Group Communication for the Constrained Application Protocol (CoAP)

Towards *draft-ietf-core-groupcomm-bis-06*

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Following IETF 112 …

- Jaime requested to add examples, especially on:
  - Encoding of application group names, e.g., in CoAP requests (topic of issue #28)
  - Discovery of CoAP groups and application groups from CoAP servers (topic of issue #29)

- Opportunity to also improve the text addressing issues #28 and #29

- Opened new PR #32 addressing the points above
  - Plus examples of message exchange
  - Plus more clarifications and editorial improvements
  - https://github.com/core-wg/groupcomm-bis/pull/32

2.2.1 - Name encoding of app groups

- Revised methods, each with an example
- Through the CoAP request, in the group URI
  - in the path component (Recommended)
  - in the query component (2 possible ways)
  - in the authority component as a whole
  - in the host subcomponent
  - in the port subcomponent
- Through the CoAP request, but not in the group URI
  - In the Uri-Host Option, added before sending
  - New custom, application-specific, CoAP option
- Not on the wire → implicit understanding from application/network context

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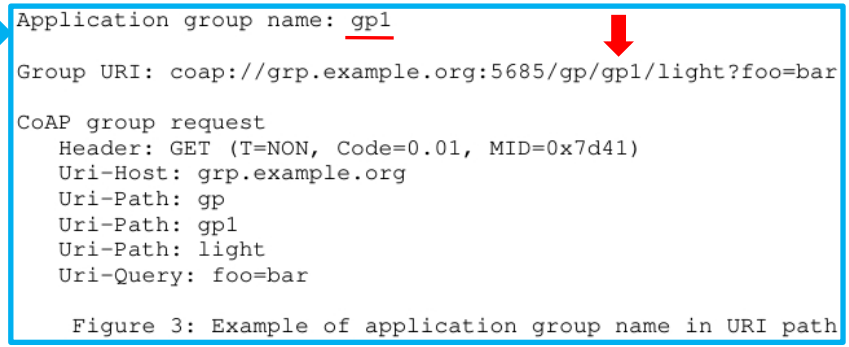

```
Application group name: gp1

Group URI: coap://grp.example.org:5685/gp/gp1/light?foo=bar

CoAP group request
   Header: GET (T=NON, Code=0.01, MID=0x7d41)
   Uri-Host: grp.example.org
   Uri-Path: gp
   Uri-Path: gp1
   Uri-Path: light
   Uri-Query: foo=bar

    Figure 3: Example of application group name in URI path
```

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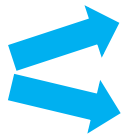

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Application group name: gp1

Group URI: coap://grp.example.org:5685/light?gp1

CoAP group request
   Header: GET (T=NON, Code=0.01, MID=0x7d41)
   Uri-Host: grp.example.org
   Uri-Path: light
   Uri-Query: gp1
```

Figure 4: Example of application group name in URI query (1/2)

```
Application group name: gp1

Group URI: coap://grp.example.org:5685/light?foo=bar&gp=gp1

CoAP group request
   Header: GET (T=NON, Code=0.01, MID=0x7d41)
   Uri-Host: grp.example.org
   Uri-Path: light
   Uri-Query: foo=bar
   Uri-Query: gp=gp1
```

Figure 5: Example of application group name in URI query (2/2)

- Through the CoAP request, but not in the group URI
  - In the Uri-Host Option, added before sending
  - New custom, application-specific, CoAP option
- Not on the wire → implicit understanding from application/network context

2.2.3 – Group discovery

- Revised methods, each with an example
- Given a CoAP group, discover …
  - The associated application groups
  - The servers in it and each group's resources
- Given an application group, discover …
  - The associated CoAP group
  - The servers in it and each group's resources
- Discover …
  - Any application group (*)
    - The associated CoAP group
    - The servers in it and each group's resources

(*) Possible to filter by group type

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- Revised methods, each with an example
- Given a CoAP group, discover …
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- Given an application group, discover …
  - The associated CoAP group
  - The servers in it and each group's resources
- Discover …
  - Any application group (*)
    - The associated CoAP group
    - The servers in it and each group's resources

```
// Request to all members of the CoAP group
Req: GET coap://grp.example.org:5685/.well-known/core?rt=g.*

// Response from server S1, as member of:
//   - The CoAP group "grp.example.org:5685"
//   - The application group "gp1"
Res: 2.05 Content
Content-Format: 40
Payload:
</gp/gp1>;rt=g.light

// Response from server S2, as member of:
// - The CoAP group "grp.example.org:5685"
// - The application groups "gp1" and "gp2"
Res: 2.05 Content
Content-Format: 40
Payload:
</gp/gp1>;rt=g.light,
</gp/gp2>;rt=g.temp
```

Figure 11: Discovery of application groups associated to a CoAP group

(*) Possible to filter by group type

2.2.3 – Group discovery

- Revised methods, each with an example
- Given a CoAP group, discover …
  - The associated application groups
  - The servers in it and each group's resources
- Given an application group, discover …
  - The associated CoAP group
  - The servers in it and each group's resources
- Discover …
  - Any application group (*)
    - The associated CoAP group
    - The servers in it and each group's resources

```
// Request to realm-local members of the application group "gp1"
   Req: GET coap://[ff03::fd]/.well-known/core?href=/gp/gp1

      // CoAP response from server S1, as member of:
      //   - The CoAP group "grp.example.org:5685"
      //   - The application group "gp1"
      Res: 2.05 Content
      Content-Format: 40
      Payload:
      <coap://grp.example.org:5685/gp/gp1>;rt=g.light

      // CoAP response from server S2, as member of:
      // - The CoAP group "grp.example.org:5685"
      // - The application groups "gp1"
      Res: 2.05 Content
      Content-Format: 40
      Payload:
      <coap://grp.example.org:5685/gp/gp1>;rt=g.light
```

Figure 12: Discovery of members of an application group, together with the associated CoAP group

(*) Possible to filter by group type

Appendix B – Message exchange

- New Appendix B
  - Three examples
- Example 1 (plain)
  - Request over multicast
  - Responses follow
- Example 2 (observe)
  - Observation request over multicast
  - Two rounds of notifications
- Example 3 (blockwise)
  - Request with Block2 over multicast
  - Following exchanges over unicast

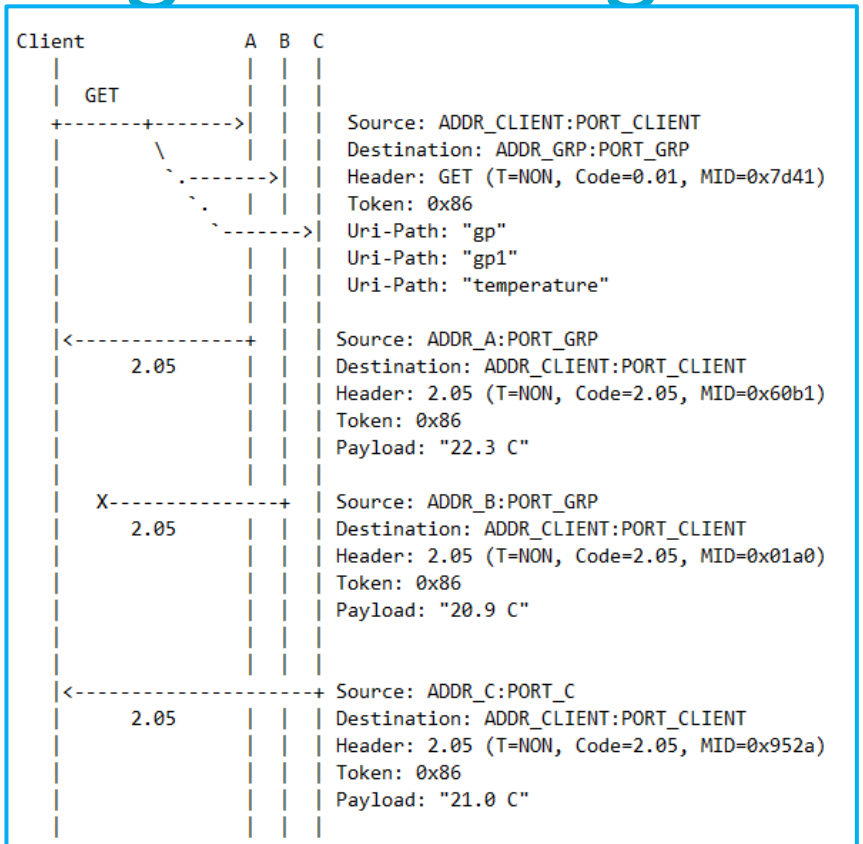

Figure 16: Example of Non-confirmable group request, followed by Non-confirmable Responses

Next steps

- If no objection, merge PR #32 soon and submit v -06
- If all is well, we can close issues #28 and #29
- Working Group Last Call (for -06)

Thank you!

Comments/questions?

https://github.com/core-wg/groupcomm-bis/

Goal

- Normative successor of experimental RFC 7390
  - Obsoletes RFC 7390, Updates RFC 7252 / 7641
- New standard reference for implementations now based on RFC 7390
- Scope
  - CoAP group communication, including latest features: Observe/Blockwise/Security …
  - Unsecured & group-OSCORE-secured
  - Definition of group types & Secure group configuration

Motivation (backup slide)

- RFC 7390 was published in 2014
  - CoAP functionalities available by then were covered
  - No group security solution was available to indicate
  - It is an Experimental document (started as Informational)
- What has changed?
  - More CoAP functionalities have been developed (Block-Wise, Observe)
  - RESTful interface for membership configuration is not really used
  - Group OSCORE provides group end-to-end security for CoAP
- Practical considerations
  - Group OSCORE clearly builds on RFC 7390 normatively
  - However, it can refer RFC 7390 only informationally