
- 11:35–12:00 Flextime: OPC/UA (CP), Time scale (LT), …
Too Many Requests Response Code for CoAP

IETF 101, London
draft-keranen-core-too-many-reqs-00

Ari Keränen
Background

• CoAP client can cause overload in server with too frequent requests
• How can server tell client to back off
• HTTP error code 429 “Too many requests”
• Proposal: register 4.29 for CoAP
  • With MaxAge to indicate when it’s OK to request again
• Originally part of CoAP Pub/sub Broker draft; also OCF interest
What requests are OK?

• Current text: Client “SHOULD NOT send the same request to the server before the time indicated in the Max-Age option has passed”

• Other requests? Should server be able to give guidance what else is (not) OK during this time?
  • Example: GET instead of PUBLISH

• Sounds like a generic problem worth a generic solution; probably out of scope for this draft
Next steps

• Bundle with other non-controversial Response Codes?
• WG item?
Constrained RESTful Environments
WG (core)

Chairs:
Jaime Jiménez <jaime.jimenez@ericsson.com>
Carsten Bormann <cabo@tzi.org>

Mailing List:
core@ietf.org

Jabber:
core@jabber.ietf.org

http://6lowapp.net
• We assume people have read the drafts

• Meetings serve to advance difficult issues by making good use of face-to-face communications

• Note Well: Be aware of the IPR principles, according to RFC 8179 and its updates

üBlue sheets
üScribe(s)
Note Well

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Tuesday (150 min)

- 09:30–09:35 Intro, Agenda
- 09:35–10:00 Post-WGLC: CoCoA (CG)
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CoAP Simple Congestion Control/Advanced (CoCoA)

draft-ietf-core-cocoa-03

Carsten Bormann – Universität Bremen TZI
August Betzler – Fundació i2Cat
Carles Gomez, Ilker Demirkol – Univ. Politècnica de Catalunya
Status

• WG state: “Submitted to IESG for publication”
• Last revision is -03
  – Mostly editorial updates
  – Addresses comments by:
    • Wesley Eddy (TSVART Early Review)
    • Mirja Kühlewind (Responsible AD)
• Next revision
  – Needs to address comments by:
    • Scott Bradner (OPSDIR Telechat Review)
    • Vincent Roca (SECDIR Review)
    • Christer Holmberg (Gen-ART Telechat Review)
Updates in -03 (I)

• Section 1
  – Paragraph previously in Section 5, now more general: overview on CoCoA
    • RTO based on (weak or strong) RTTs
    • Weak RTTs: reaction to congestion with a lower sending rate
    • For NONs, sending rate limited to 1/RTO
      – More conservative than RFC 7641 (Observe): 1/RTT
Updates in -03 (II)

• Section 3
  – Added details on scenarios where CoCoA has been found to perform well
    • Latencies: milliseconds to peaks of dozens of seconds
      – Comment from Jaime: which reference contributes to what within this range
    • Single-hop and multihop network topologies
    • Link technologies: IEEE 802.15.4, GPRS, UMTS, Wi-Fi
  – Added that CoCoA is also expected to work suitably across the general Internet
Updates in -03 (III)

• Section 4.2
  – Added that default weight values for strong and weak RTO estimators have been found to work well in evaluations (Appendix A)

• Section 4.2.1
  – Added an explicit note on VBF replacing RFC 6298 simple exponential backoff
Updates in -03 (IV)

• Section 4.3
  – State of RTO estimators for an endpoint
    • Should be kept long enough to avoid frequent returns to inappropriate initial values
    • For default parameters in CoAP, it is RECOMMENDED to keep it for at least 255 s
      – Was a “MUST” in -02

• Minor editorial updates throughout the document
Next revision (I)

• Scott Bradner’s comment
  – The draft makes no reference to RFC 5033...
    • “Specifying New Congestion Control Algorithms”
  – ... But we have taken RFC 5033 into account in the design of CoCoA
Next revision (II)

- RFC 5033 guidelines
  - 0. Differences with congestion control principles (RFC 2914)
    - CoCoA design considers such principles (preventing congestion collapse, fairness, optimizing performance)
  - 1. Impact on standard TCP, SCTP, DCCP
    - No negative impact
  - 2. Difficult environments
    - CoCoA has been designed for “difficult environments”
  - 3. Investigating a range of environments
    - Done (see slide 4)
Next revision (III)

• RFC 5033 guidelines
  – 4. Protection against congestion collapse
    • VBF of 1.5, 2 or 3 (always greater than 1)
  – 5. Fairness within the alternate cong. control mech.
    • High fairness measured (thanks to the VBF)
  – 6. Performance with misbehaving nodes
    • Considered. Weak estimator role
  – 7. Responses to sudden or transient events
    • CoCoA restores “normal” network state quickly
  – 8. Incremental deployment
    • CoCoA runs correctly in current CNNs and in CNN-cloud
Thanks!

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August Betzler, Carles Gomez, Ilker Demirkol
Universitat Politècnica de Catalunya
carlesgo@entel.upc.edu
Experimental Results with Default CoAP, CoCoA and CoAP over TCP RTO Management & Congestion Control

Ilpo Järvinen, Iivo Raitahila, Laura Pesola, Zhen Cao§, Markku Kojo

Department of Computer Science
University of Helsinki
§ Huawei
System under Study

• 1 to 400 IoT devices communicate with a fixed host over a constrained link
• Emulated wireless NB-IoT like network
• Varying router buffer sizes
  • 2500 B (recommended ~ BDP of the link)
  • 14100 B
  • 28200 B
  • 1410000 B (“infinite”, extreme buffer bloat)
Transport & Congestion Control

• Client and server implemented using libcoap
• Default CoAP as implemented in libcoap (+some bugfixes)
• CoCoA implemented as per draft-ietf-core-cocoa-01 and draft-ietf-core-cocoa-03
• For Default CoAP and CoCoA
  • MAX RETRANSMIT = 20 (EXCHANGE_LIFETIME and MAX_TRANSMIT_WAIT adjusted accordingly)
  • Max RTO: 60 secs, 32 secs for CoCoA as specified
• Implemented CoAP over TCP as per draft-ietf-core-coap-tcp-tls-09
  • Only necessary features implemented
  • Run on top of Linux TCP
• Linux TCP (modified)
  • Use NewReno, Disabled: SACK, Cubic, Timestamps, F-RTO, CBI
  • Experimental features disabled: TCP RACK, TFO
  • Initial RTO: 2 secs
  • Delayed Ack timer: constant 200 msec
  • SYN and SYN/ACK retries: 40 and 41
  • Max RTO: 120 secs (Linux default)
Workloads

- Small request-response exchanges
- Request and response both fit in one CoAP message
- 1, 10, 50, 100, 200, 400 simultaneous client-server pairs (flows)
- Two types of clients:
  - **Continuous**: 50 successful request-response exchanges
    - TCP connection for each client is pre-established and the three-way handshake is not included in the measurements
  - **Random**: emulates short-lived clients (Random clients)
    - A short-lived random client sends 1-10 requests followed by another random client until 50 request-response pairs successfully exchanged
      - Retransmission timer reinitialized for each new random client
      - A new TCP connection opened for a new random client
Flow Completion Time (FCT) - 1 and 10 Clients

Table 1: Flow completion time (FCT) of 1 Continuous Client (secs)

<table>
<thead>
<tr>
<th>Buffer Size</th>
<th>CC algorithm</th>
<th>Min</th>
<th>10</th>
<th>25</th>
<th>Median</th>
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<td>Default CoAP</td>
<td>33.003</td>
<td>33.003</td>
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<tr>
<td>2500B</td>
<td>CoAP over TCP</td>
<td>33.208</td>
<td>33.208</td>
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<td>33.208</td>
<td>33.208</td>
<td>33.208</td>
</tr>
</tbody>
</table>

Table 2: Flow completion time (FCT) of 1 Random Client (secs)

<table>
<thead>
<tr>
<th>Buffer Size</th>
<th>CC algorithm</th>
<th>Min</th>
<th>10</th>
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<td>41.900</td>
<td>41.924</td>
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<td>46.239</td>
<td>46.417</td>
<td>46.580</td>
</tr>
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</table>

Table 3: Flow completion time (FCT) of 10 Continuous Clients (secs)

<table>
<thead>
<tr>
<th>Buffer Size</th>
<th>CC algorithm</th>
<th>Min</th>
<th>10</th>
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<th>max</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500B</td>
<td>Default CoAP</td>
<td>33.043</td>
<td>33.044</td>
<td>33.126</td>
<td>33.220</td>
<td>33.300</td>
<td>33.335</td>
<td>33.387</td>
</tr>
<tr>
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<td>CoCoA</td>
<td>33.043</td>
<td>33.044</td>
<td>33.126</td>
<td>33.220</td>
<td>33.299</td>
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<tr>
<td>2500B</td>
<td>CoAP over TCP</td>
<td>33.236</td>
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<td>33.521</td>
<td>33.571</td>
<td>33.616</td>
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</table>

Table 4: Flow completion time (FCT) of 10 Random Clients (secs)

<table>
<thead>
<tr>
<th>Buffer Size</th>
<th>CC algorithm</th>
<th>Min</th>
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<td>33.335</td>
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<td>33.387</td>
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<tr>
<td>2500B</td>
<td>CoAP over TCP</td>
<td>40.494</td>
<td>43.245</td>
<td>43.821</td>
<td>46.166</td>
<td>46.663</td>
<td>46.872</td>
<td>47.202</td>
</tr>
</tbody>
</table>

- With CoAP over TCP Random clients are clearly slower to complete compared to Continuous clients due to an additional RTT for TCP 3WHS when a new random client starts
- Larger TCP header causes some additional overhead for CoAP over TCP
- Queuing delay increases the flow completion times of 10 clients by up to a few hundreds milliseconds
FCT - 50 Clients

Continuous Clients

- Queuing delay increases and some congestion occurs resulting in a few packet losses
  - The major reason for the increased FCT is still in increased queuing delay
  - CoAP over TCP flows that encounter drops retransmit & back off -> FCT increases at higher percentiles
- “Infinite” queue: can absorb more packets eliminating packet losses with TCP
  - TCP more stable, but slightly increased queuing delay because packets dropped with small buffer now fit into the buffer
**FCT - 100 Clients**

- Larger router buffers: longer queuing delay takes RTT over 2.5 secs
  - Unnecessary retransmissions with initial RTO
  - Default CoAP FCT increases significantly
    - Default CoAP unable to adjust its RTO unlike CoCoA and CoAP over TCP
    - Cannot avoid unnecessary retransmissions
Number of retransmissions - 100 Clients

- With larger buffers Default CoAP unnecessarily retransmits nearly every requests once
- CoCoA and CoAP over TCP able to adjust RTO
  - CoCoA has more difficulties in adjusting RTO with Random Clients
• Default CoAP Congestion Collapsible behavior with infinite buffer
  • A vast number of unnecessary retransmissions add to the queuing delay
• With smaller 2500 B buffer TCP responds congestion more effectively
Number of Retransmission – 200 Clients

- Default CoAP: degree of Congestion Collapse increases with infinite buffer
  - Less forward progress made as most requests are unnecessarily retransmitted at least twice
  - With smaller 2500 B buffer CoAP over TCP has clearly less lost packets & retransmissions
    - This decreases the congestion level and allows TCP to complete with a lower number of retransmissions than Default CoAP and CoCoA that have more undelivered retransmissions
Default CoAP Congestion Collapse degree even more higher with “infinite” buffer
- Little forward progress made as almost all requests are unnecessarily retransmitted several times
- CoCoA -03 starts to collapse with Continuous Clients & “infinite” buffer
- Both CoCoA -01 and CoCoA -03 collapse with Random Clients & “infinite” buffer
Number of Retransmissions - 400 Clients

Continuous Clients

Random Clients

- CoCoA v03 with Continuous Clients & “infinite” buffer:
  - RTT increases well above 10 secs -> Bit more than half of the clients are not able to adjust RTO
  - VBF of 1.5 does not allow CoAP exchanges with initial RTO (2-3 secs) to complete with 2 resmots
  - Many clients that manage to get weak sample and update RTO to > 3 secs suffer from aging
  - CoCoA RTO has upper bound of 32 secs -> increases the number of unnecessary retransmissions
Protocol Actions Needed

• Problems with Default CoAP (RFC 7252)
  • Does not employ full back off that is TCP-compatible
    • After retransmitting and backing off, restores 2 secs initial RTO for the next exchange

• Problems with CoCoA
  • Does not employ full back off that is TCP-compatible
    • After retransmitting and backing off, starts the next exchange with current RTO estimate
  • With RTO estimate > 3, applies aging that blindly decreases RTO estimate
    • Even if increase would be appropriate
  • Applies upper bound of 32 secs for RTO (in conflict with draft-ietf-tcpm-rto-consider)

• Action points (edit draft-ietf-core-cocoa; write a short I-D that updates RFC 7252):
  • Default CoAP and CoCoA: With confirmable message exchanges, add full congestion control back off (TCP-compatible):
    • After retransmitting and backing off RTO, retain the backed off RTO as initial RTO for the next new CoAP message exchange (CON-ACK)
    • Back off RTO further, if retransmissions needed
    • Restore RTO only after no retransmissions are needed to complete CoAP message exchange
  • CoCoA: Reconsider the use of aging with RTO > 3
  • CoCoA: Reconsider the use of 32 secs upper bound for RTO
Thank You!

Q & A
Backup Slides
Frequency of transmissions with 400 Continuous Clients

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<tr>
<th>Buffer</th>
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<th>2.</th>
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If MAX_RETRANSMIT=4, requests requiring more than 5 retransmissions would have never completed.
# Frequency of transmissions with 200 Continuous Clients

## # of (re)transmissions (0= no retransmissions needed)

| Buffer  | CC algorithm          | 0.    | 1.    | 2.    | 3.    | 4.    | 5.    | 6.    | 7.    | 8.    | 9.    | 10.   | 11.   | 12.   | 13.   | 14.   | 15.   | 16.   | 17.   | 18.   | 19.   | 20.   |
|---------|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2500B   | Default CoAP          | 174944| 10911 | 6194  | 3440  | 2017  | 1266  | 769   | 398   | 61    | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 2500B   | CoCoA v01 no aging   | 171172| 12415 | 7158  | 4062  | 2370  | 1324  | 821   | 394   | 189   | 70    | 25    | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 2500B   | CoCoA v01            | 170783| 12688 | 7249  | 4194  | 2261  | 1338  | 767   | 440   | 186   | 70    | 24    | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 2500B   | CoCoA v03            | 166863| 13643 | 8025  | 4781  | 2903  | 1622  | 987   | 570   | 344   | 178   | 62    | 25    | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 2500B   | CoAP over TCP        | 191300| 7338  | 233   | 65    | 398   | 149   | 59    | 15    | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 14100B  | Default CoAP         | 13781 | 165203| 13139 | 4291  | 2261  | 1338  | 767   | 440   | 186   | 70    | 24    | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 14100B  | CoCoA v01 no aging  | 184597| 11985 | 2369  | 730   | 212   | 81    | 21    | 5     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 14100B  | CoCoA v01           | 183300| 13197 | 2366  | 812   | 248   | 55    | 21    | 1     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 14100B  | CoCoA v03           | 183285| 13149 | 2455  | 790   | 238   | 61    | 17    | 4     | 0     | 0     | 1     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 14100B  | CoAP over TCP       | 189559| 9369  | 982   | 88    | 2     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 28200B  | Default CoAP        | 6483  | 52253 | 136114| 3372  | 1195  | 403   | 135   | 31    | 8     | 6     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 28200B  | CoCoA v01 no aging  | 183147| 16100 | 729   | 24    | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 28200B  | CoCoA v01          | 183277| 15982 | 716   | 25    | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 28200B  | CoCoA v03          | 183151| 15863 | 930   | 50    | 6     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 28200B  | CoAP over TCP      | 189870| 9378  | 746   | 6     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| infinite| Default CoAP       | 1489  | 4281  | 98156 | 96074 | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| infinite| CoCoA v01 no aging | 181374| 17878 | 748   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| infinite| CoCoA v01          | 181283| 18027 | 690   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| infinite| CoCoA v03          | 181517| 17525 | 958   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| infinite| CoAP over TCP     | 188465| 9251  | 2284  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
Frequency of transmissions with 100 Continuous Clients

# of (re)transmissions  (0= no retransmissions needed)

| Buffer | CC algorithm       | 0. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. |
|---------|--------------------|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2500B   | Default CoAP       | 92211 | 4045 | 1925 | 945 | 540 | 275 | 59 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2500B   | CoCoA v01 no aging | 92270 | 4016 | 1834 | 969 | 518 | 277 | 113 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2500B   | CoCoA v01          | 92372 | 3867 | 1883 | 999 | 486 | 291 | 101 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2500B   | CoCoA v03          | 91073 | 4384 | 2251 | 1127 | 603 | 302 | 184 | 76 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2500B   | CoAP over TCP      | 96128 | 3358 | 427 | 72 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14100B  | Default CoAP       | 3069 | 95295 | 1529 | 88 | 18 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14100B  | CoCoA v01 no aging | 99133 | 867 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14100B  | CoCoA v01          | 99103 | 897 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14100B  | CoCoA v03          | 99072 | 928 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14100B  | CoAP over TCP      | 96968 | 3031 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| infinite| Default CoAP       | 2100 | 97900 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| infinite| CoCoA v01 no aging | 99058 | 942 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| infinite| CoCoA v01          | 99148 | 852 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Infinite| CoCoA v03          | 99091 | 909 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
Frequency of transmissions with 400 Random Clients

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<td>CoAP over TCP</td>
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</tbody>
</table>
Number of Retransmissions - 400 Continuous Clients

- Fraction of unnecessary retransmits increases when buffer size increases
- With small 2500 B buffer TCP responds congestion more effectively
Number of retransmissions - 400 Random Clients

Retransmissions

Unnecessary Retransmissions

- Default CoAP
- CoCoA (v01)
- CoCoA (v01 w/o aging)
- CoAC (v01)
- CoAPoverTCP

# of retransmissions per client (downlink)
Tuesday (150 min)

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- 11:10–12:00 Flextime: OPC/UA (CP), Time scale (LT), …
A Uniform Resource Name (URN) namespace for hardware device identifiers.

Potentially useful in applications such as in sensor data streams and storage, or equipment inventories.

Complements other similar identifiers NIs (RFC 6920), UUIDs (RFC 4122), IMEIs (RFC 7254) etc. Supports, e.g., MAC and EUI-64, identifiers.

\[ \text{urn:dev:mac:0024befffe804ff1} \]
Versions -00 and -01

- -01 was published this week
- Fixed a typo in the ABNF ("dn:" => "org:"")
- Conformance to the URN registration template
Next Steps

- Can people read the new template (Section 3)?

- What should the draft say about q-, r-, and f-components?

- Needs text and decision: adding device IDs specified in OneM2M and LWM2M (urn:dev:os and urn:dev:ops)?
  - And would BBF USP protocol identifiers be useful to add as well?

- Adding other, new device identification schemes related to Web of Things work (e.g., urn:dev:wot:something:mysensor1)
  - Note: the DEV URN scheme allows extension to new types, do not have to define everything now

- But getting the initial set of the relevant ones would be very useful
Tuesday (150 min)

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Echo and Request Tag

draft-ietf-core-echo-request-tag

Christian Amsüss, John Mattson, Göran Selander

2018-03-20
Update 7252 Token processing mitigates attacks described in coap-actuators
News since IETF 100 part II

Echo updated for readability
News since IETF 100 part III

Request-Tag can be simpler

as we understand block-wise

see “Strictness of RFC7959” thread

128
We want YOU for . . .

reviews
Tuesday (150 min)

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‘Pending’ response code

Peter van der Stok, Klaus Hartke

IETF 101 - CoRE Working Group
Motivation

RFC 7030:
Enrollment over Secure Transport (EST) uses http response 202 when result is not immediately available (say: 3 hours) in response to GET or POST.

No such response code exists for coap. This functionality is needed for EST over coap.
HTTP 202

The request has been accepted for processing, but the processing has not been completed. The request might or might not eventually be acted upon, as it might be disallowed when processing actually takes place. The representation sent with this response ought to describe the request's current status and point to (or embed) a status monitor that can provide the user with an estimate of when the request will be fulfilled.
Use cases

draft-ietf-ace-coap-est specifies requests to servers to verify a node’s identity; this may need manual intervention and takes a minimum response time

draft-ietf-core-coap-pubsub specifies a server to send a response to the client to indicate a valid request but may contain an empty payload.

draft-keranen-core-too-many-reqs specifies that response is available after minimum response time
History

A new response code (e.g. 2.06) was deemed harmful for proxies. (They will return 5.01 (Not Implemented))

An extension to response code 5.03 “Service Unavailable” does not cover the case because service is available

This draft specifies a content format “60001” extension to existing response codes
Details

- Pending response indicates that target resource exists, but no representation is available yet.
- Location may be specified where result will become available.
- Allows multiple clients to have multiple concurrent requests open at the server.
- Client has to retry with GET request after Max-Age.
- Can be used in conjunction with “observe”
Pushing application-specific state machines into CoAP?

- How should application-specific state machines be added to CoAP applications?
- REST approach: transfer representations
- Need to define media types for those application states
- Related trial balloon: draft-bormann-core-maybe-00
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CoRE Pub/Sub
CoRE Interfaces
CoRE Dynlink

Status, Issues, and Roadmap

Jaime Jimenez, Ari Keranen, Michael Koster, Bill Silverajan, Julian Zhu
CoRE Pub/Sub - Status

• Incremental progress since last WG review, document cleanup

• Split out the proposed new CoAP response codes into a separate draft
  • Too Many Requests – like HTTP 429
  • TBD - No Content – like HTTP 204

• TBD - update security considerations to incorporate OSCORE

• TBD - need to address some issues and comments
CoRE Pub/sub – Remaining Issues

• Do we require all topics to be created under the core.ps resource?
• Conditional Notification (Dynlink parameters) for CoRE pub/sub subscribers?
• How does topic discovery work with topic trees?
CoRE Pub/sub – Roadmap

• Small amount of work left to be done
• Interim meeting before IETF 102 to complete the remaining issues
• WG Review
• Prepare for WGLC by IETF102
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All times are in time-warped WET (UTC+00:00)
CoRE Pub/Sub
CoRE Interfaces
CoRE Dynlink

Status, Issues, and Roadmap

Jaime Jimenez, Ari Keranen, Michael Koster, Bill Silverajan, Julian Zhu
CoRE Interfaces - Status

• The draft is informational and intended as high level guidance for how to use the "if" link target attribute

• Propose to keep the original examples, not going to try to align with any specific implementation

• Will update the examples to conform to SenML

• Close the remaining issues
CoRE Interfaces - Roadmap

• Address the comments and issues in the draft
• WG Review
• Prepare for WGLC at IETF 102
CoRE Dynlink

• This document specifies two components
  • **Dynamic Links** that define asynchronous data transfer between two resources
  • **Conditional Notification** parameters that are used to filter and control notification behavior

• Conditional notification parameters may be:
  • Included in Dynamic Links as target attributes, which point to the data source to control notifications from the data source
  • Applied to a resource instance to control its notification behavior for all observe requests as a default
  • Applied to an observation instance to

• New proposed document structure
  • Section 1: Dynamic Links
  • Section 2: Conditional Notification
CoRE Dynlink – one new feature

• Considered many enhancements to Conditional notification attributes, propose adding only one more notification attribute
  • pmin, pmax, lt, gt, st are already defined and being used by OMA LWM2M
  • Decided not to rename "lt"
  • adding the "band" attribute in order to optionally use lt and gt as a band-pass notification filter, e.g. only notify when measured value is greater than gt and less than lt
CoRE Dynlink - Roadmap

• Last changes are scoped and nearly done
  • 2 sections
  • band attribute
  • security considerations for embedded client

• WG Review

• Prepare for WGLC at IETF 102
Tuesday (150 min)

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CoAP Protocol Negotiation

draft-silverajan-core-coap-protocol-negotiation-08

Bill Silverajan  TUT
Mert Ocak  Ericsson
Context

• Aimed at CoAP nodes that have multiple transports, and wish to allow CoAP requests and responses over some or all these transports
• Both per-server and per-resource models supported
• Allows clients to directly query origin servers for available transports and communicate using an alternative transport (using a CoAP Option, or a link attribute)
• When a CoRE Resource Directory is present, origin servers can also register transport availability to RD for clients to query (using new parameter types)
Current Status

• Updates from -07 to -08
  – ‘ol’ is now a repeatable attribute allowing multiple base URIs, to align it with OCF ‘ep’
  – ‘at’ is now a repeatable parameter for registering alternate transports at the RD
  – Better examples provided
  – Updated example usage with RD, based on suggestions found in draft-ietf-core-resource-directory-13
Next Steps

• Evaluate other means to obtain transport endpoints from the origin server in place of Alternative-Transports Option
  – Using FETCH
  – Using an entry in .well-known/ for site-wide metadata (either core or something else)
  – Using a resource such as ”/pn/” with resource type ”core.pn” and content type application/link-format
CoAP Communication with Alternative Transports

draft-silverajan-core-coap-alternative-transports-11

Bill Silverajan     TUT
Teemu Savolainen    Nokia
Context

- Draft's focus is on the URI design work for CoAP over alternative transports
  - If you need to embed the transport information in a CoAP URI, which URI component should be used?
    
    `scheme://host:port/path/to/resource?query`
    
    - The URI query, path and authority components were all disqualified based on identified requirements
    - Technical requirements leave only the URI scheme as the best place to embed transport identification
Current Status

- Draft -11 is a small delta to -10
- The work has been completed
  - Listed as an informative reference to RFC 8323
- Next step is for WG adoption
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OPC UA Message Transmission Method over CoAP

draft-wang-core-opcua-transmission-03

Ping Wang, Chenggen Pu,
Heng Wang, Junrui Wu, Yi Yang,
Lun Shao, Jianqiang Hou

London, March 20, 2018
Status

- Last version is 02.
- Made some meaningful changes according to the last meeting comments.
- Keep the draft updated.
What We Have Updated

Three use cases:
   - Offline/Online diagnostic system for resource-constrained factories,
   - Factory data monitoring based on web pages,
   - Factory data analysis based on cloud.

Consolidate two transmission schemes into one:
   - Consolidate the proxy for OPC UA-CoAP and the direct transmission into one to realize better transmission performance.
Next Steps

Contact with OPC Foundation to get feedback.

Implement the transmission schemes mentioned above over a reasonable architecture.
Comments or Questions?
Thank you!