# New CoAP Block-Wise Transfer Options For Faster Transmission

draft-bosh-core-new-block-04

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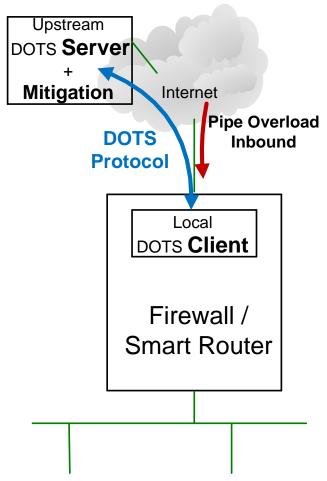
## Agenda

Handling blocks in lossy environments:
 The DOTS Case

- The Solution
  - Block3 Option
  - Block4 Option

Next Steps

# Sample Target Deployment



- DDoS Open Threat Signalling (DOTS)
- DOTS: App CBOR CoAP DTLS IP
- Client requests mitigation (NON)
- Server updates with simple DOTS mitigation status (NON)
- Inbound Pipe Overload
  - Clients can still request mitigations
  - Mitigation should be able to control pipe overload
- See <u>RFC8782</u> for more details

## DOTS-inferred CoAP Requirements

- Need to transfer body with multiple payloads
- Handle packet loss
  - Need recovery mechanism
- Cannot rely on getting responses (Pipe overload)
  - Request/Response model lock-step fails
- *Fast* transfer for large bodies
  - Lock-step model slows things down (RTT)
  - Packet interchange reduction
- *Utilize* other CoAP options where possible
- Maintain existing CoAP ethos/methodology

#### Solution

- BLOCK3 with BLOCK1 characteristics
- BLOCK4 with BLOCK2 characteristics

OSCORE Class E and Class U

#### BLOCK3

- BLOCK3 has BLOCK1 characteristics
- Individual payload 2.xx response not required
  - 2.31 (Continue) not used
- Use of NON (recommended) or increase of NSTART
- Requires CoAP Option Request-Tag unique per body
- Each request payload has unique Token
- New TBA3 4.xx (Missing Payloads) to indicate missing payloads
- Every MAX\_PAYLOAD (default 10) pause/check guard (ACK\_TIMEOUT or CON)
- Body subject to PROBING\_RATE

#### Response TBA3 4.xx (Missing Payloads)

- CBOR encoded diagnostic response
- Content-Format "application/missing-blocks+cbor-seq"
- CDDL

```
TBA3-payload = (request-tag, missing-block-list)
; A copy of the opaque Request-Tag value
request-tag = bstr
missing-block-list = [1 * missing-block-number]
; A unique block number not received
missing-block-number = uint
```

#### **BLOCK3** Example

```
Request-
                                     Block3
                                             Num
                             Tag
                                                   More
CoAP
        CoAP
                                                       SZX
Client
        Server
                   MID
                         Token
 | Success |
 +---->| NON PUT /path M:0x01 T:0xf0 RTag=10 B3:0/1/1024
 +---->| NON PUT /path M:0x02 T:0xf1 RTag=10 B3:1/1/1024
 +---->| NON PUT /path M:0x03 T:0xf2 RTag=10 B3:2/1/1024
 +---->| NON PUT /path M:0x04 T:0xf3 RTag=10 B3:3/0/1024
 | Failure
 +---->| NON PUT /path M:0x05 T:0xe0 RTag=11 B3:0/1/1024
 +--->X | NON PUT /path M:0x06 T:0xe1 RTag=11 B3:1/1/1024
 +--->X | NON PUT /path M:0x07 T:0xe2 RTag=11 B3:2/1/1024
 +---->| NON PUT /path M:0x08 T:0xe3 RTag=11 B3:3/0/1024
 | Retry
 +---->| NON PUT /path M:0x09 T:0xe4 RTag=11 B3:1/1/1024
 +--->X | NON PUT /path M:0x0a T:0xe5 RTag=11 B3:2/1/1024
 | Retry
 +---->| NON PUT /path M:0x0b T:0xe6 RTag=11 B3:2/1/1024
```

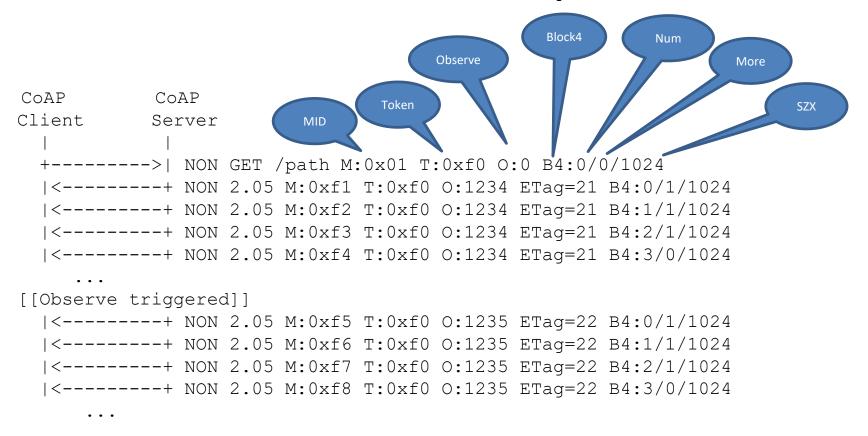
#### **BLOCK4**

- BLOCK4 has BLOCK2 characteristics
- GET with BLOCK4 triggers BLOCK4 response instead of BLOCK2 if needed
  - Missing blocks indicated by GET with multiple BLOCK4
- Use of NON (recommended) or increase of NSTART
- Requires CoAP Option ETag unique per body
- Every MAX\_PAYLOAD (default 10) pause/check guard (ACK\_TIMEOUT or CON)
- Body subject to PROBING\_RATE

#### **BLOCK4** with Observe

- Same Observe value returned in all of the pseudo responses for the same body
  - Block Number 0 could get dropped
- Same Token is used in the set of pseudo responses
- New Token used for requesting missing blocks
  - Set of retry pseudo responses use new Token
- Next Observe pseudo response uses original Observe setup Token

## BLOCK4 Example 1



## BLOCK4 Example 2

```
Block4
                                                      Num
CoAP
         COAP
                                                             More
Client
         Server
                                 Observe
                                                                 SZX
                    MID
                          Token
 [[Observe triggered]]
  |<----+ NON 2.05 M:0xf9 T:0xf0 O:1236 ETag=23 B4:0/1/1024</pre>
       X<---+ NON 2.05 M:0xfa T:0xf0 O:1236 ETag=23 B4:1/1/1024
      X<---+ NON 2.05 M:0xfb T:0xf0 O:1236 ETag=23 B4:2/1/1024
   |<----+ NON 2.05 M:0xfc T:0xf0 O:1236 ETag=23 B4:3/0/1024</pre>
 [[Client realizes blocks are missing and asks for the missing ones in one go]]
  +---->| NON GET /path M:0x02 T:0xf1 B4:1/0/1024 B4:2/0/1024
      X<---+ NON 2.05 M:0xfd T:0xf1 ETag=23 B4:1/1/1024
   [[Get the final missing block]]
  +---->| NON GET /path M:0x03 T:0xf2 B4:1/0/1024
```

#### Status & Next Steps

- The draft was discussed in two dedicated interim meetings
  - All comments raised in these interims and also in the mailing list are addressed
  - Simplified design with reuse of existing CoAP options
- Request adoption as a WG Document

#### Thank You