

API Reference

FHSOperator API

API Version: 0.1

This is the FHSOperator API for the IEEE 2302-2021 Standard for Intercloud Interoperability and Federation (<https://standards.ieee.org/ieee/2302/7056>). This standard is based on the NIST Cloud Federation Reference Architecture (CFRA), SP 500-332, (<https://doi.org/10.6028/NIST.SP.500-332>).

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Terms of service: <http://swagger.io/terms/>

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Security and Authentication

SECURITY SCHEMES

KEY	TYPE	DESCRIPTION
fhs_auth	openIdConnect	

API

1. FHSOPERATOR CORE

Calls for an FHSOperator to manage a Fed Hosting Server.

1.1 POST /FHSOperator/NewFedAdmin

Add a new user authorized to create and administer federations

REQUEST

REQUEST BODY - application/json

```
{
  name*      string
  email      string
  description string
  enabled*   boolean
}
```

REQUEST BODY - application/xml

```
{
  name*      string
  email      string
  description string
  enabled*   boolean
}
```

RESPONSE

STATUS CODE - 201: Federation Admin account ready to use.

RESPONSE MODEL - application/json

```
{
  member_id* string
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

1.2 GET /FHSOperator/FedAdmins

List federation admins

REQUEST

No request parameters

RESPONSE

STATUS CODE - 200: List of Federation Admins.

RESPONSE MODEL - application/json

```
[{
  Array of object:
    member_id*   string
    member_name* string
    email        string
    description   string
    enabled*     boolean
    feds_owned*  [{
      Array of object:
        fed_id*  string
      }]
    }]
}]
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

1.3 PUT /FHSOperator/FedAdmin/{member_id}

Update FedAdmin information.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*member_id	uuid	The FedAdmin MemberID

REQUEST BODY - application/json

```
{
  member_name string
  email       string
  description  string
  enabled     boolean
}
```

REQUEST BODY - application/xml

```
{
  member_name string
  email       string
  description  string
  enabled     boolean
}
```

RESPONSE

STATUS CODE - 200: FedAdmin info updated

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

1.4 DELETE /FHSOperator/FedAdmin/{member_id}

Delete a FedAdmin.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*member_id	uuid	The FedAdmin MemberID

RESPONSE

STATUS CODE - 200: FedAdmin deleted

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

1.5 GET /FHSOperator/FedInstances

List federation instances

REQUEST

No request parameters

RESPONSE

STATUS CODE - 200: List of Federation Instances.

RESPONSE MODEL - application/json

```
[{  
  Array of object:  
    fed_id*      string  
    fed_name*    string  
    description  string  
    enabled*     boolean  
    owning_fedadmin_id* string  
    connections_used* [{  
      Array of object:  
        conn_id* string  
    }]  
}]
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

1.6 PUT /FHSOperator/FedInstance/{fed_id}

Update FedInstance information.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The Federation ID

REQUEST BODY - application/json

```
{
  enabled*  boolean
}
```

REQUEST BODY - application/xml

```
{
  enabled*  boolean
}
```

RESPONSE

STATUS CODE - 200: Federation info updated

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

1.7 DELETE /FHS0perator/FedInstance/{fed_id}

Delete a federation.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation ID

RESPONSE

STATUS CODE - 200: Federation deleted

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

2. FHSOPERATOR FHS-FHS

Calls to Enable/Manage FHS-FHS Communication.

2.1 POST /FHSOperator/AllowConnection

Allow a connection from another Fed Service

REQUEST

REQUEST BODY - application/json

```
{
  FHS_URL*    string
  connect_ttl string
  description  string
}
```

REQUEST BODY - application/xml

```
{
  FHS_URL*    string
  connect_ttl string
  description  string
}
```

RESPONSE

STATUS CODE - 200: Connection Allowed.

RESPONSE MODEL - application/json

```
{
  connection_id* string
  FHS_URL*       string
  description     string
  status*        enum    ALLOWED:allowed, expired, declined, active, terminated
  time_established string
  time_terminated string
  known_federations* [{
    Array of object:
    fed_id* string
  }]
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

2.2 POST /FHSOperator/Connect

Request connection to another Fed Service

REQUEST

REQUEST BODY - application/json

```
{
```



```

FHS_URL*      string
connect_ttl   string
description   string
}

```

RESPONSE

STATUS CODE - 201: Connection Established.

RESPONSE MODEL - application/json

```

{
  connection_id*  string
  FHS_URL*        string
  description      string
  status*         enum    ALLOWED:allowed, expired, declined, active, terminated
  time_established string
  time_terminated string
  known_federations* [{
    Array of object:
      fed_id* string
  }]
}

```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

STATUS CODE - 408: Request timed-out.

STATUS CODE - 503: Request declined.

2.3 GET /FHSOperator/Connections

List Connections

REQUEST

No request parameters

RESPONSE

STATUS CODE - 200: List of Connections.

RESPONSE MODEL - application/json

```

[ {
  Array of object:
    connection_id*  string
    FHS_URL*        string
    description      string
    status*         enum    ALLOWED:allowed, expired, declined, active, terminated
    time_established string
    time_terminated string
    known_federations* [{
      Array of object:
        fed_id* string
    }]
  } ]
} ]

```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

2.4 DELETE /FHSOperator/Connection/{conn_id}

Delete a connection.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*conn_id	uuid	The Connection ID

RESPONSE

STATUS CODE - 200: Connection terminated

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

API Reference

Member-FHS API

API Version: 0.1

This is the FHS Member API for the IEEE 2302-2021 Standard for Intercloud Interoperability and Federation (<https://standards.ieee.org/ieee/2302/7056>). This standard is based on the NIST Cloud Federation Reference Architecture (CFRA), SP 500-332, (<https://doi.org/10.6028/NIST.SP.500-332>).

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Security and Authentication

SECURITY SCHEMES

KEY	TYPE	DESCRIPTION
fhs_auth	openIdConnect	

API

1. ATTRIBUTES

Calls to manage federation roles and attributes.

1.1 GET /Attribute/{fed_id}

List the attributes in this federation

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*request_id	uuid	The request UUID

RESPONSE

STATUS CODE - 200: List of Attributes.

RESPONSE MODEL - application/json

```
[{  
  Array of object:  
    attr_id*   string  
    attr_name* string  
}]
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

1.2 POST /Attribute/{fed_id}

Create an attribute in a federation

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID

REQUEST BODY - application/json

```
{  
  attr_name* string  
}
```

REQUEST BODY - application/xml

```
{  
  attr_name* string  
}
```

RESPONSE

STATUS CODE - 201: Attribute created.

RESPONSE MODEL - application/json

```
{
  attr_id*   string
  attr_name* string
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

1.3 DELETE /Attribute/{fed_id}/{attr_id}

Delete an attribute from a federation.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*attr_id	uuid	The attribute UUID

RESPONSE

STATUS CODE - 200: Attribute deleted.

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

2. AUTHORIZATION

Calls to grant/revoke authorization attributes.

2.1 PUT /Authorization/{fed_id}/{member_id}/{attr_id}

Grant an authorization attribute to a federation member.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*member_id	uuid	The member UUID
*attr_id	uuid	The attribute UUID

RESPONSE

STATUS CODE - 200: Authorization attribute granted

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

2.2 DELETE /Authorization/{fed_id}/{member_id}/{attr_id}

Revoke an authorization attribute from a federation member.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*member_id	uuid	The member UUID
*attr_id	uuid	The attribute UUID

RESPONSE

STATUS CODE - 200: Authorization attribute revoked

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

3. DISCOVERY

Query catalog for available services in a federation.

3.1 GET /Discovery/{fed_id}/{member_id}

Look-up services.

Query for services I am authorized to see and use.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*member_id	uuid	The member UUID

REQUEST BODY - application/json

```
{
}
```

RESPONSE

STATUS CODE - 200: Service IDs

RESPONSE MODEL - application/json

```
[ {
  Array of object:
    svc_id*      string
    svc_metadata {
    }
    svc_endpoint* string
  } ]
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

4. FEDERATION

Calls to create and manage federation instances.

4.1 GET /Federation

List federations owned by the caller

REQUEST

REQUEST BODY - application/json

```
{
  member_id*  string
}
```

REQUEST BODY - application/xml

```
{
  member_id*  string
}
```

RESPONSE

STATUS CODE - 200: List of Federations.

RESPONSE MODEL - application/json

```
[ {
  Array of object:
    fed_id*      string
    fed_name*    string
    fed_description string
  } ]
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

4.2 POST /Federation

Create a federation instance

REQUEST

REQUEST BODY - application/json

```
{
  name*      string
  description string
  enabled*   boolean
}
```

REQUEST BODY - application/xml

```
{
  name*      string
  description string
  enabled*   boolean
}
```

```
}
```

RESPONSE

STATUS CODE - 201: Federation created.

RESPONSE MODEL - application/json

```
{
  fed_name*  string
  fed_id*    string
  enabled*   boolean
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

4.3 GET /Federation/{fed_id}

Get federation information

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID

REQUEST BODY - application/json

```
{
  member_id* string
}
```

REQUEST BODY - application/xml

```
{
  member_id* string
}
```

RESPONSE

STATUS CODE - 200: Federation Information. Many items could be added.

RESPONSE MODEL - application/json

```
{
  fed_id*    string
  fed_name*  string
  n_members  integer
  n_services integer
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

4.4 DELETE /Federation/{fed_id}

Delete a federation

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID

REQUEST BODY - application/json

```
{
  member_id* string
}
```

REQUEST BODY - application/xml

```
{
  member_id* string
}
```

RESPONSE

STATUS CODE - 200: Federation deleted.

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

5. FEDERATION FHS-FHS

Calls to join a federation at a different Fed Service.

5.1 GET /Federation/Query

Get a list of federations known to this FHS at other connected FHSs

REQUEST

No request parameters

RESPONSE

STATUS CODE - 200: Other known federations.

RESPONSE MODEL - application/json

```
[ {  
  Array of object:  
    fed_id*           string  
    fed_name*         string  
    fed_description   string  
  } ]
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

5.2 POST /Federation/Join/{fed_id}

Request to join a federation known to this FHS but at another connected FHSs

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID

RESPONSE

STATUS CODE - 200: Join request accepted.

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

STATUS CODE - 403: Forbidden; Join request declined.

5.3 GET /Federation/JoinRequests

Get a list of federation join requests

REQUEST

No request parameters

RESPONSE

STATUS CODE - 200: Federation join requests.

RESPONSE MODEL - application/json

```
[ {  
  Array of object:  
    request_id*      string  
    fed_id*          string  
    fed_name         string  
    requestor_name*  string  
    requestor_FHS*   string  
  } ]
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

5.4 POST /Federation/JoinGrant/{request_id}

Grant a federation join request

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*request_id	uuid	The request UUID

RESPONSE

STATUS CODE - 200: Federation join request granted.

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

5.5 POST /Federation/JoinDeny/{request_id}

Deny a federation join request

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*request_id	uuid	The request UUID

RESPONSE

STATUS CODE - 200: Federation join request denied.

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

5.6 DELETE /Federation/Leave/{fed_id}

Leave a federation that originated at another connected FHSs

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID

RESPONSE

STATUS CODE - 200: Federation originating at another Fed Service left.

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

6. FEDERATION MONITORING

Calls to manage an external monitoring system.

6.1 GET /MonitoringParams/{fed_id}

Get the current parameters for an external monitoring system for this federation.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID

RESPONSE

STATUS CODE - 200: Current monitoring parameters.

RESPONSE MODEL - application/json

```
{
  monitoring_level*      enum      ALLOWED:fatal, error, warning, info, debug,
                           trace
  monitoring_system_URL  string
  send_monitoring_data_to_FHS string
  enabled*               boolean
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

6.2 PUT /MonitoringParams/{fed_id}

Set the parameters for an external monitoring system for this federation.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID

REQUEST BODY - application/json

```
{
  monitoring_level*      enum      ALLOWED:fatal, error, warning, info, debug,
                           trace
  monitoring_system_URL  string
  send_monitoring_data_to_FHS string
  enabled*               boolean
}
```

RESPONSE

STATUS CODE - 200: Monitoring parameters set.

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

6.3 PUT /MonitoringProxy/{fed_id}

Proxy a call to the external monitoring service.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID

REQUEST BODY - application/json

```
{  
}
```

RESPONSE

STATUS CODE - 200: Response format defined by monitoring system in use.

RESPONSE MODEL - application/json

```
{  
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

7. INVOCATION

Calls to invoke services available in a federation. Any HTTP verb might be possible.

7.1 GET /Invocation/{fed_id}/{svc_id}

Call a service I am authorized to use.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*svc_id	uuid	The service UUID

REQUEST BODY - application/json

```
{  
}
```

RESPONSE

STATUS CODE - 200: Service Response. This could have many different elements.

RESPONSE MODEL - application/json

```
{  
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

7.2 PUT /Invocation/{fed_id}/{svc_id}

Call a service I am authorized to use.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*svc_id	uuid	The service UUID

REQUEST BODY - application/json

```
{  
}
```

RESPONSE

STATUS CODE - 200: Service Response. This could have many different elements.

RESPONSE MODEL - application/json

```
{
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

7.3 POST /Invocation/{fed_id}/{svc_id}

Call a service I am authorized to use.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*svc_id	uuid	The service UUID

REQUEST BODY - application/json

```
{
}
```

RESPONSE

STATUS CODE - 200: Service Response. This could have many different elements.

RESPONSE MODEL - application/json

```
{
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

7.4 DELETE /Invocation/{fed_id}/{svc_id}

Call a service I am authorized to use.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*svc_id	uuid	The service UUID

REQUEST BODY - application/json

```
{
}
```

RESPONSE

STATUS CODE - 200: Service Response. This could have many different elements.

RESPONSE MODEL - application/json

```
{
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

7.5 PATCH /Invocation/{fed_id}/{svc_id}

Call a service I am authorized to use.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*svc_id	uuid	The service UUID

REQUEST BODY - application/json

```
{
}
```

RESPONSE

STATUS CODE - 200: Service Response. This could have many different elements.

RESPONSE MODEL - application/json

```
{
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

7.6 OPTIONS /Invocation/{fed_id}/{svc_id}

Call a service I am authorized to use.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*svc_id	uuid	The service UUID

REQUEST BODY - application/json

```
{
}
```

RESPONSE

STATUS CODE - 200: Service Response. This could have many different elements.

RESPONSE MODEL - application/json

```
{  
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

7.7 HEAD /Invocation/{fed_id}/{svc_id}

Call a service I am authorized to use.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*svc_id	uuid	The service UUID

REQUEST BODY - application/json

```
{  
}
```

RESPONSE

STATUS CODE - 200: Service Response. This could have many different elements.

RESPONSE MODEL - application/json

```
{  
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

8. LOG IN/OUT

Log in or out for a specific federation.

8.1 POST /MemberLogin

Log into a specific federation instance.

REQUEST

REQUEST BODY - application/json

```
{
  fed_name*   string
  member_id*  string
}
```

REQUEST BODY - application/xml

```
{
  fed_name*   string
  member_id*  string
}
```

RESPONSE

STATUS CODE - 201: Log in successful.

RESPONSE MODEL - application/json

```
{
  login_session_id* string
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

8.2 DELETE /MemberLogout/{login_session_id}

Log out from a specific federation instance

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*login_session_id	uuid	Login session UUID

RESPONSE

STATUS CODE - 201: Logout successful.

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

9. MEMBERSHIP

Calls to manage federation membership.

9.1 GET /Membership/{fed_id}

List members of a federation

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID

RESPONSE

STATUS CODE - 200: Federation membership list

RESPONSE MODEL - application/json

```
[ {  
  Array of object:  
    member_id*   string  
    member_name* string  
    email        string  
    description  string  
    enabled*     boolean  
  } ]
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

9.2 POST /Membership/{fed_id}

Grant membership to a federation

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID

REQUEST BODY - application/json

```
{  
  name*       string  
  email       string  
  description string  
  enabled*    boolean  
}
```


REQUEST BODY - application/xml

```
{
  name*      string
  email      string
  description string
  enabled*   boolean
}
```

RESPONSE

STATUS CODE - 201: Federation membership granted.

RESPONSE MODEL - application/json

```
{
  member_id*  string
  member_name* string
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

9.3 GET /Membership/{fed_id}/{member_id}

Get specific member info

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*member_id	uuid	The member UUID

RESPONSE

STATUS CODE - 200: Member Info

RESPONSE MODEL - application/json

```
{
  member_id*  string
  member_name* string
  email       string
  description  string
  enabled*    boolean
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

9.4 DELETE /Membership/{fed_id}/{member_id}

Revoke a member's federation membership.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*member_id	uuid	The member UUID

RESPONSE

STATUS CODE - 200: Membership revoked

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

10. SERVICES

Calls to manage federation services.

10.1 POST /Services/{fed_id}

Register a service with a federation

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID

REQUEST BODY - application/json

```
{
  svc_owner_id*      string
  svc_endpoint*      string
  svc_metadata {
  }
  svc_discovery_policy string
  svc_access_policy   string
}
```

REQUEST BODY - application/xml

```
{
  svc_owner_id*      string
  svc_endpoint*      string
  svc_metadata {
  }
  svc_discovery_policy string
  svc_access_policy   string
}
```

RESPONSE

STATUS CODE - 201: Service registered.

RESPONSE MODEL - application/json

```
{
  svc_id* string
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

10.2 GET /Services/{fed_id}/{svc_owner_id}

Get list of the svc_ids for my services in this federation

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*svc_owner_id	uuid	The service owner UUID

RESPONSE

STATUS CODE - 200: Service IDs

RESPONSE MODEL - application/json

```
[ {  
  Array of object:  
    svc_id* string  
}]
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

10.3 GET /Services/{fed_id}/{svc_owner_id}/{svc_id}

Get info for a specific service in this federation

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*svc_owner_id	uuid	The service owner UUID
*svc_id	uuid	The service UUID

RESPONSE

STATUS CODE - 200: Service Info

RESPONSE MODEL - application/json

```
{  
  svc_id* string  
  svc_endpoint* string  
  svc_metadata {  
  }  
  svc_discovery_policy string  
  svc_access_policy string  
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

10.4 PUT /Services/{fed_id}/{svc_owner_id}/{svc_id}

Update the metadata, discovery policy or access policy for a service in this federation

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*svc_owner_id	uuid	The service owner UUID
*svc_id	uuid	The service UUID

REQUEST BODY - application/json

```
{
  svc_metadata {
  }
  svc_discovery_policy string
  svc_access_policy    string
}
```

REQUEST BODY - application/xml

```
{
  svc_metadata {
  }
  svc_discovery_policy string
  svc_access_policy    string
}
```

RESPONSE

STATUS CODE - 200: Service updated

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

10.5 DELETE /Services/{fed_id}/{svc_owner_id}/{svc_id}

Delete a specific service in this federation

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID
*svc_owner_id	uuid	The service owner UUID
*svc_id	uuid	The service UUID

RESPONSE

STATUS CODE - 200: Service deleted

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.

API Reference

FHS-FHS API

API Version: 0.1

This is the Fed Hosting Service-to-Fed Hosting Service API for the IEEE 2302-2021 Standard for Intercloud Interoperability and Federation (<https://standards.ieee.org/ieee/2302/7056>). This standard is based on the NIST Cloud Federation Reference Architecture (CFRA), SP 500-332, (<https://doi.org/10.6028/NIST.SP.500-332>).

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Security and Authentication

SECURITY SCHEMES

KEY	TYPE	DESCRIPTION
fhs_auth	openIdConnect	

API

1. CONNECTION

Calls to connect and disconnect Federation Service.

1.1 POST /Connect

Connect to another Fed Service.

REQUEST

REQUEST BODY - application/json

```
{
  FHS_API_endpoint*  string
  description         string
}
```

REQUEST BODY - application/xml

```
{
  FHS_API_endpoint*  string
  description         string
}
```

RESPONSE

STATUS CODE - 201: Connection established. Array of known federations returned.

RESPONSE MODEL - application/json

```
{
  connection_id*  string
  known_federations* [{
    Array of object:
    fed_id*        string
    fed_name       string
    fed_description string
  }]
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

1.2 DELETE /Connect/{connection_id}

Disconnect from another Fed Service.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*connection_id	uuid	Connection UUID

RESPONSE

STATUS CODE - 200: Connection terminated.

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

2. FEDERATION

Calls to join, manage, and leave a specific Federation Instance.

2.1 POST /JoinFederation

Join a Federation.

Join a federation at a different FHS. Sent at the request of a FedAdmin.

REQUEST

REQUEST BODY - application/json

```
{
  fed_id*           string
  member_id*        string
  member_name       string
  member_email      string
  member_description string
}
```

REQUEST BODY - application/xml

```
{
  fed_id*           string
  member_id*        string
  member_name       string
  member_email      string
  member_description string
}
```

RESPONSE

STATUS CODE - 201: Joined Federation Info: Service Catalog and Attribute Set.

RESPONSE MODEL - application/json

```
{
  svc_cat* [{
    Array of object:
    svc_id*           string
    svc_metadata {
    }
    svc_endpoint*     string
    svc_discovery_policy string
  }]
  attr_set* [{
    Array of object:
    attr_id*  string
    attr_name* string
  }]
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

2.2 PUT /UpdateFederation

Update a Federation.

Propagate federation information whenever it changes.

REQUEST

REQUEST BODY - application/json

```
{
  fed_id*      string
  svc_cat [{
    Array of object:
    svc_id*      string
    svc_metadata {
    }
    svc_endpoint* string
    svc_discovery_policy string
  }]
  attr_set [{
    Array of object:
    attr_id*     string
    attr_name*   string
  }]
}
```

REQUEST BODY - application/xml

```
{
  fed_id*      string
  svc_cat [{
    Array of object:
    svc_id*      string
    svc_metadata {
    }
    svc_endpoint* string
    svc_discovery_policy string
  }]
  attr_set [{
    Array of object:
    attr_id*     string
    attr_name*   string
  }]
}
```

RESPONSE

STATUS CODE - 200: Federation updated.

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

2.3 GET /ValidateMember

Validate a Member from another Fed Service.

The exact arguments depend on the IdP in use.

REQUEST

REQUEST BODY - application/json

```
{
  member_id* string
}
```

REQUEST BODY - application/xml

```
{
  member_id* string
}
```

RESPONSE

STATUS CODE - 200: Member validated. Allow request. Format depends on IdP in use.

RESPONSE MODEL - application/json

```
{
}
```

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Member not validated. Deny request.

2.4 DELETE /LeaveFederation/{fed_id}

Leave a Federation.

(Longer winded explanation can go here.)

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	Federation UUID

RESPONSE

STATUS CODE - 200: Federation left.

STATUS CODE - 400: Bad Request; Leave failed. Some request info may be malformed or invalid.

STATUS CODE - 401: Unauthorized; User is unauthorized to perform this operation.

3. FEDERATION MONITORING

Forwarding monitoring data for a specific federation.

3.1 POST /MonitoringData/{fed_id}

Forward monitoring data for a specific federation.

REQUEST

PATH PARAMETERS

NAME	TYPE	DESCRIPTION
*fed_id	uuid	The federation UUID

REQUEST BODY - application/json

```
{  
}
```

RESPONSE

STATUS CODE - 200: Monitoring data posted.

STATUS CODE - 400: Bad Request; Some request info was malformed or invalid.

STATUS CODE - 401: Unauthorized; Member is unauthorized to perform this operation.