

# Constrained Signaling Over LP-WAN CoSOL

draft-pelov-core-cosol-01

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# CoSOL

Use CoAP as control protocol for Low-Power WANs

Manage the full behavior of end-devices  
(+applications running on them)

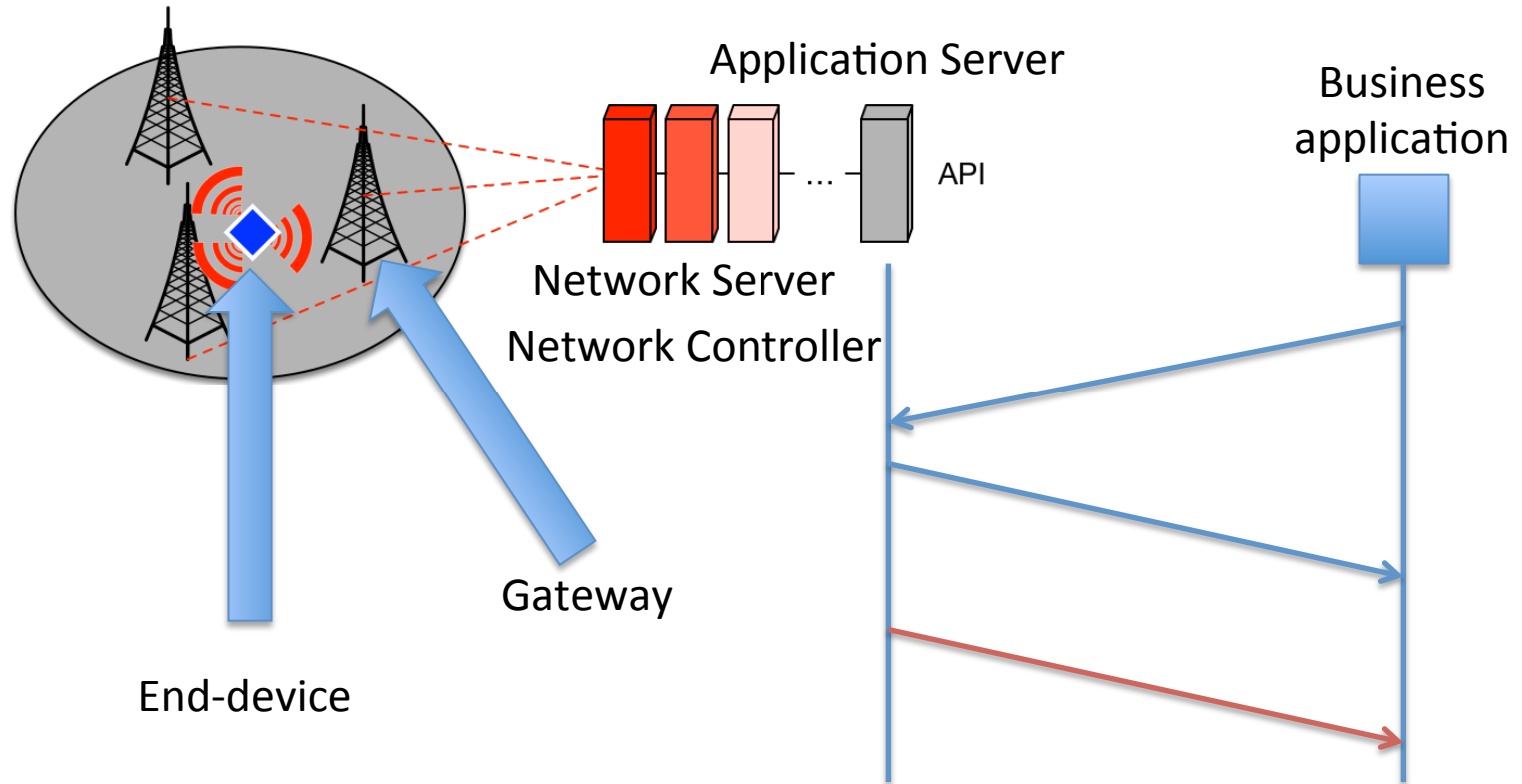
In a scalable, extensible, efficient way compatible  
with current NMS

Before allocating IP:

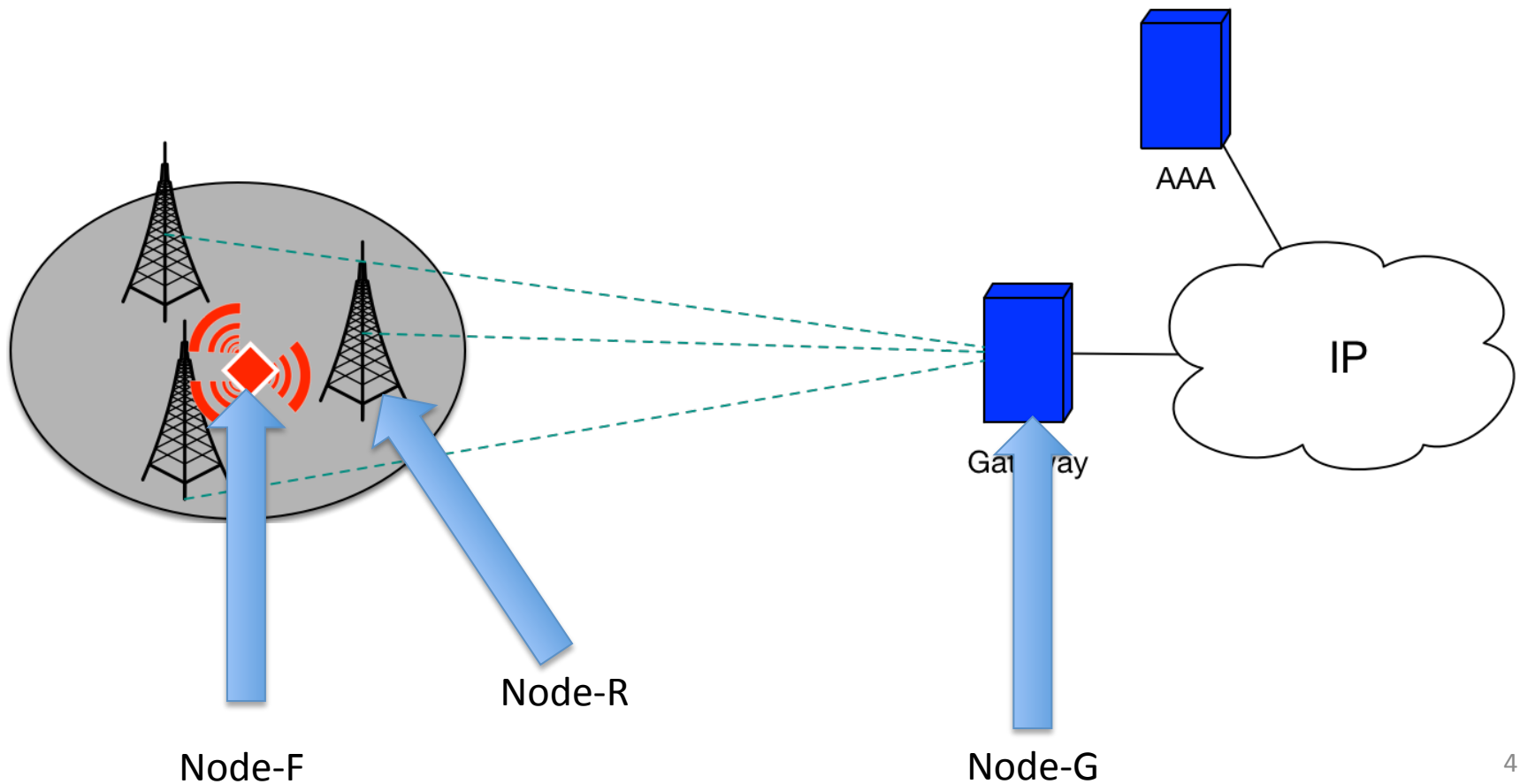
E.g. CoAP on L2 (e.g. draft-wang-6tisch-6top-coapie-01),  
EAP controlled port (AAA),

...

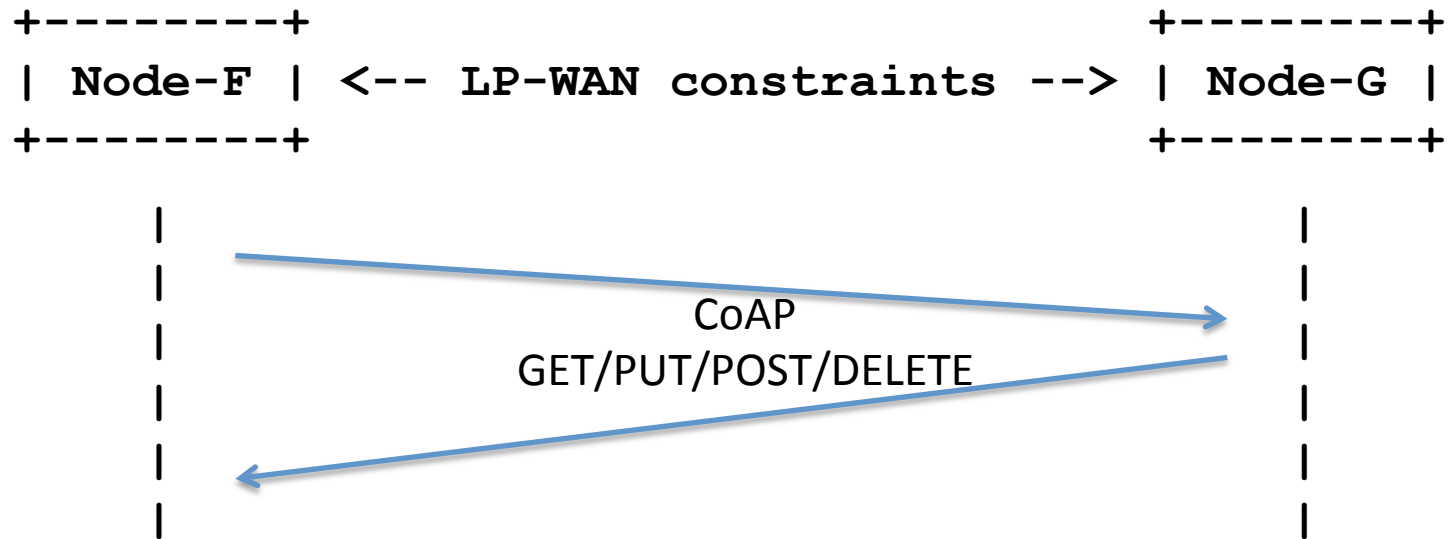
# General architecture: LoRaWAN



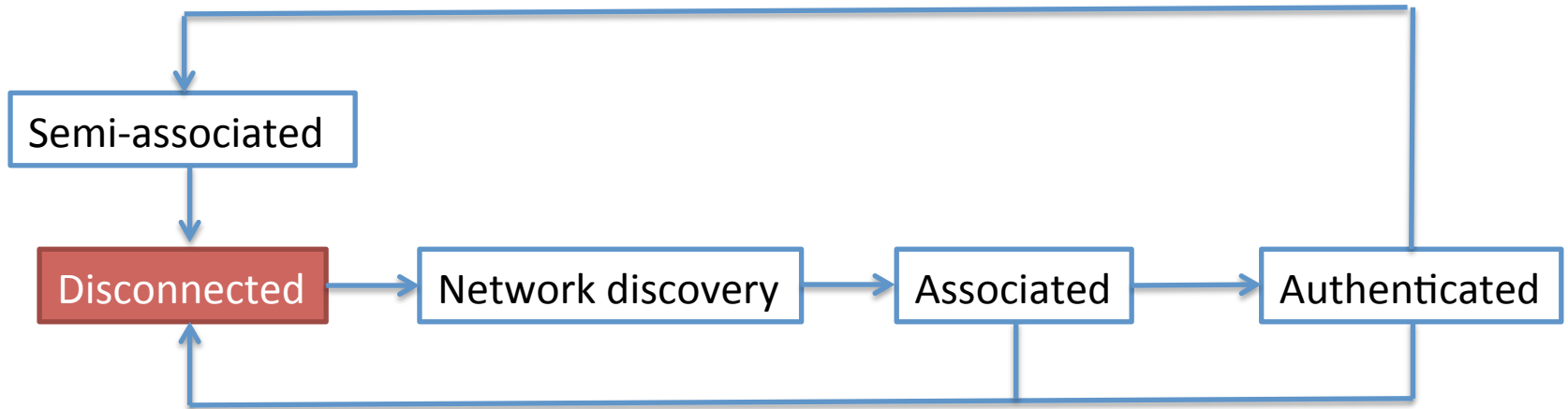
# General architecture: CoSOL

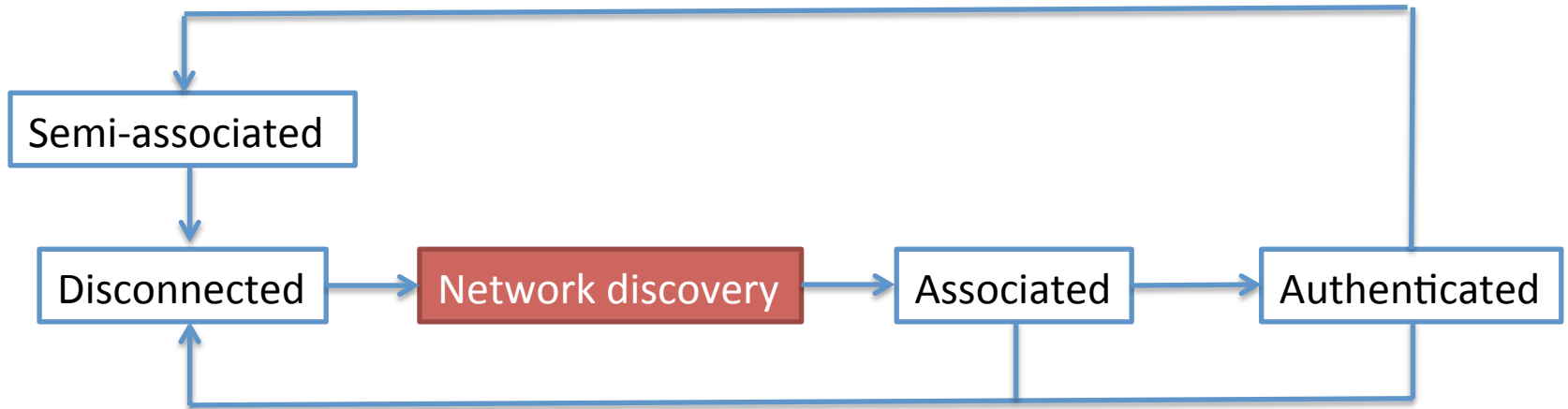


# Entities



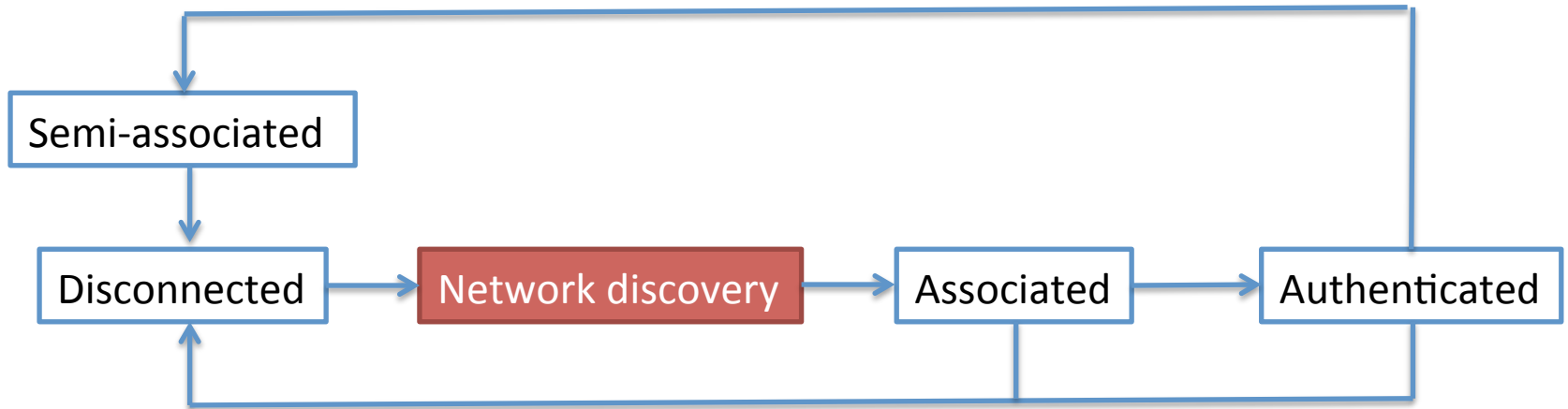
- Node-F: far-reachable node, e.g. the end-point, object, device
- Node-R: radio relay, bridging the LP-WAN radio technology to a different medium
- Node-G: gateway node, interconnection between the radio-relay node and the Internet





### Reactive

Node-F	Node-G
<-----+	Header: POST
POST /g	Uri-Path: "g"
	[No-Response]

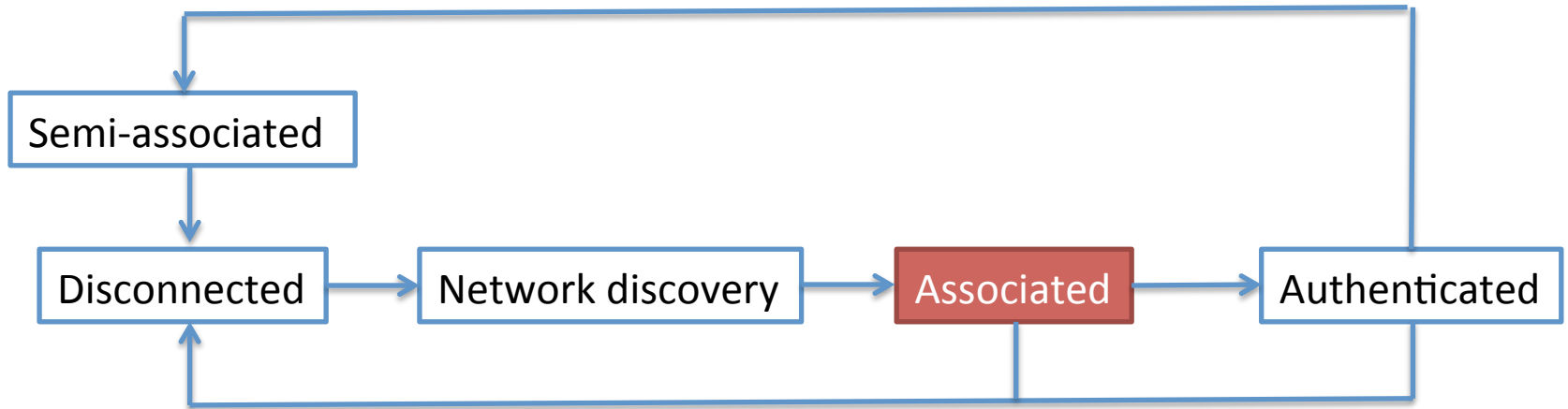


### Reactive

Node-F	Node-G
<-----+	Header: POST
POST /g	Uri-Path: "g"
	[No-Response]

### Proactive

Node-F	Node-G
+----->	Header: GET
GET /g	Uri-Path: "g"
	Accept: cbor
<-----+	Header: 2.05
2.05	Payload: ...
	8



Node-F

Node-G

```

|
|
|+----->|
| POST /n  |
|          |
|          |
|<-----+
| 2.01     |
|          |
|          |

```

```

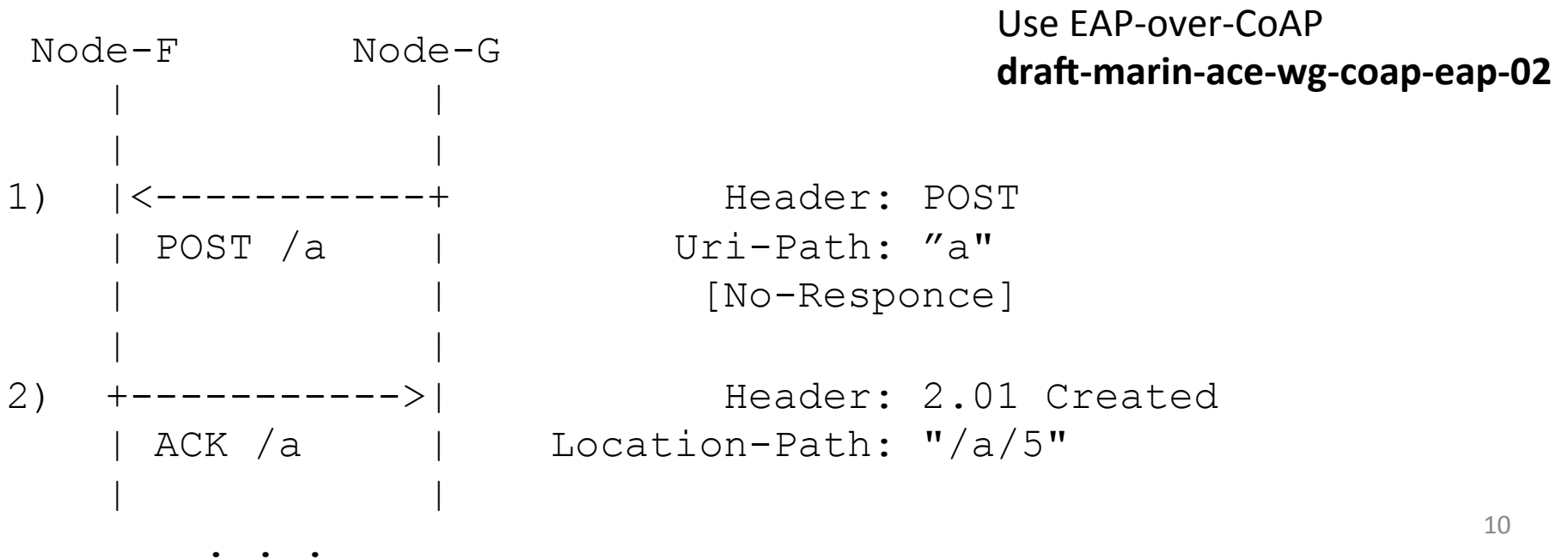
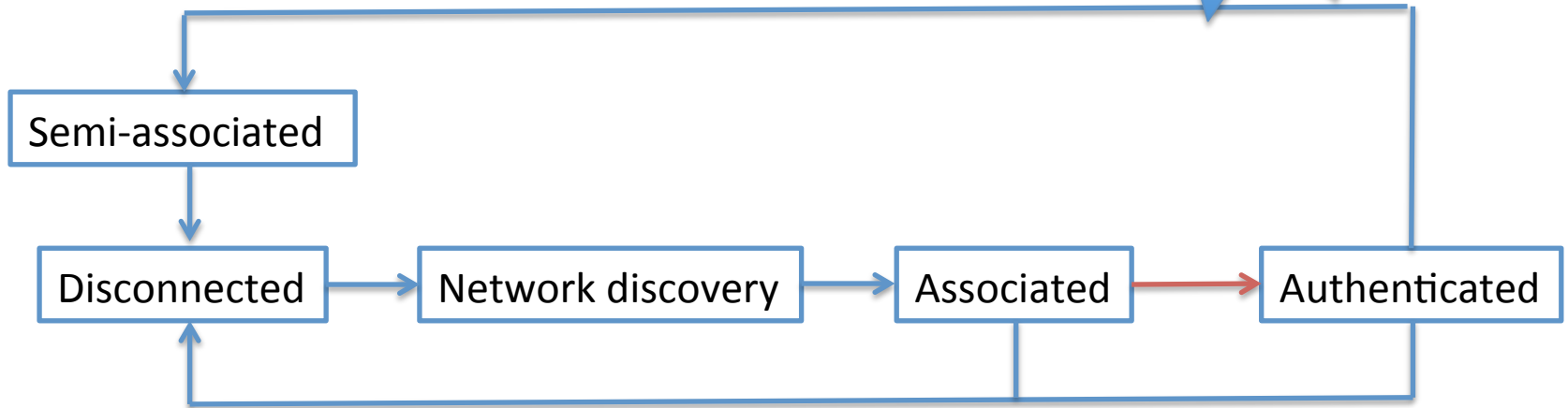
Header: POST
Uri-Path: "n"
Payload: ...

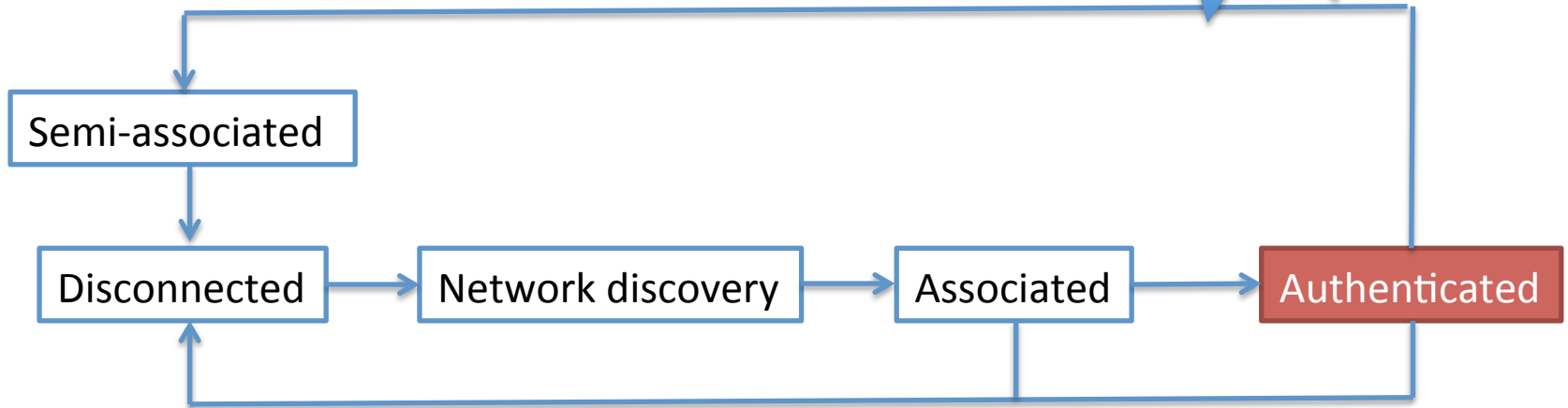
```

```

Header: 2.01 Created
Location-Path: "/n/n705"

```





Node-F

Node-G

```

1)  | <-----+
    | PUT /c  |
    |         |
    |         |
    |         |
2)  +----->|
    | 2.04    |
    |         |
    |         |
  
```

...

Use CoOL

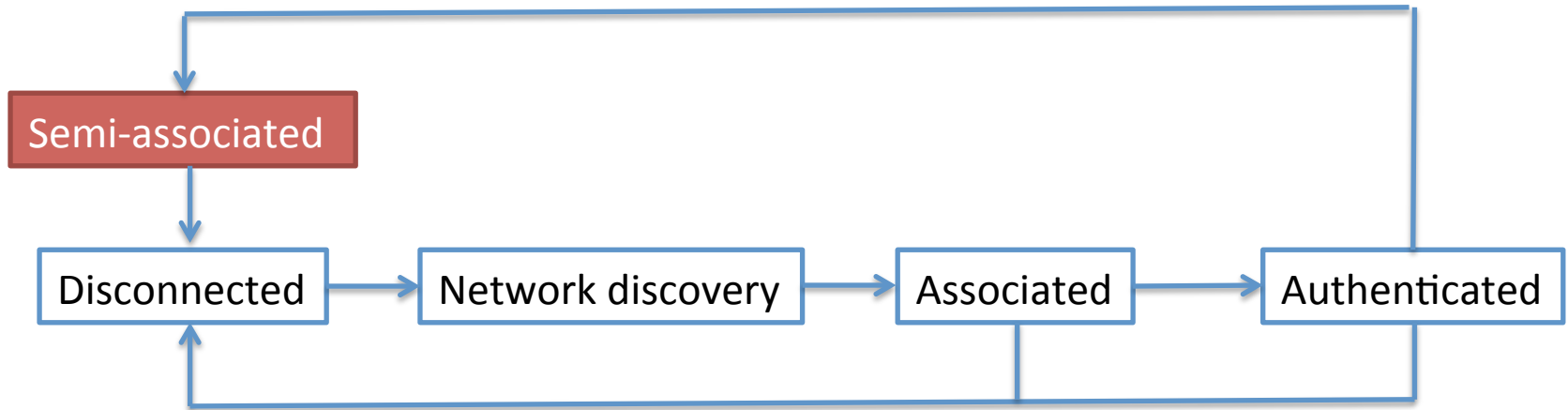
**draft-veillette-core-cool +4**

```

Header: PUT
Uri-Path: "c"
Payload: {5:10,6:2}
  
```

```

Header: 2.04 Changed
  
```



Node-F

Node-G

```

|
|
| +----->
| POST /temp |
|
|
| <-----+
| 2.01      |
|
|

```

. . .

```

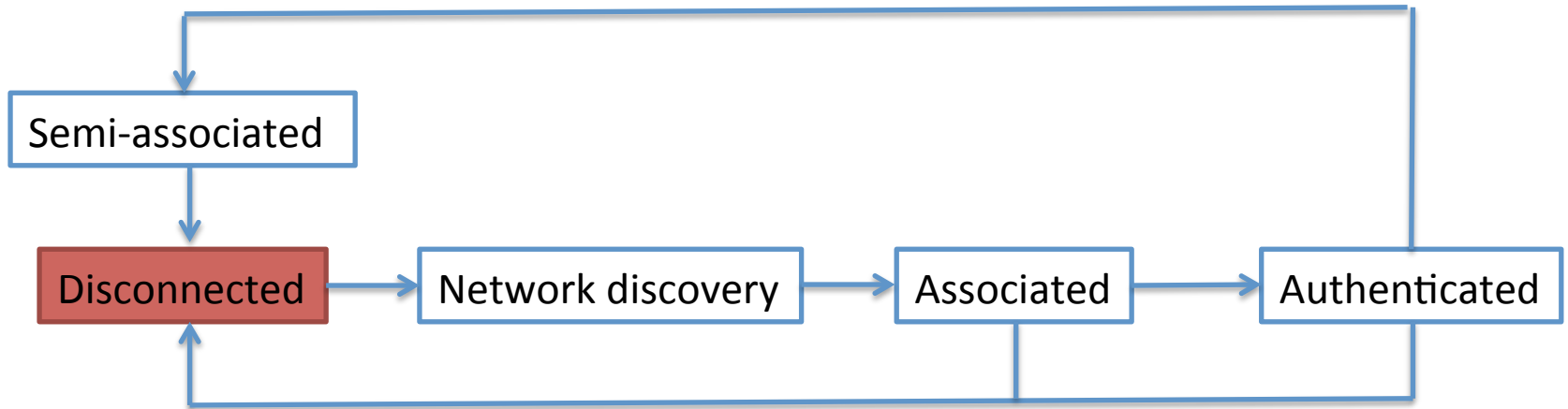
Header: POST
Uri-Host: "destination.example.com"
Uri-Path: "temp"

```

```

Header: 2.01 Created

```



Node-F

Node-G

```

|
|
|+----->|
| DELETE /n/n705 |
|
|
|<-----+
|      2.02      |
|
|
  
```

```

Header: POST
Uri-Path: "n/n705"
  
```

```

Header: 2.02 Deleted
  
```

# Example:

## YANG model for LoRa device

CoOL request: 19 bytes to change full end-device configuration.

**draft-pelov-yang-lora-01**

```
+-- RW Mode
| +- RW Channel Bandwidth enumeration
| +- RW Coding Rate enumeration
| +- RW Spreading Factor int8
+-- Physical Layer
| +- RW Preamblelength int32
| +- RW Channel Frequency Range enumeration
| +- RW Channel int8
| +- RW SymbolTimeout int32
+-- MAC Layer
| +- RW Frame Payload Encryption boolean
| +- RW Delay int32
| +- RW Fixlength Payload Enabled boolean
```

# Why CoSOL?

- CoSOL is technology independent
  - Can run on top of standard technology with 802.15.4 frame format
  - Can run on top of LoRaWAN
  - Can run on top of SIGFOX
- Simplify end-device development
  - Single application protocol
- With suitable compression
  - IP+UDP+CoAP -> 2-3 bytes
- Keep L2 technologies SIMPLE and EXTENSIBLE
  - Work with technology providers
  - Bringing new technology == define new YANG module

# Thanks

- Alexander Pelov  
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