

INTERNET2

# 2022 TECHNOLOGY exchange

Down in the weeds with apologies:  
Introducing NS API and the I2 Insight Console.



**Mike Simpson**

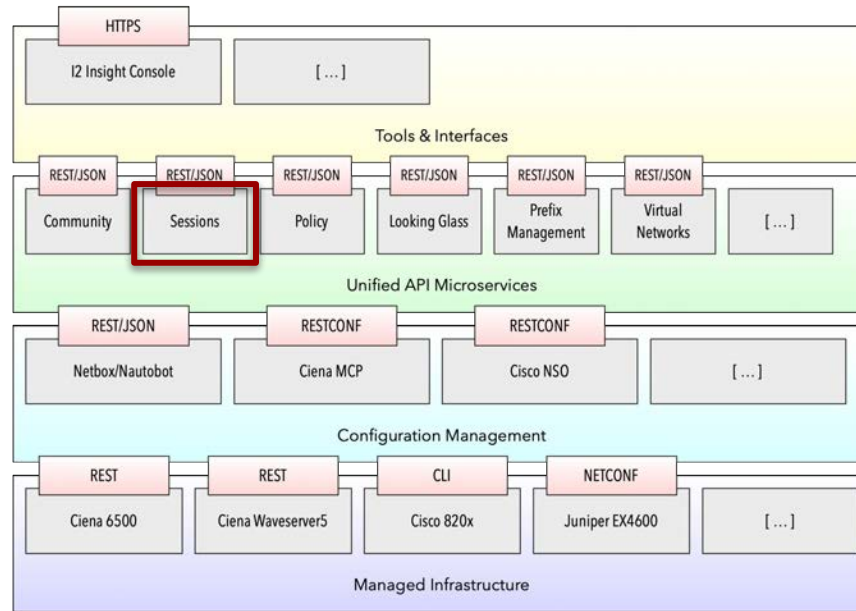
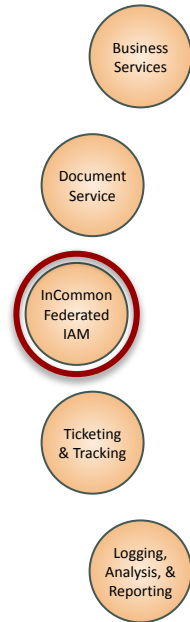
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520.314.3899



I2 NS API



# Establishing a session:



# Establishing a session (1):

GET https://api.ns.internet2.edu/v1/sessions/ping

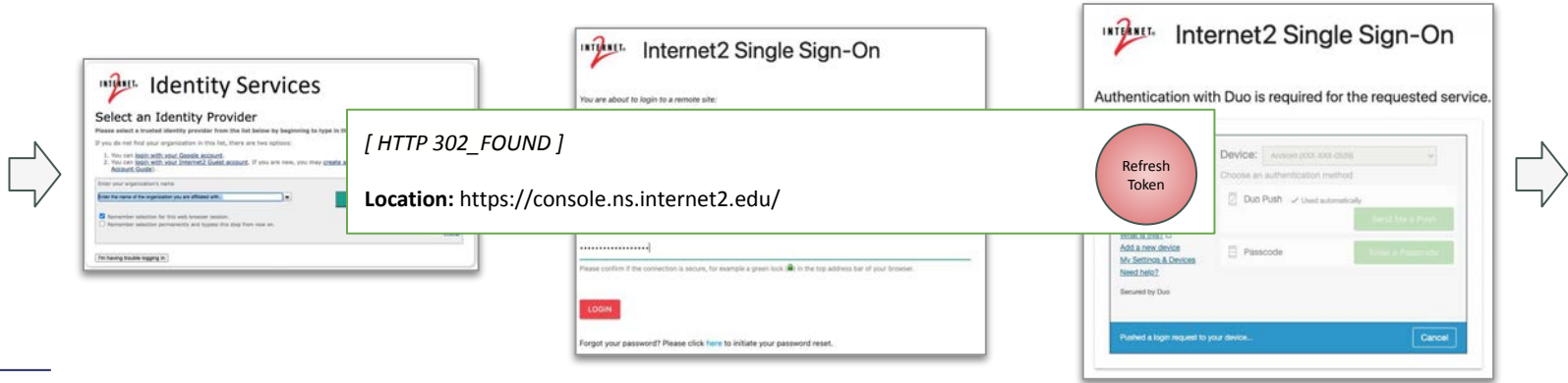
[ HTTP 200\_OK ]

```
{  
  "i2nsapi_package_version": "0.7.1",  
  "i2nsapi_api_version": "v1"  
}
```

GET https://api.ns.internet2.edu/v1/sessions/login

[ HTTP 302\_FOUND ]

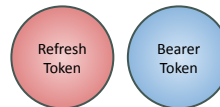
**Location:** https://login.at.internet2.edu/Saml2/sso/redirect?SAMLRequest=[ ... ]



## Establishing a session (2):

GET https://api.ns.internet2.edu

```
{
  "id": "d220f84e-ec94-4605-aaa9-56163b6a8a2b",
  "iss": "arroyo",
  "type": "bearer",
  "iat": "1668787828",
  "exp": "1668813928",
  "sub": "mike.simpson@at.internet2.edu",
  "given_name": "Mike",
  "family_name": "Simpson",
  "email": "msimpson@internet2.edu",
  "description": "Mike Simpson (msimpson@internet2.edu) - mike.simpson@at.internet2.edu",
  "attrib": {
    "roles": {
      "i2": ["superadmin"],
      "i2/mcnc": ["orgadmin", "neteng"]
    },
    "authorizations": {
      "i2": ["core"],
      "i2/mcnc": ["core", "peering"],
      "i2/mcnc/duke": ["peering"]
    }
  }
}
```

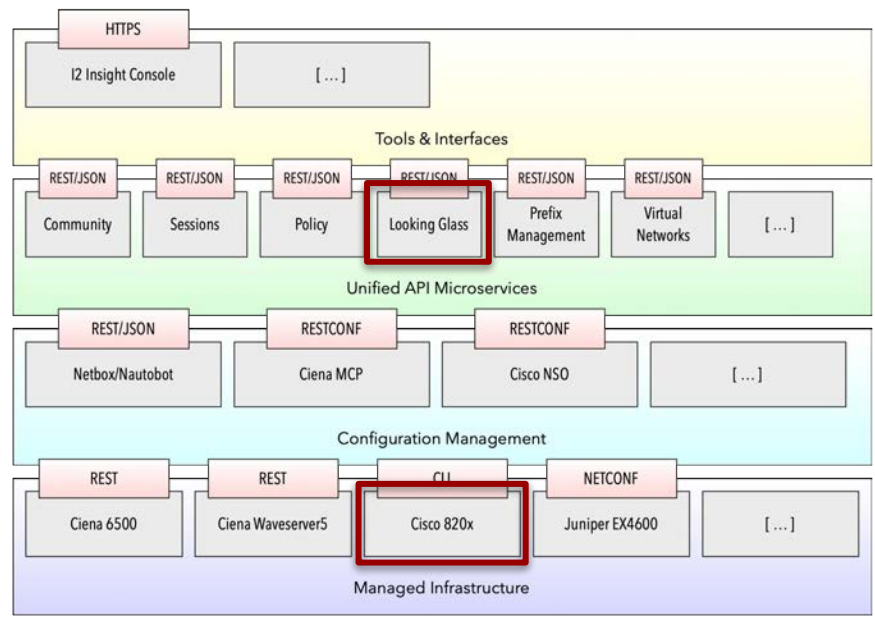


8 hrs

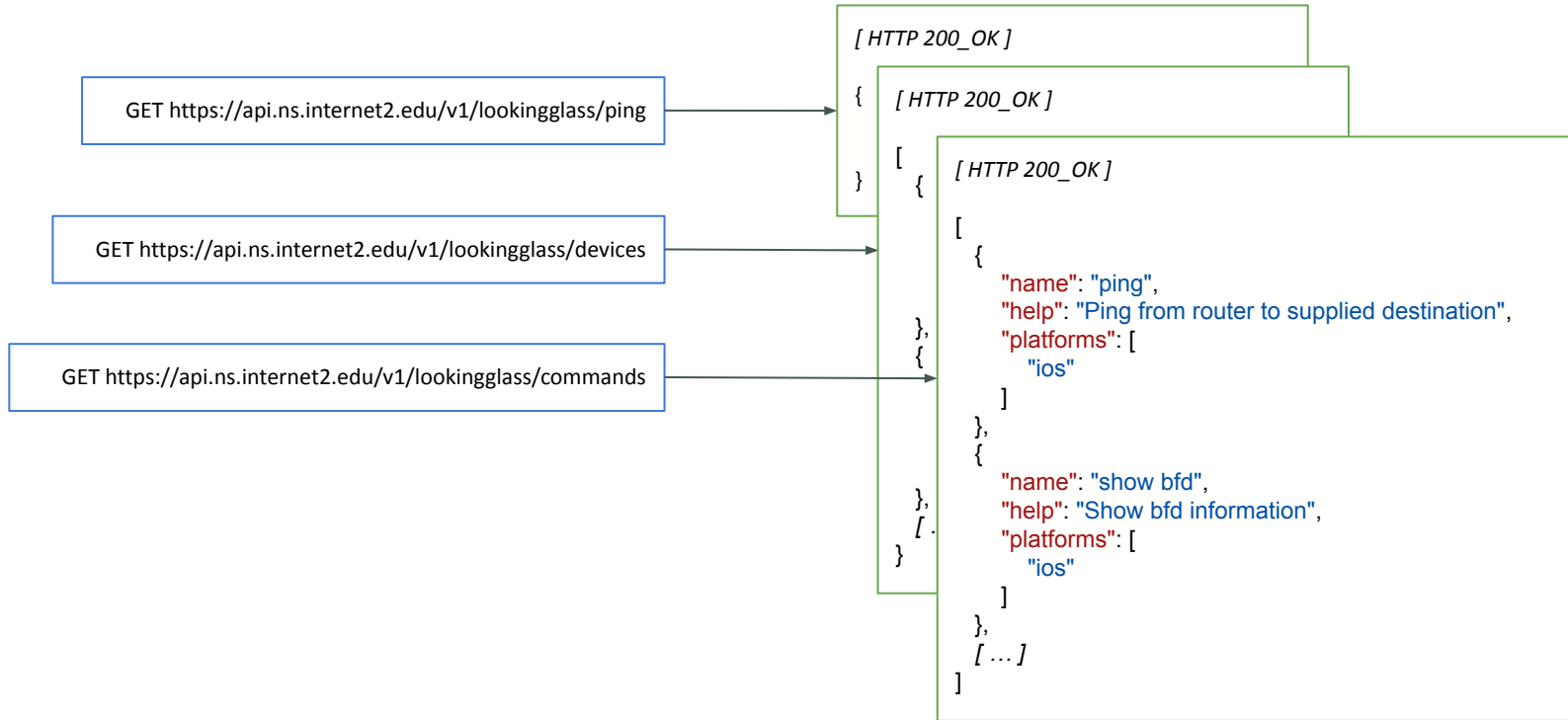
15 mins

# Querying the Looking Glass:

- Business Services
- Document Service
- InCommon Federated IAM
- Ticketing & Tracking
- Logging, Analysis, & Reporting



# Querying the Looking Glass (1):



## Querying the Looking Glass (2):

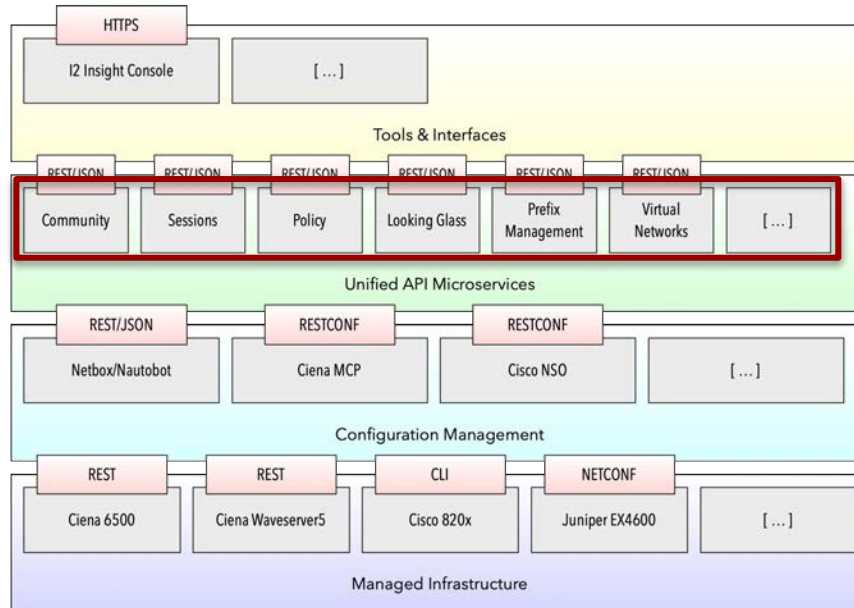
```
[ HTTP 200_OK ]
```

```
{  
  "targets": [  
    "core1.tucs"  
  ],  
  "command": "show version",  
  "parameter": null,  
  "filter": null,  
  "outputs": [  
    {  
      "target": "core1.tucs",  
      "output": "Mon Nov 21 18:04:36.972 UTC\nCisco IOS XR Software, Version 7.3.3  
LNT\nCopyright (c) 2013-2022 by Cisco Systems, Inc.\n\nBuild Information:\n Built By   :  
ingunawa\n Built On   : Sat Jan 29 10:33:37 UTC 2022\n Build Host : iox-ucs-060\n Workspace : /auto/srcarchive16/prod/7.3.3/8000/ws\n Version   : 7.3.3\n Label    : 7.3.3\n cisco    : 8000  
(Intel(R) Xeon(R) CPU D-1530 @ 2.40GHz)\ncisco 8201 (Intel(R) Xeon(R) CPU D-1530 @  
2.40GHz) processor with 32GB of memory\ncore1.tucs uptime is 10 weeks, 9 hours, 38  
minutes\nCisco 8201 Chassis w/ 24x400GE QSFP56-DD & 12x100GE QSFP28",  
    }  
  ]  
}
```



# Exploring the API:

- Business Services
- Document Service
- InCommon Federated IAM
- Ticketing & Tracking
- Logging, Analysis, & Reporting



# Exploring the API:

GET https://api.ns.internet2.edu/docs

GET https://api.ns.internet2.edu/openapi.json

The screenshot shows the FastAPI 0.10 OAS3 API documentation for the 'Looking Glass' API. The interface includes a header with the API name and version, a list of endpoints, and a detailed view of the 'GET /v1/lookingglass/devices' endpoint. The 'Parameters' section shows a required 'arrayofRefreshToken' parameter. The 'Responses' section shows a 200 'Successful Response' and a 422 'Validation Error'.

```
{
  "openapi": "3.0.2",
  "info": {
    "title": "FastAPI",
    "version": "0.1.0"
  },
  "paths": {
    "/v1/lookingglass/ping": {
      "get": {
        "tags": [
          "v1",
          "Looking Glass"
        ],
        "summary": "Ping",
        "description": "Quick verification that the Looking Glass API is up and available.",
        "operationId": "ping_v1_lookingglass_ping_get",
        "parameters": [
          {
            "required": false,
            "schema": {
              "title": "ArrayofrefreshToken",
              "type": "string",
              "default": ""
            },
            "name": "arrayofrefreshToken",
            "in": "cookie"
          }
        ],
        "responses": {
          "200": {
            "description": "Successful Response",
            "content": {
              "application/json": {
                "schema": {
                  "title": "Response Ping V1 Lookingglass Ping Get",
                  "anyOf": [
                    {
                      "$ref": "#/components/schemas/PingResponse"
                    },
                    {
                      "$ref": "#/components/schemas/ErrorResponse"
                    }
                  ]
                }
              }
            }
          },
          "422": {
            "description": "Validation Error",
            "content": {
              "application/json": {
                "schema": {
                  "$ref": "#/components/schemas/HTTPValidationError"
                }
              }
            }
          }
        ],
        "security": [
          {
            "OptionalHTTPBearer": []
          }
        ]
      }
    },
    "/v1/lookingglass/config": {
      "get": {
        "tags": [
          "v1",
          "Looking Glass"
        ],
        "summary": "Lookingglass Config",

```

# I2 INSIGHT CONSOLE



Looking Glass

Filter by node name or location

10 nodes selected (maximum allowed) > show ipv4 interface

Run Command

Supported Commands

- Aggregation Router
- aggl1ashb.net.internet2.edu  
Ashburn, VA
  - aggl1ashb.net.internet2.edu  
Ashburn, VA
  - aggl1ashb.net.internet2.edu  
Ashburn, VA
  - aggl1ashb.net.internet2.edu  
Ashburn, VA
  - aggl1ashb.net.internet2.edu  
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  - aggl1ashb.net.internet2.edu  
Ashburn, VA
  - aggl1ashb.net.internet2.edu  
Ashburn, VA
  - aggl1ashb.net.internet2.edu  
Ashburn, VA
  - aggl1ashb.net.internet2.edu  
Ashburn, VA
  - aggl1ashb.net.internet2.edu  
Ashburn, VA

```

aggl1ashb.net.internet2.edu > show ipv4 interface

Mon Oct 3 19:32:47.238 UTC
Bundle-Ether2 is Up, ipv4 protocol is Up
Vrf is I2PX (vrfid 0x60000002)
Internet address is 162.252.69.228/31
MTU is 9144 (1500 is available to IP)
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound common access list is not set, access list is not set
Proxy ARP is disabled
ICMP redirects are never sent
ICMP unreachable are always sent
ICMP mask replies are never sent
Table Id is 0xe0000002

Bundle-Ether3 is Up, ipv4 protocol is Up
Vrf is I2PX (vrfid 0x60000002)
Internet address is 162.252.69.242/31
MTU is 9144 (1500 is available to IP)
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound common access list is not set, access list is not set
Proxy ARP is disabled
ICMP redirects are never sent
ICMP unreachable are always sent
ICMP mask replies are never sent
Table Id is 0xe0000002

Bundle-Ether4 is Up, ipv4 protocol is Up
Vrf is RE (vrfid 0x60000001)
Internet address is 99.82.179.33/31
MTU is 9144 (1500 is available to IP)

aggl1ashb.net.internet2.edu > show ipv4 interface

Mon Oct 3 19:32:47.238 UTC
Bundle-Ether2 is Up, ipv4 protocol is Up
Vrf is I2PX (vrfid 0x60000002)
Internet address is 162.252.69.228/31
MTU is 9144 (1500 is available to IP)
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound common access list is not set, access list is not set
Proxy ARP is disabled
ICMP redirects are never sent
ICMP unreachable are always sent
ICMP mask replies are never sent
Table Id is 0xe0000002

Bundle-Ether3 is Up, ipv4 protocol is Up
Vrf is I2PX (vrfid 0x60000002)
Internet address is 162.252.69.242/31
MTU is 9144 (1500 is available to IP)
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound common access list is not set, access list is not set
Proxy ARP is disabled
ICMP redirects are never sent
ICMP unreachable are always sent
ICMP mask replies are never sent
    
```

Copy

**ping**  
Ping from router to supplied destination.

**show bfd**  
Show BFD information.

**show bgp**  
Show BGP info.

**show cef**  
Show Cisco Express Forwarding.

**show controllers**  
Show controller stats.

**show ipv4 interface**  
IPv4 interface status and configuration.

**show ipv6 interface**  
IPv6 interface status and configuration.

**show lacp**  
LACP information.

**show lldp neighbors**  
LLDP neighbors.

---

**History** Edit

- show bgp vrf I2PX summary  
aggl1ashb aggl1ashb aggl1ashb
- show bgp vrf I2PX neighbors  
aggl1ashb aggl1ashb aggl1ashb aggl1ashb aggl1ashb aggl1ashb
- show bgp vrf I2PX summary  
aggl1ashb aggl1ashb aggl1ashb aggl1ashb aggl1ashb aggl1ashb aggl1ashb aggl1ashb
- show bgp vrf I2PX  
aggl1ashb aggl1ashb aggl1ashb aggl1ashb aggl1ashb
- show bgp vrf RE summary  
aggl1ashb
- show bgp vrf RE neighbors  
aggl1ashb
- show bgp vrf RE  
aggl1ashb aggl1ashb aggl1ashb aggl1ashb aggl1ashb aggl1ashb aggl1ashb aggl1ashb

