IP SHOWCASE™ THEATER

CURATED BY VSF VIDEO SERVICES FORUM

Securing IS-04/05 - How to Lock My Media Streams

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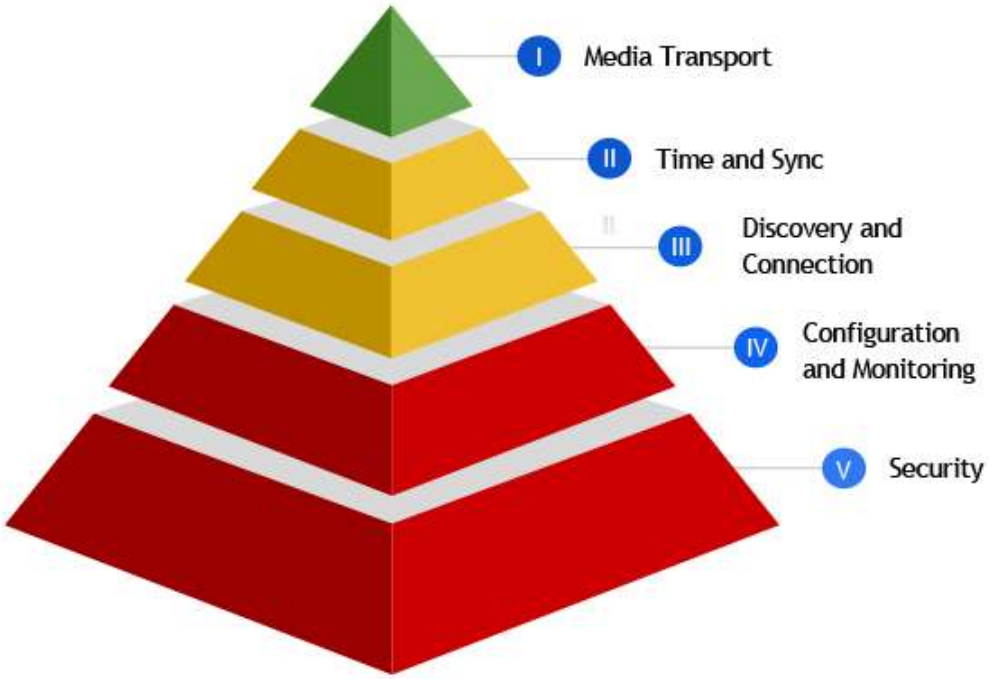
TR-1001 - THE MEDIA NODE MATURITY CHECKLIST FOR NAB SHOPPING

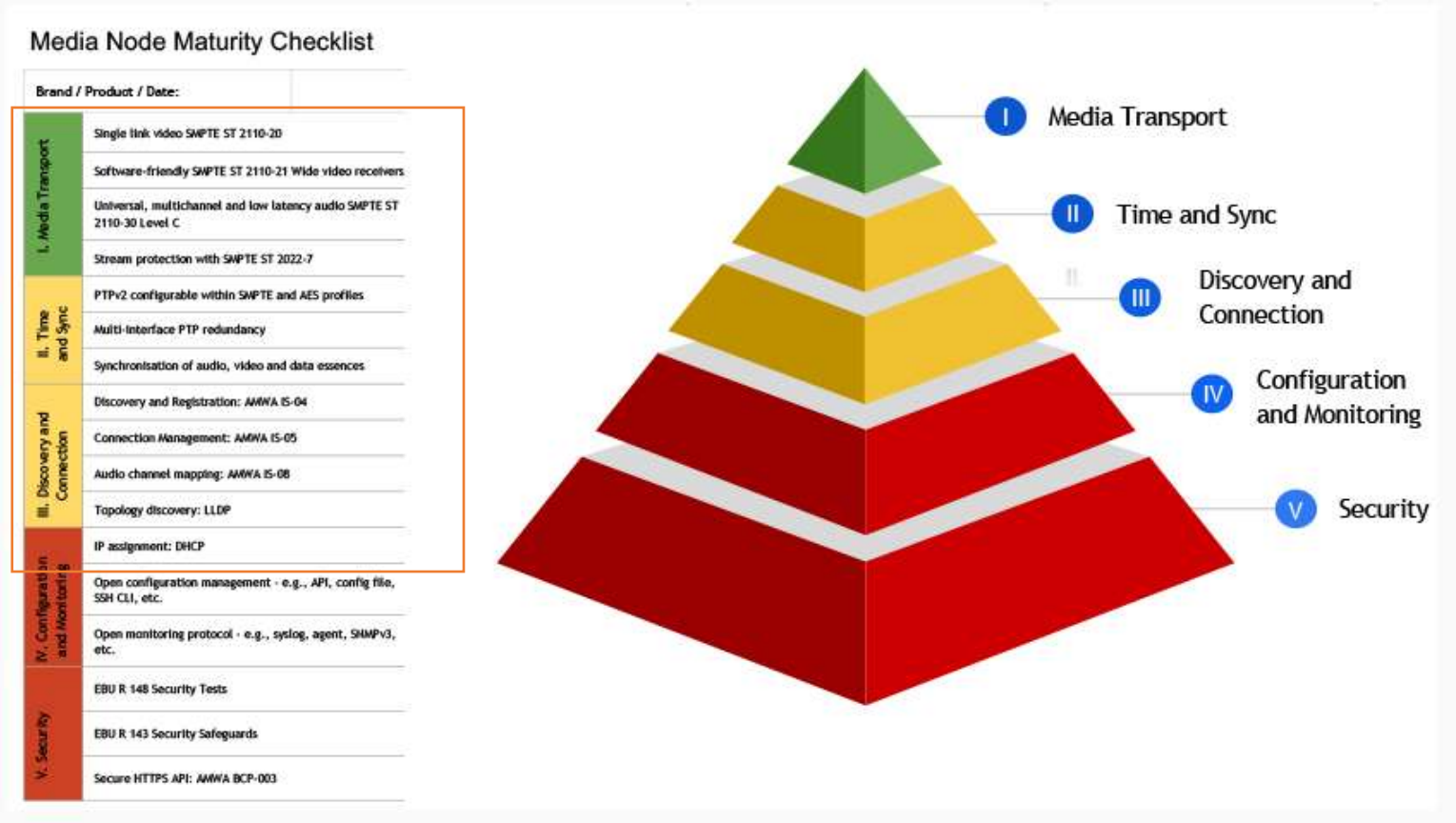
Media Node Maturity Checklist

Brand / Product / Date:	
I. Media Transport	Single link video SMPTE ST 2110-20
	Software-friendly SMPTE ST 2110-21 Wide video receivers
	Universal, multichannel and low latency audio SMPTE ST 2110-30 Level C
	Stream protection with SMPTE ST 2022-7
II. Time and Sync	PTPv2 configurable within SMPTE and AES profiles
	Multi-interface PTP redundancy
	Synchronisation of audio, video and data essences
III. Discovery and Connection	Discovery and Registration: AMWA IS-04
	Connection Management: AMWA IS-05
	Audio channel mapping: AMWA IS-08
	Topology discovery: LLDP
IV. Configuration and Monitoring	IP assignment: DHCP
	Open configuration management - e.g., API, config file, SSH CLI, etc.
	Open monitoring protocol - e.g., syslog, agent, SNMPv3, etc.
V. Security	EBU R 148 Security Tests
	EBU R 143 Security Safeguards
	Secure HTTPS API: AMWA BCP-003



TR-1001 - THE MEDIA NODE MATURITY CHECKLIST FOR NAB SHOPPING

- TR-1001-1



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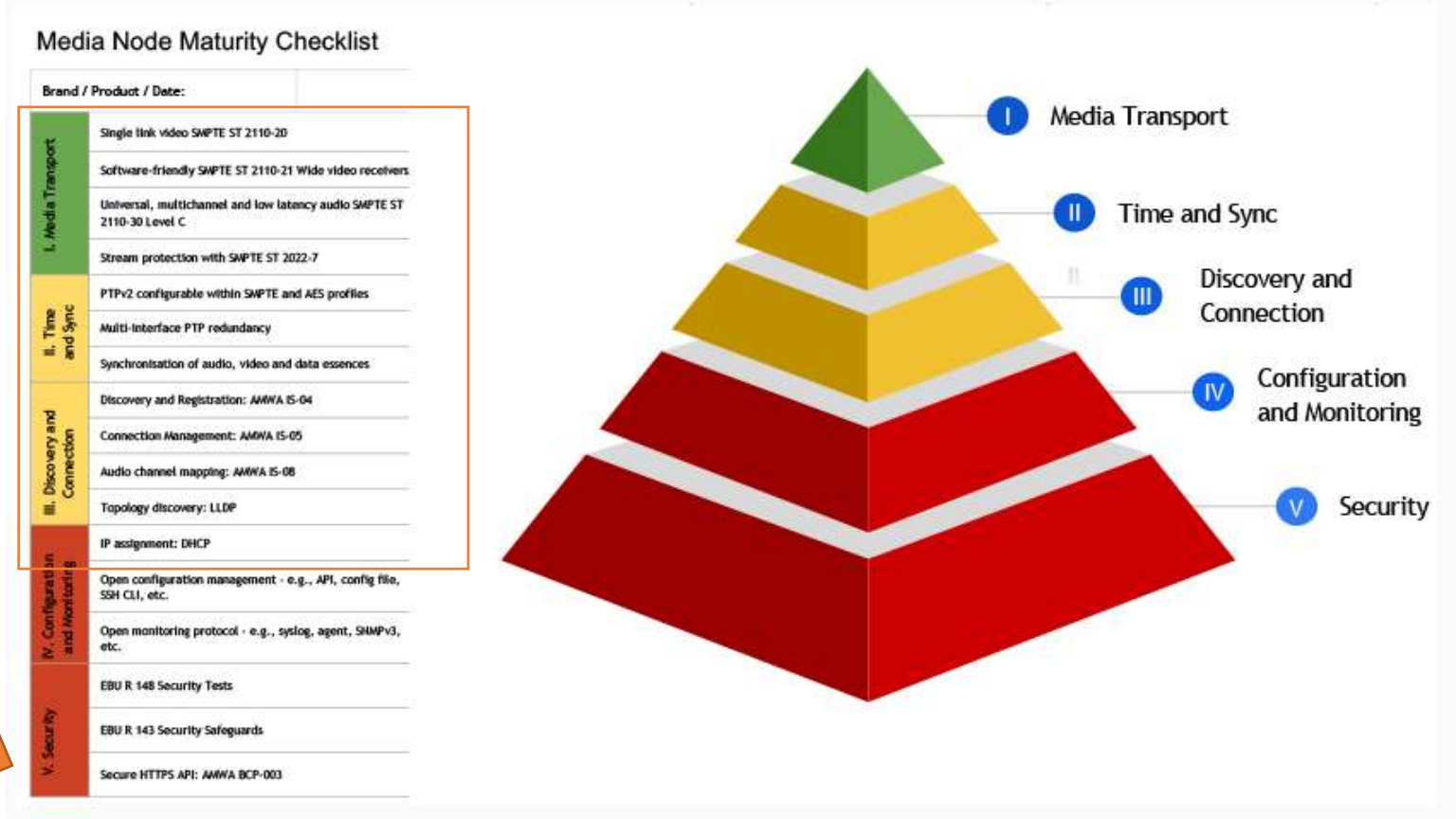

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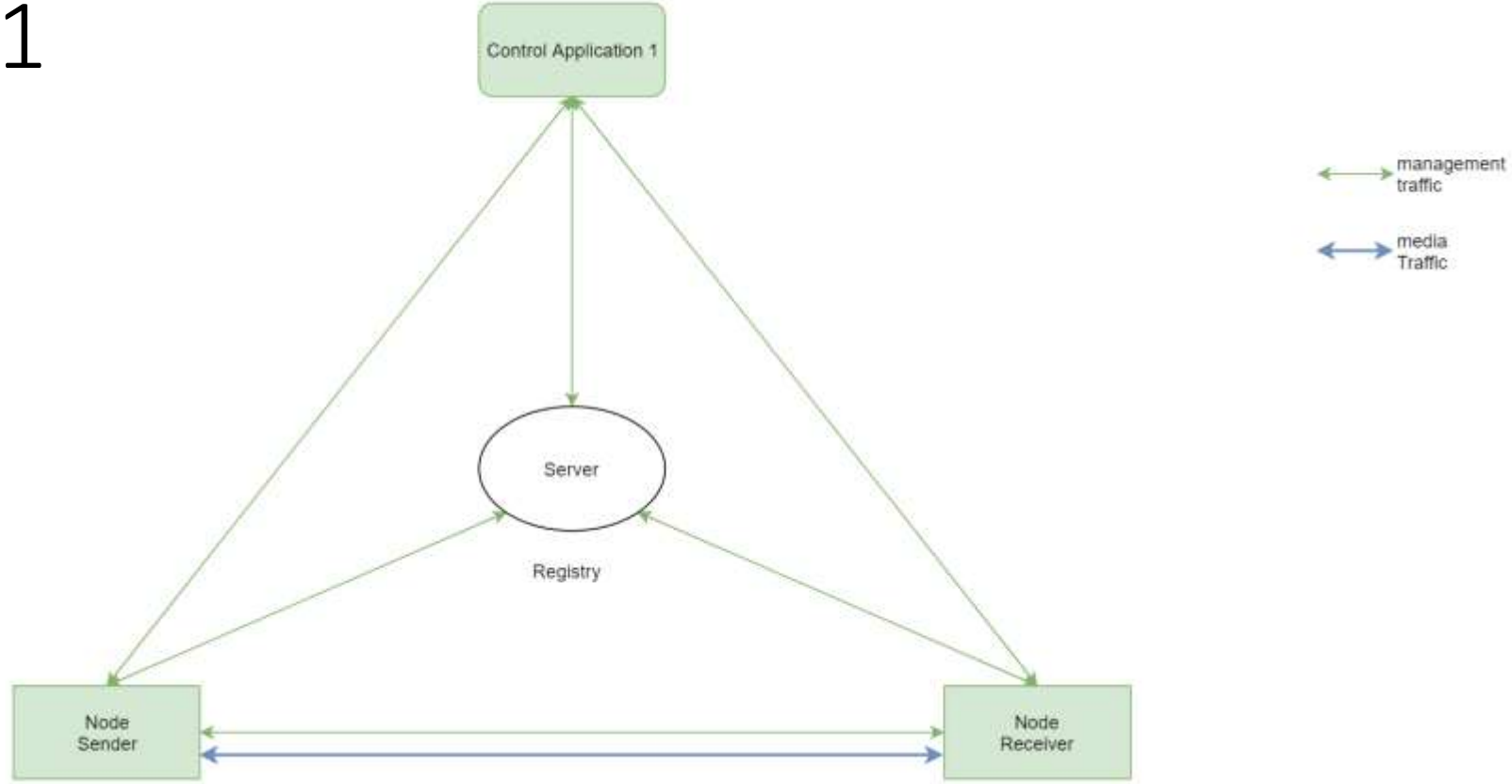
BCP-003-01



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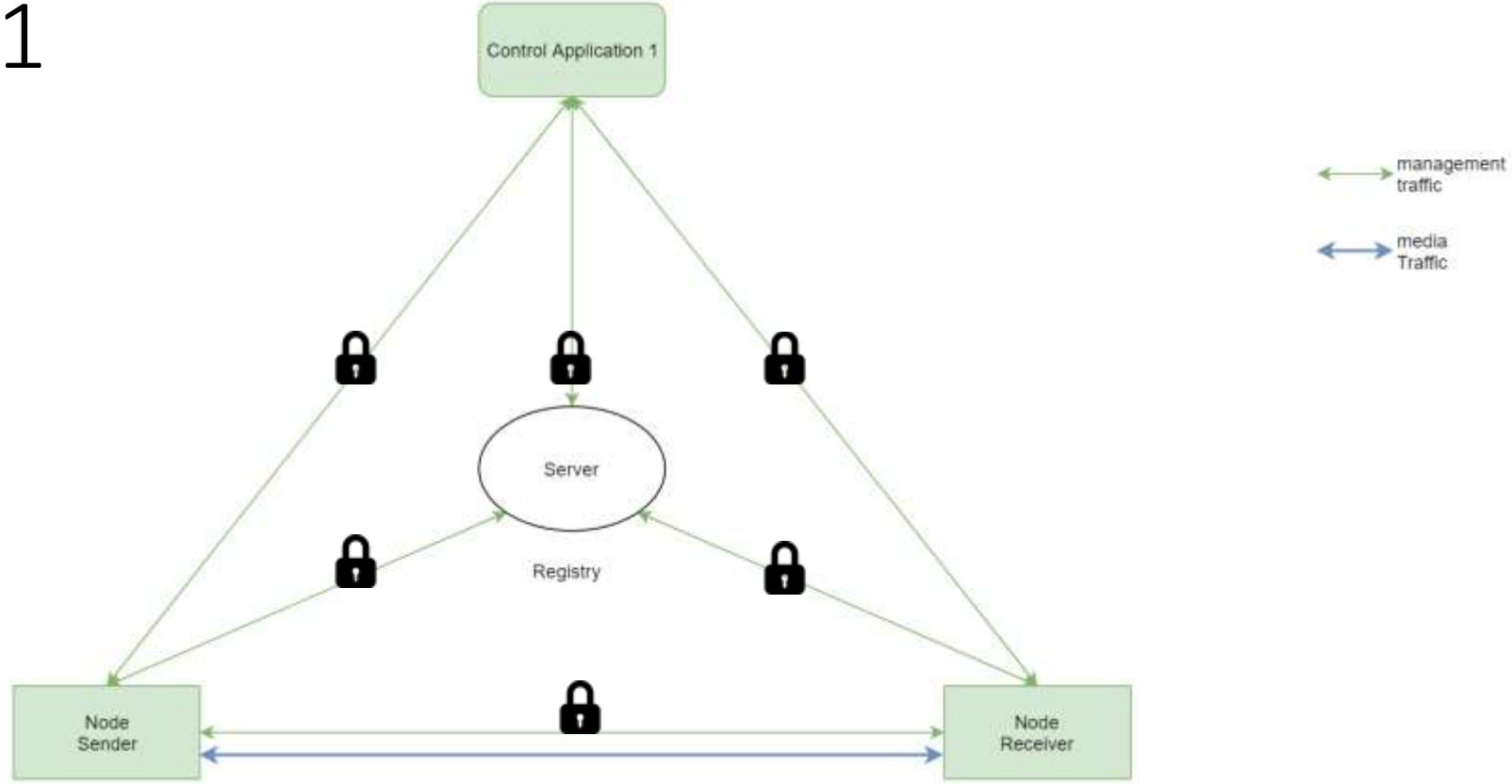
BCP-003-01



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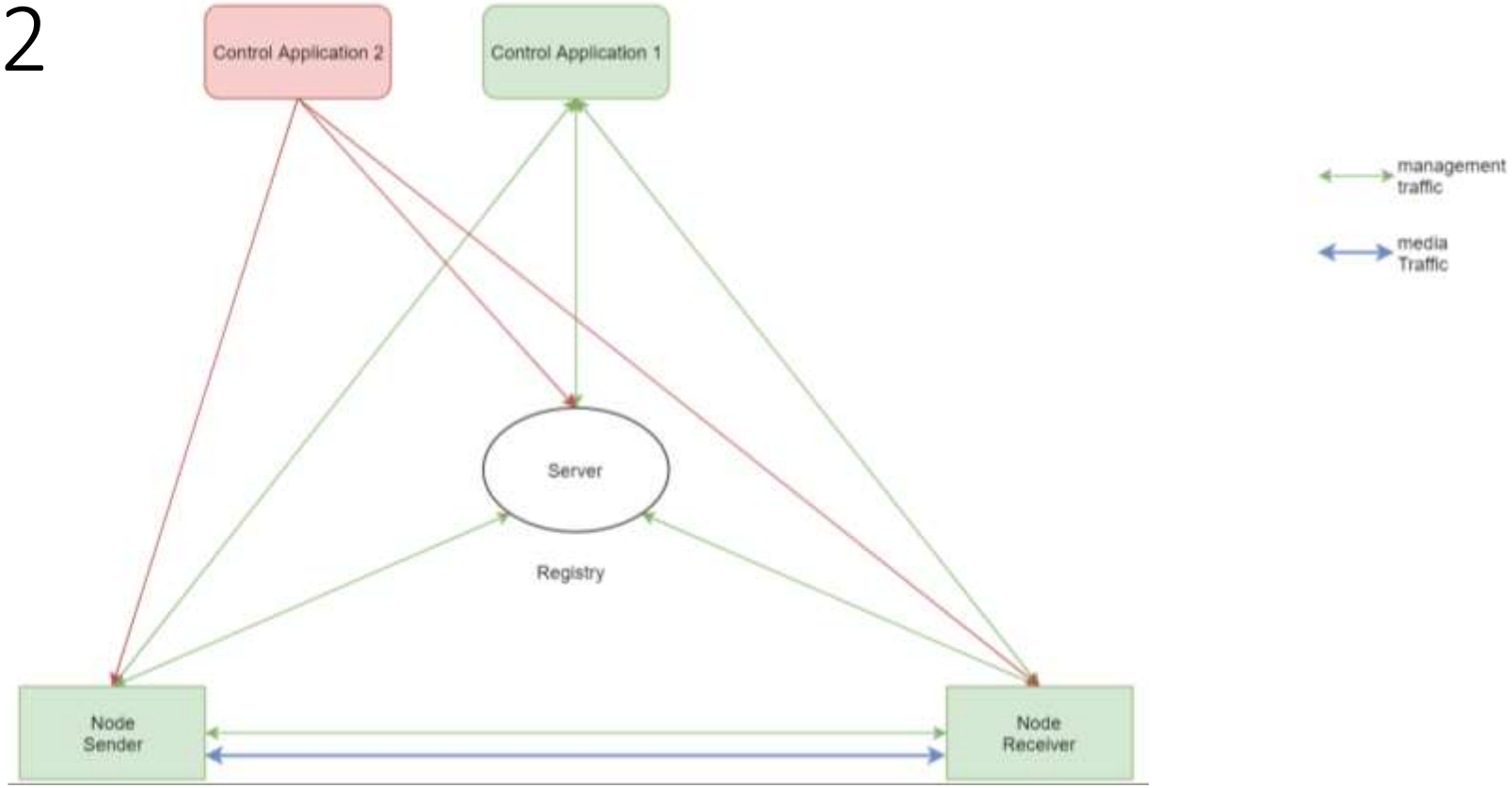
BCP-003-02



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BCP-003-02

- As a user, I want my main control system to be the only system being authorized to query the network for IS-04 ressources
- As a user, I want my main control system to be the only system being authorized to make connections with IS-05

Authorisation vs. Authentication

- Authentication:
  - verify that someone is who they claim to be
  - ➢Covered by exchange of certificates

BCP-003-01

- Authorization:
  - deciding which resource a user should be able to access, and what they should be allowed to do with those resources
  - ➢Additional techniques needed

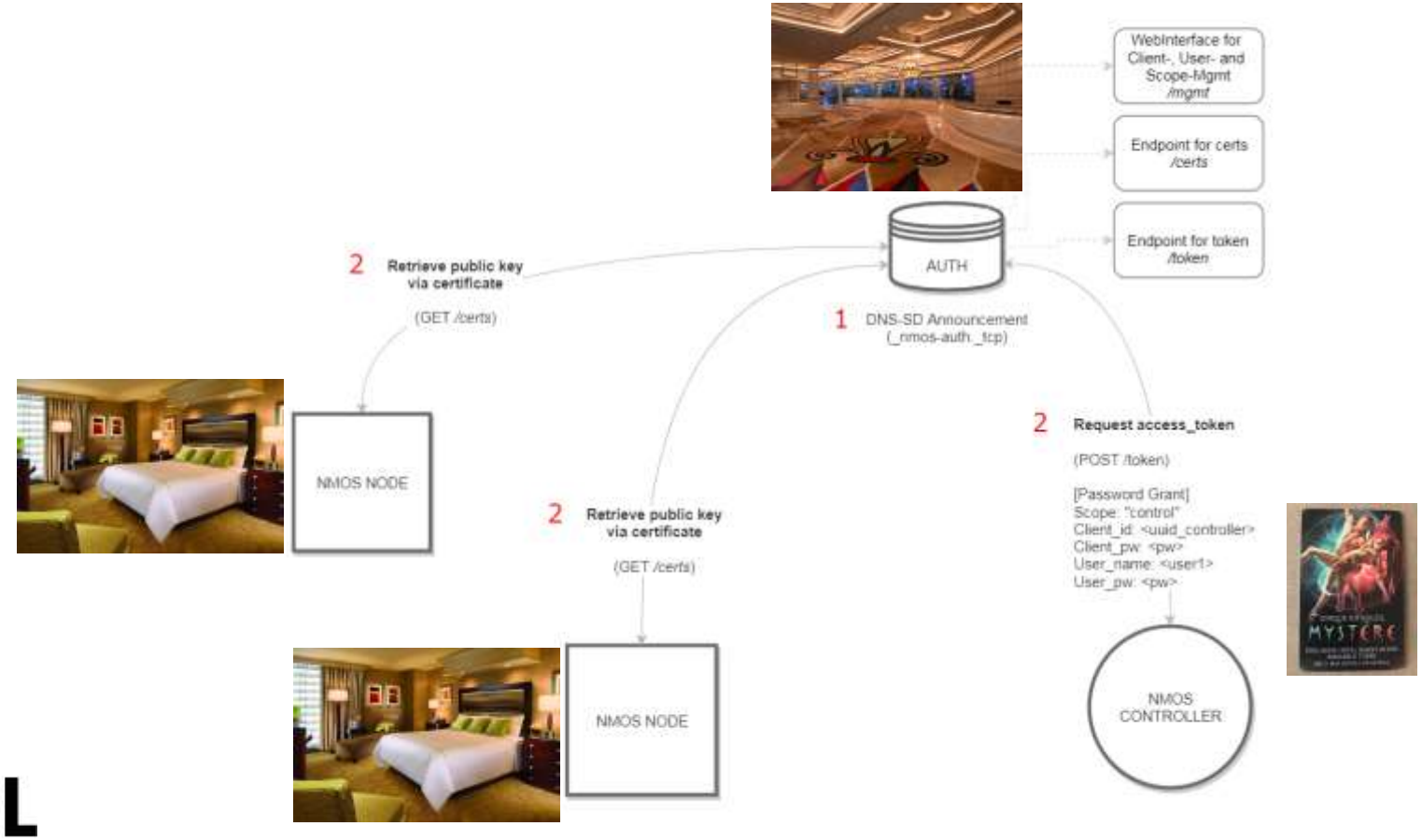
BCP-003-02

BCP-003-02

- Describes techniques how to retrieve a token and get authorized access
- Describes techniques for NMOS nodes how to validate tokens
- Describes the type of information stored in the token

How to become authorized?

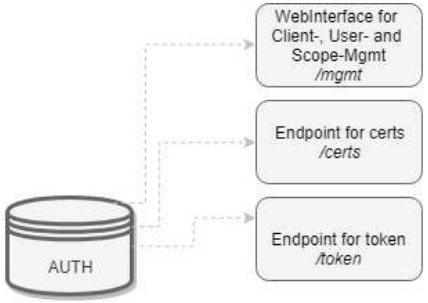
Initial setup

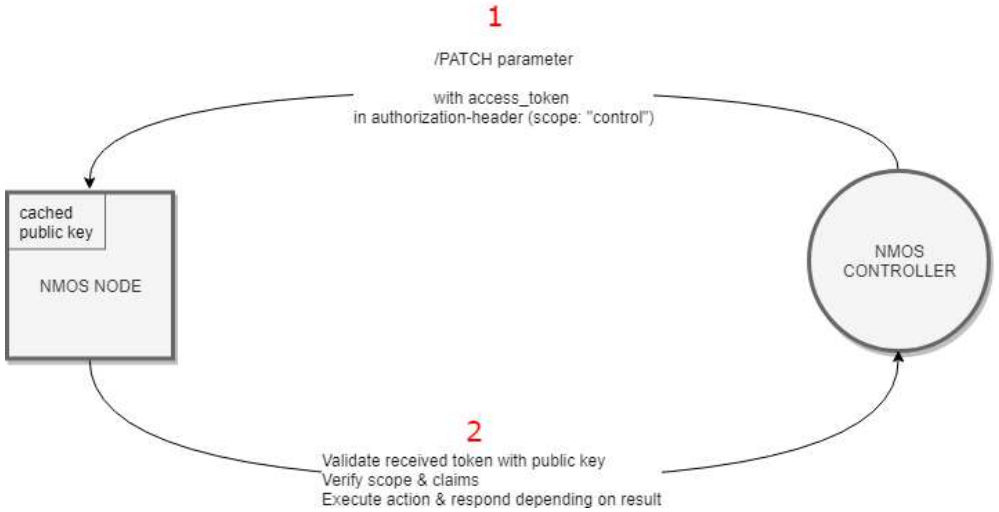


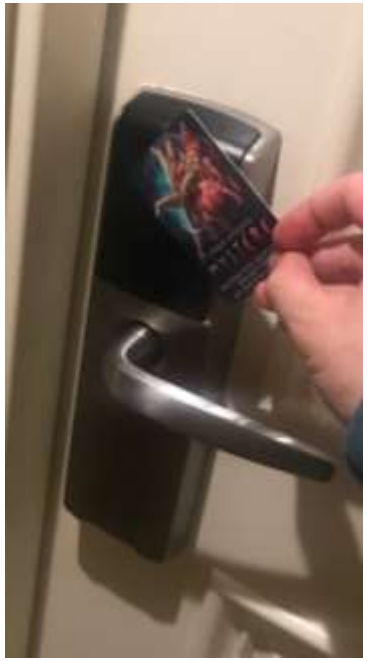
OAuth2 + JWT for NMOS

- Authorization server issues keys to ressource servers (=NMOS Nodes)
  - Needed to be able to decrypt tokens for validation
  - Keys are refreshed in short intervals (1 hour)
- Authorization server issues tokens to Clients (=control systems)
  - Needed to be able to perform actions against ressource servers
  - Clients need to be listed in advance in the auth server (out of scope
    - LDAP/AD/SSO

Accessing Resources



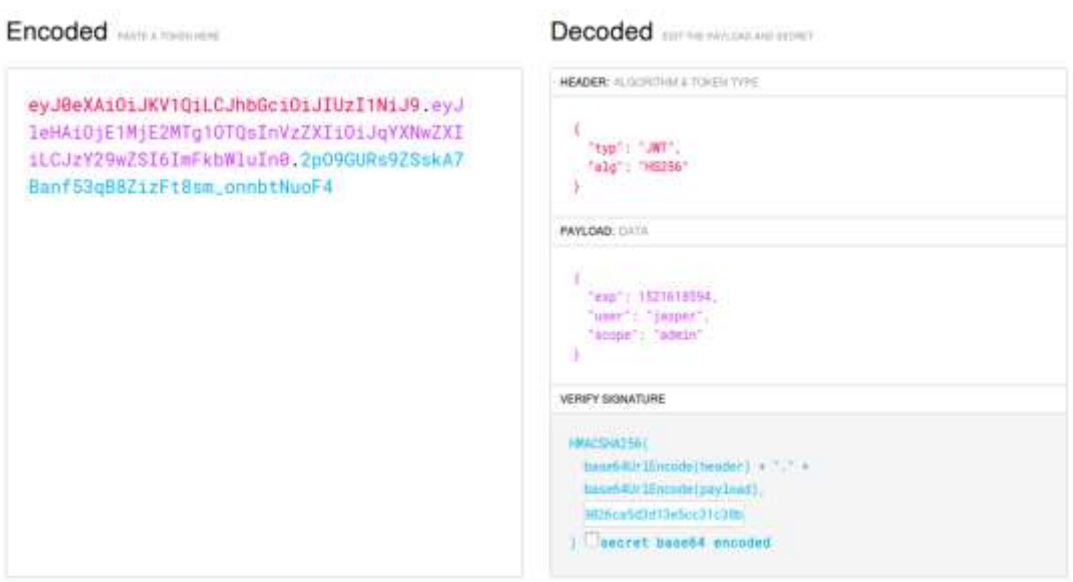




Token based auth

- Stateless
  - No record on Server about a session
- Traditional Token flow:
  1. User enters their login credentials
  2. Server verifies the credentials are correct and returns signed token
  3. Token is stored client-side (most common in local storage, but cookie is possible as well)
  4. Subsequent requests to the server include this token as an additional Authorization header
  5. Server decodes the token and if token is valid process the request
  6. Once a user logs out, the token is destroyed client-side. No interaction with server is needed.

JWT



- Header, Body, Signature
- Body containing claims
- Rfc7519

➢Issued key needed to verify the signature

➢only valid tokens are processed

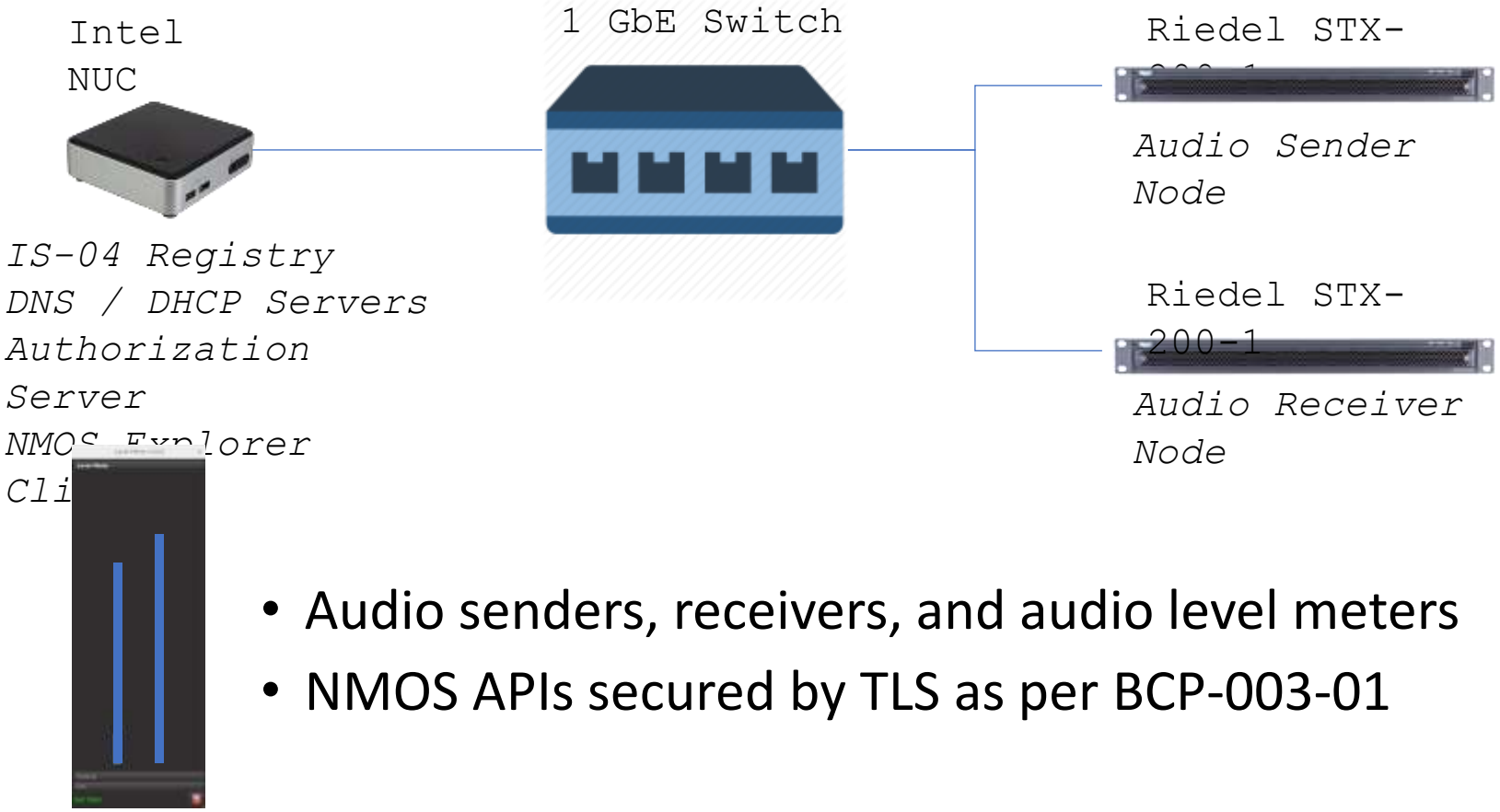
JWT Claims

```
{
  "iss": "https://auth.example.com",
  "sub": "username@example.com",
  "aud": "https://node.example.com",
  "iat": "1548779460",
  "exp": "1548783060",
  "x-nmos-api": {
    "name": "is-04",
    "node-read": true
  }
}
```

- Define more granular claims

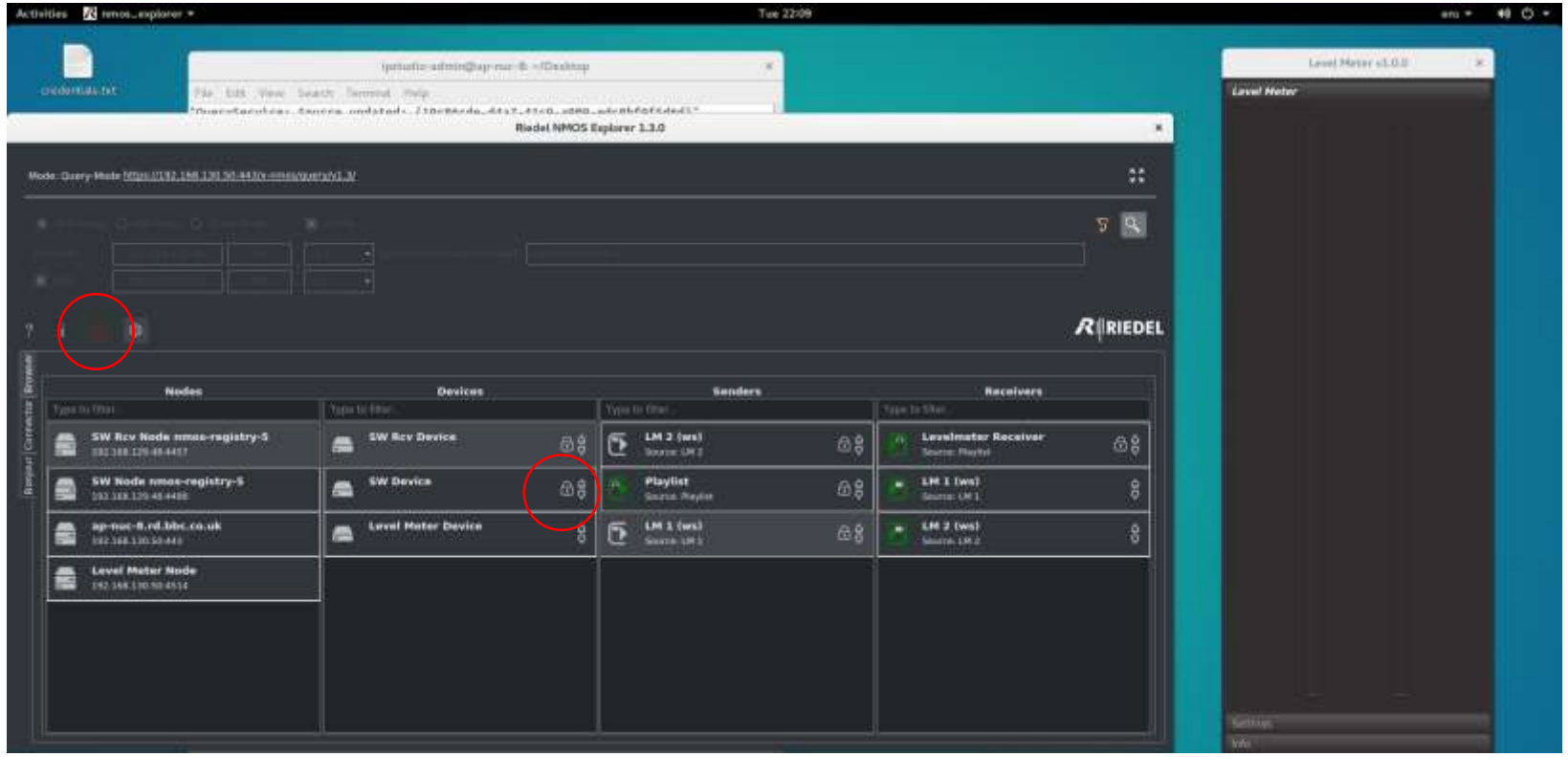
```
"x-nmos-api": {
  "name": "is-04",
  "version": ["1.0","1.1","1.2"],
  "node-read": true
}
```

IP Showcase Demonstration



- Audio senders, receivers, and audio level meters
- NMOS APIs secured by TLS as per BCP-003-01

Prototype using JWT & proposed Oauth2 workflow



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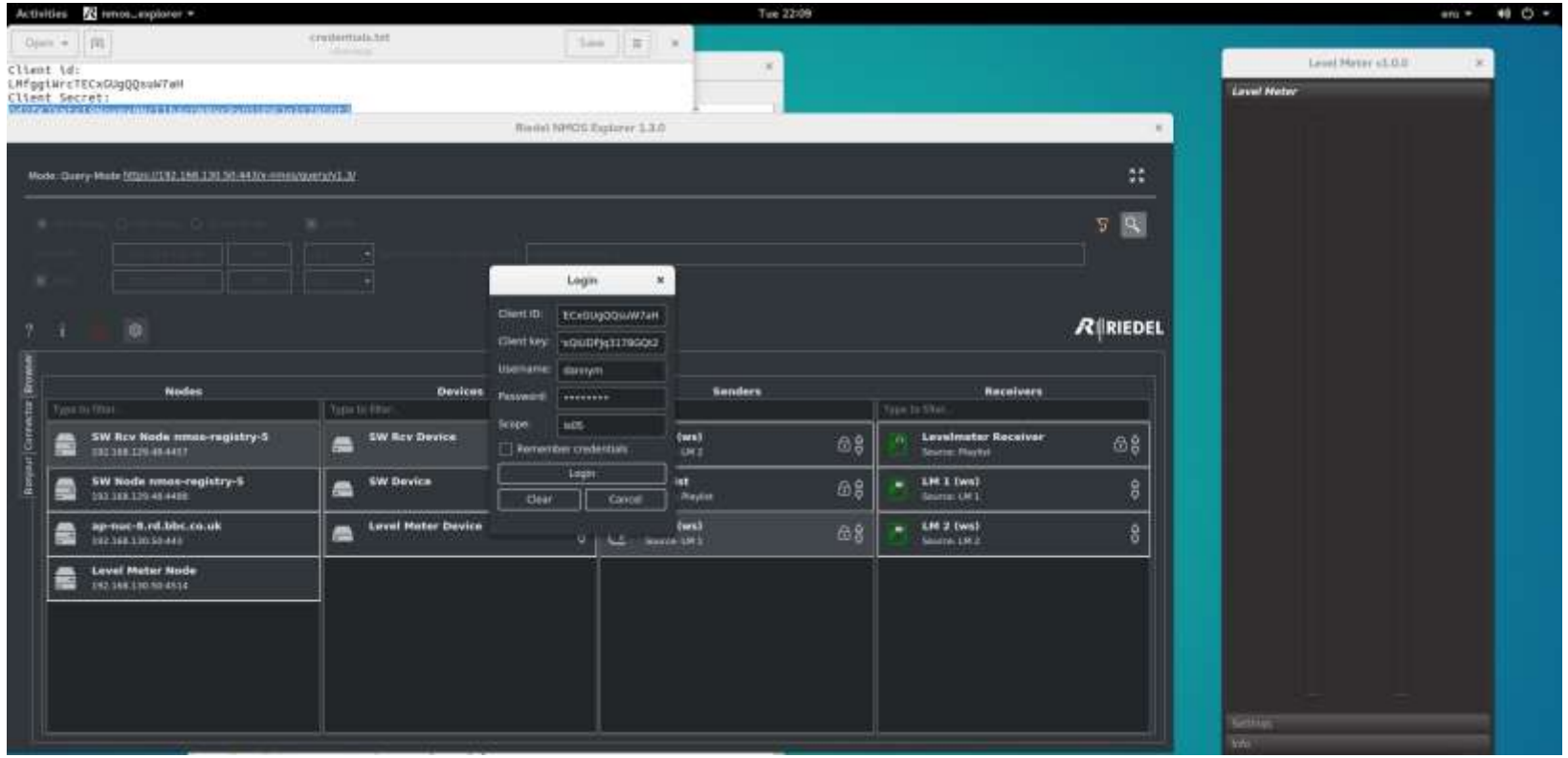

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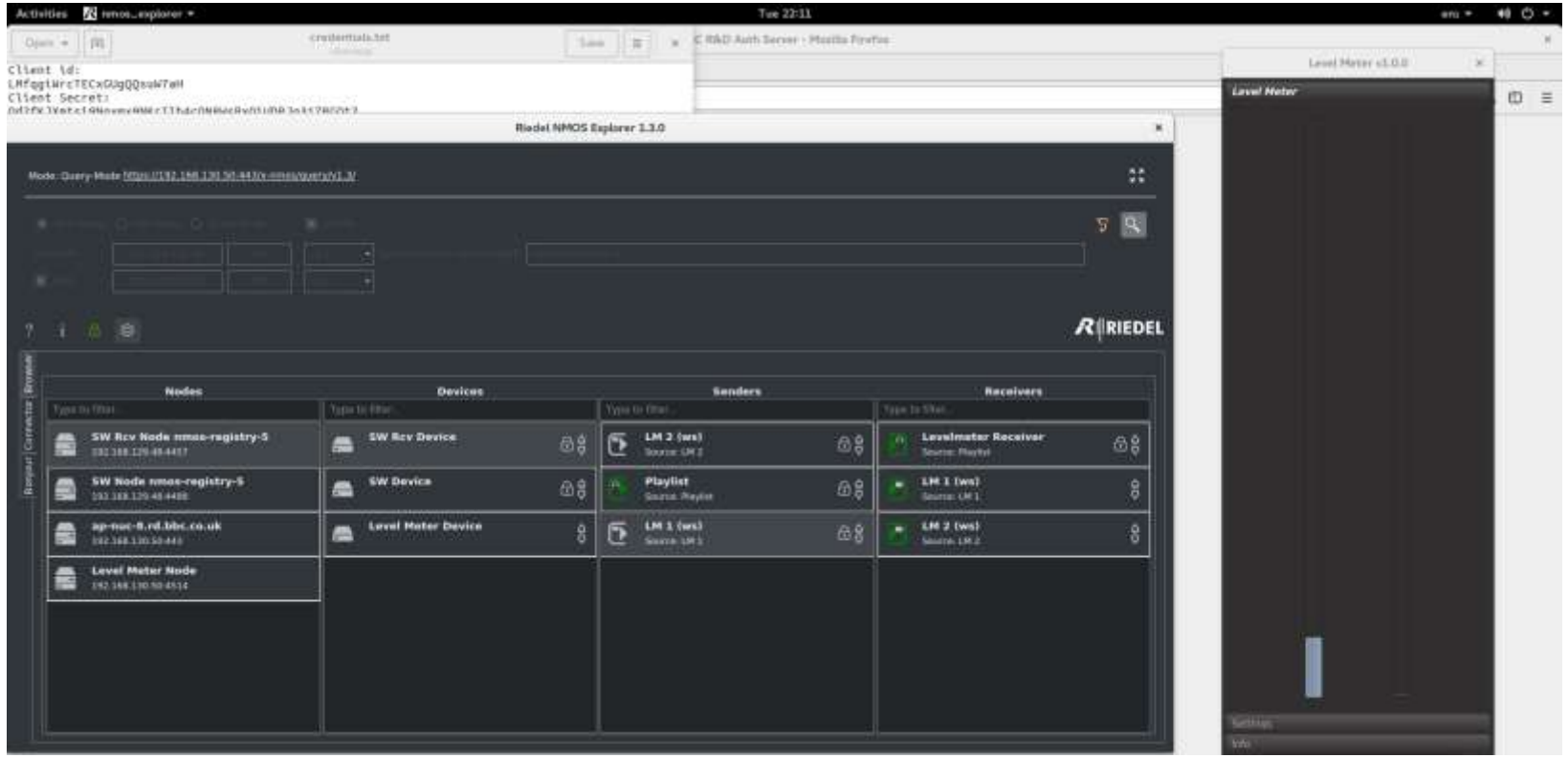

“NMOS World”

- Authorisation server visible through DNS-SD (unicast!)
- Backwards compatible
  - Just send IS-04 and IS-05 without token
- Also applicable for IS-04 query API
  - Example: only some controllers are allowed to retrieve information

Conclusion

- IS-04 and IS-05 are based on standard IT technology
- HTTP and JSON are used by many other applications
- Other applications use OAuth2 and JWT already in large scale
- Key exchange workflow provides the fundamental environment for HTTPS transport
- Secure Transport enables OAuth2
- Backwards compatibility given

Next steps

- Finish discussion around grants
  - Define grant types for different applications
  - Need more user input and testing
- Test interoperability
- Test backwards compatibility
- Get involved!
  - https://amwa-tv.github.io/nmos-api-security/

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Thank You

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