AARC Authentication and Authorisation for Research and Collaboration

SaToSa Training

Training by AARC

Reti
Business & IT Consulting

Summary and Actions

✓ **Training**:

- What is SaToSa
- How to Install
- How to Configure
  - directory
  - Proxy_conf and internal_attributes
  - Saml2
  - OIDC
  - Plugins & social
- How to extend (MS)

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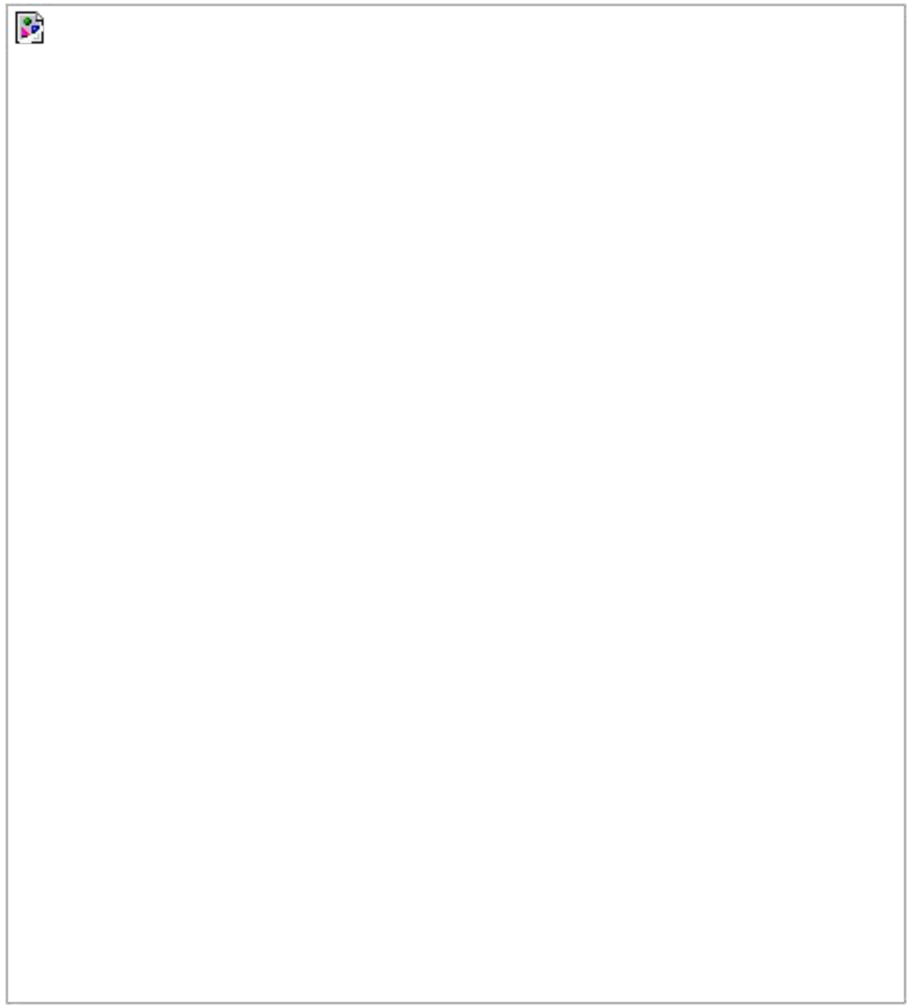
What is SaToSa

- A configurable proxy for translating between different authentication protocols
- Allows the manipulation of attributes and flows
- Based on Python3
- Easy to config

Many to one

- Many SP to a single IdP



One to many

- One
- Multiple Idp
  - Require a Discovery service

SAML2 to Social Login

- From SAML2 to Social Login
- One plugin for each social account

Translator OIDC - SAML2

SaTosa allows translation between different protocols

- OpenID Connect <-> SAML2
- SAML2 <-> OpenID Connect

Later, we will see how to do that

What is SaToSa

Authentication protocols:

- SAML2
- OpenID Connect
- OAuth2
- Social Network (Facebook, Google, OrcID…)

Use Cases

- SAML2<->SAML2
- SAML2<->Social logins
- SAML2<->OIDC
- OIDC<->SAML2

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How to install

- Two ways:
  - Docker
  - Manual installation
- Manual installation (First way)
  1. Install dependencies: apt-get install libffi-dev libssl-dev xmlsec1
  2. Download the SATOSA proxy project as a compressed archive and unpack it to <satosa_path>.
  3. Install the application: “pip install <satosa_path>”
- Manual installation (“lazy” way)
  - “Pip install satosa”
- **Docker is the recommended way of running the proxy**
  - LINK: https://hub.docker.com/r/satosa/satosa/

Docker command

Docker pull command:

Docker pull satosa/satosa

```
docker run
	-p <port on host>:<proxy_port>
	-v <host directory>:<data_dir>
	-e DATA_DIR=<data_dir>
	-e PROXY_PORT=<proxy_port>
	[-e METADATA_DIR=<metadata_dir>]
	satosa/satosa
```

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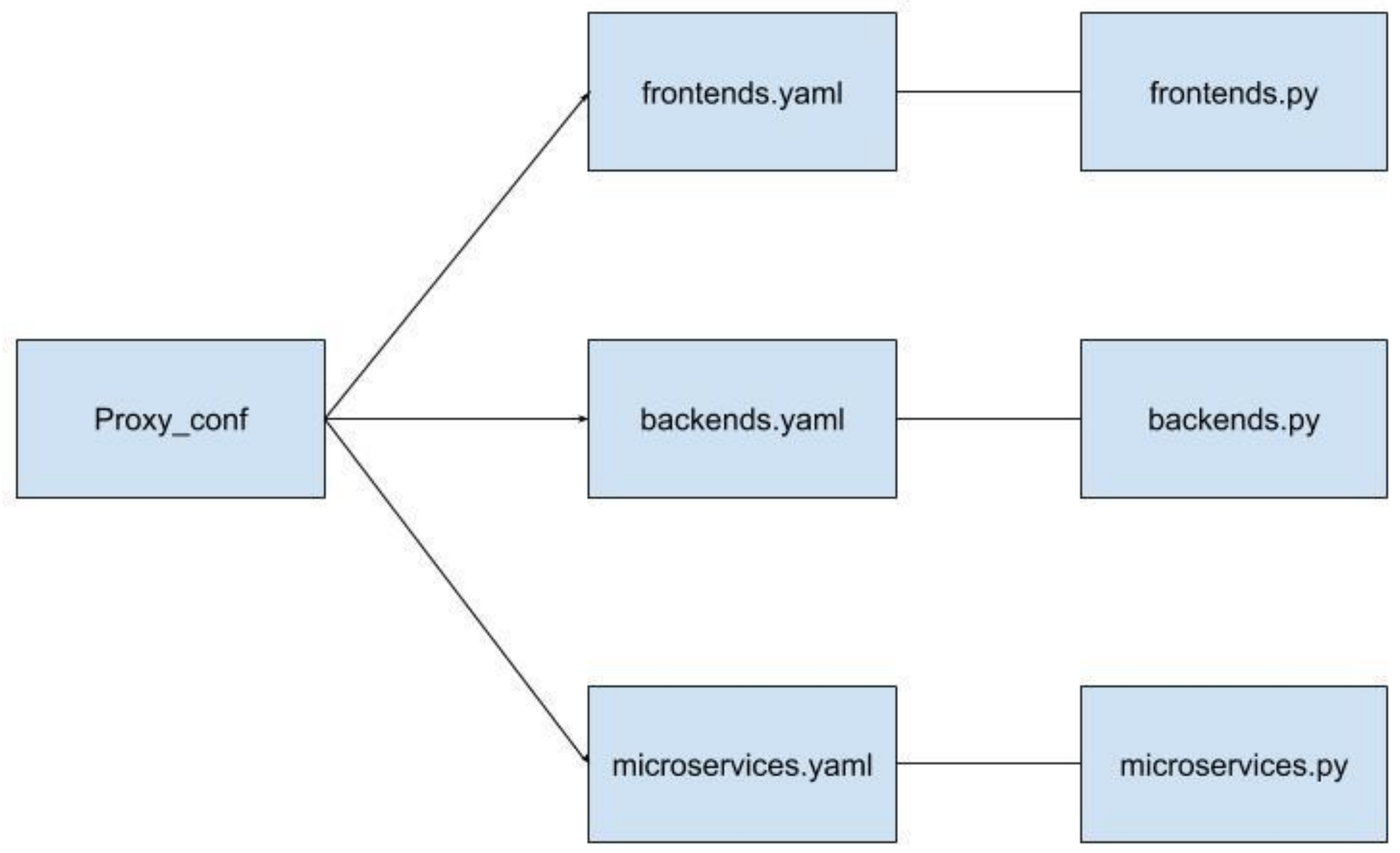
What is SaToSa / Example directory

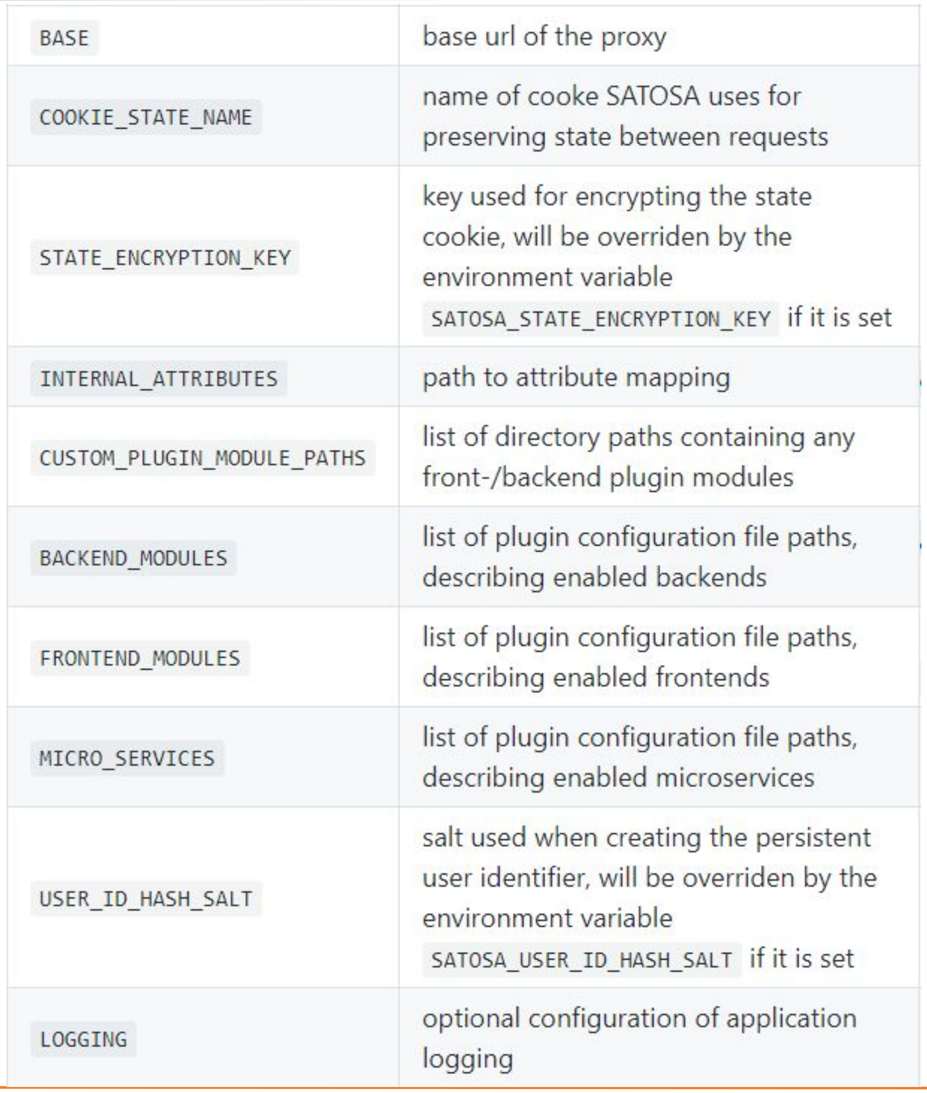
- Proxy.conf
- Internal_attributes.yaml
- plugins/
  - Backends/
    - Saml2_backends.yaml
    - Google_backends.yaml
    - Facebook_backends.yaml
    - ..._backends.yaml
  - Frontends/
    - Openid_connect_frontend.yaml
    - saml2_frontend.yaml
  - Microservices/
    - Account_linking.yaml
    - ldap_attributes.yaml

File hierarchy



Proxy_conf

- Configuration file. It points to all satosa files and modules
- Provide list of directory/file path, to enable any module
  - Frontend
  - Backend
  - Microservices
  - Plugins



`BASE`	base url of the proxy
`COOKIE_STATE_NAME`	name of cooke SATOSA uses for preserving state between requests
`STATE_ENCRYPTION_KEY`	key used for encrypting the state cookie, will be overriden by the environment variable `SATOSA_STATE_ENCRYPTION_KEY` if it is set
`INTERNAL_ATTRIBUTES`	path to attribute mapping
`CUSTOM_PLUGIN_MODULE_PATHS`	list of directory paths containing any front-/backend plugin modules
`BACKEND_MODULES`	list of plugin configuration file paths, describing enabled backends
`FRONTEND_MODULES`	list of plugin configuration file paths, describing enabled frontends
`MICRO_SERVICES`	list of plugin configuration file paths, describing enabled microservices
`USER_ID_HASH_SALT`	salt used when creating the persistent user identifier, will be overriden by the environment variable `SATOSA_USER_ID_HASH_SALT` if it is set
`LOGGING`	optional configuration of application logging

Internal Attributes

- Map every internal attributes
- Every internal attribute has a map of profiles, which in turn has a list of external attributes names which should be mapped to the internal attributes
- multiple external attributes are specified under a profile
- “User_id_from_attrs” override user identifier generated by the backend module with a list of internal attribute names
- “User_id_to_attr” store the user identifier in a specific internal attribute

```
attributes:
  mail:
    openid: [email]
    saml: [mail, emailAdress, email]
  address:
    openid: [address.formatted]
    saml: [postaladdress]
```

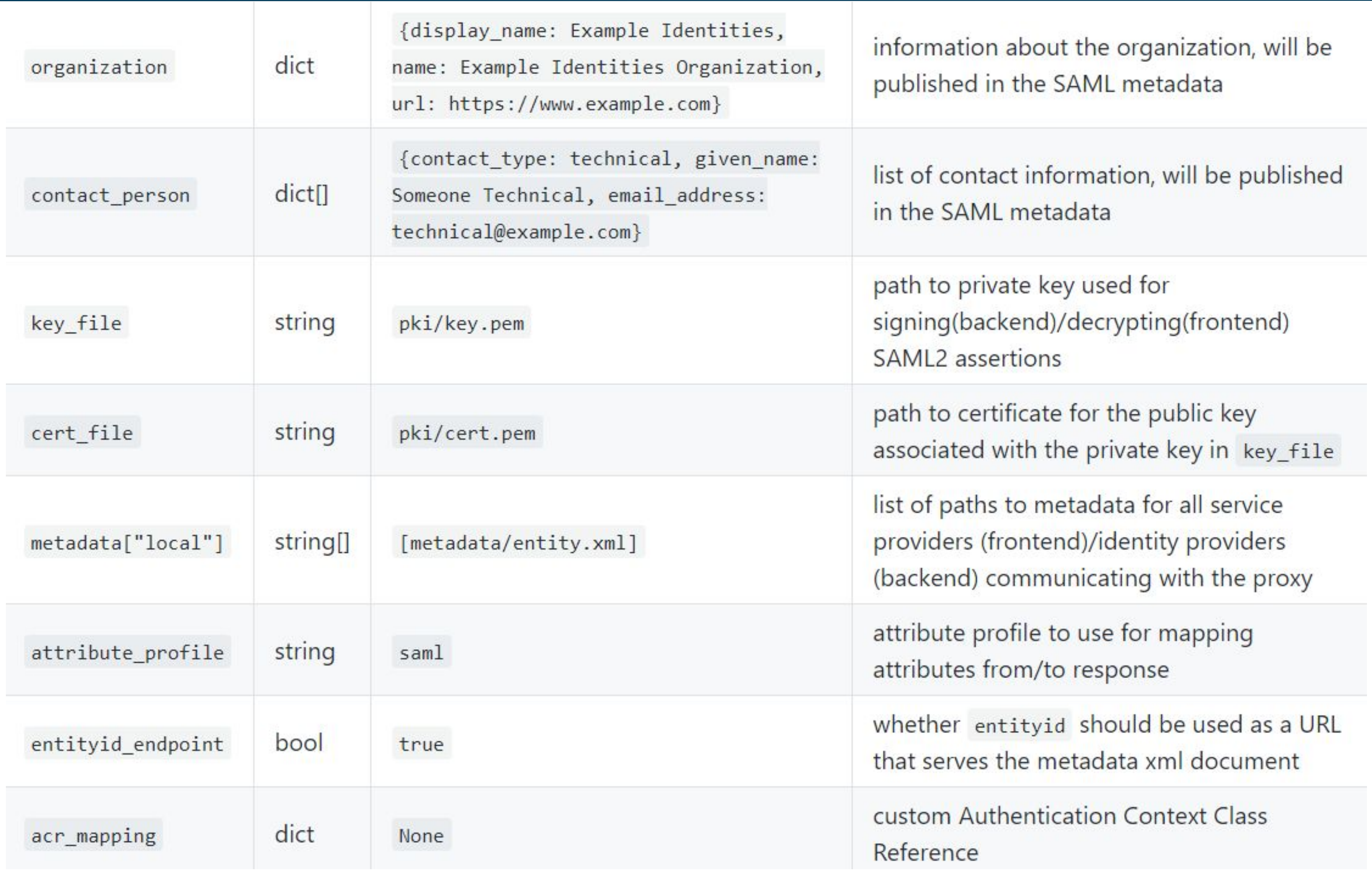
Plugins

- Divided into:
  - frontends, receiving requests from clients
  - backends, sending requests to target providers
  - Micro_services, allows the management and manipulation of attributes
- Require usually 3 parameters:
  - Module, module file path
  - Name, unique name to identify this plugin
  - Config, provide variable to make plugin work correctly
- plugins are customizable

Saml2 Plugin

- SAML2 frontend acts as a SAML Identity Provider (IdP)
  - SAML2 backend acts as a SAML Service Provider (SP), making authentication requests to SAML Identity Providers (IdP)
- The SAML2 frontend comes in 3 different flows:
  - “SAMLMirrorFrontend” module, mirrors each target provider as a separate entity in the SAML metadata
    SP -> optional discovery service -> selected proxy SAML entity -> target IdP
  - “SAMLFrontend” module, acts like a single IdP, and hides all target providers
    SP -> proxy SAML SSO location -> target IdP
- SAML frontend can also further restrict the attribute release

Saml2 Plugin\Parameters



`organization`	dict	`{display_name: Example Identities, name: Example Identities Organization, url: https://www.example.com}`	information about the organization, will be published in the SAML metadata
`contact_person`	dict[]	`{contact_type: technical, given_name: Someone Technical, email_address: technical@example.com}`	list of contact information, will be published in the SAML metadata
`key_file`	string	`pki/key.pem`	path to private key used for signing(backend)/decrypting(frontend) SAML2 assertions
`cert_file`	string	`pki/cert.pem`	path to certificate for the public key associated with the private key in `key_file`
`metadata["local"]`	string[]	`[metadata/entity.xml]`	list of paths to metadata for all service providers (frontend)/identity providers (backend) communicating with the proxy
`attribute_profile`	string	`saml`	attribute profile to use for mapping attributes from/to response
`entityid_endpoint`	bool	`true`	whether `entityid` should be used as a URL that serves the metadata xml document
`acr_mapping`	dict	`None`	custom Authentication Context Class Reference

Saml2 Frontend - Backend Plugin\Metadata

Metadata from local file:

```
        "metadata":
                local: [idp.xml]
```

Metadata from remote URL:

```
"metadata": {
        "remote":
        https://example.org/simplesaml/module.php/aggregator/ : null
}
```

Metadata from remote mdq:

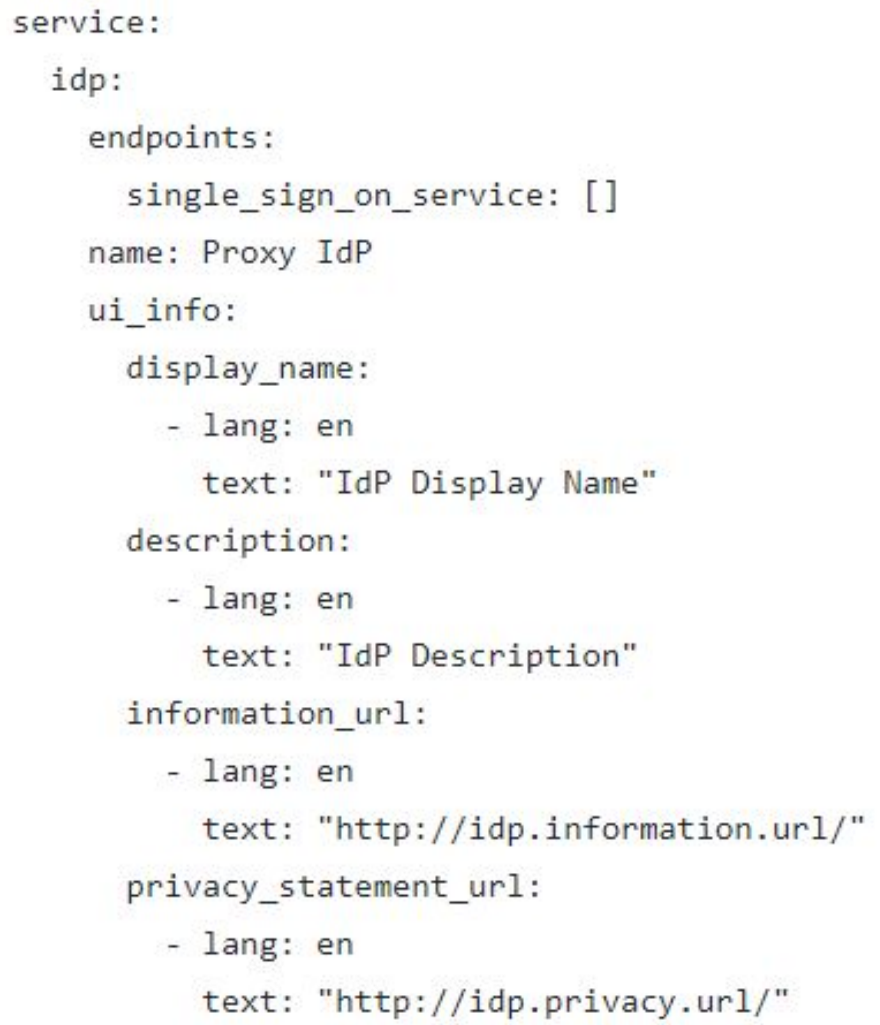
```
"metadata": {
        "mdq":
       https://example.disco.org: null
}
```

Saml2 Frontend Plugin\Example(1/3)

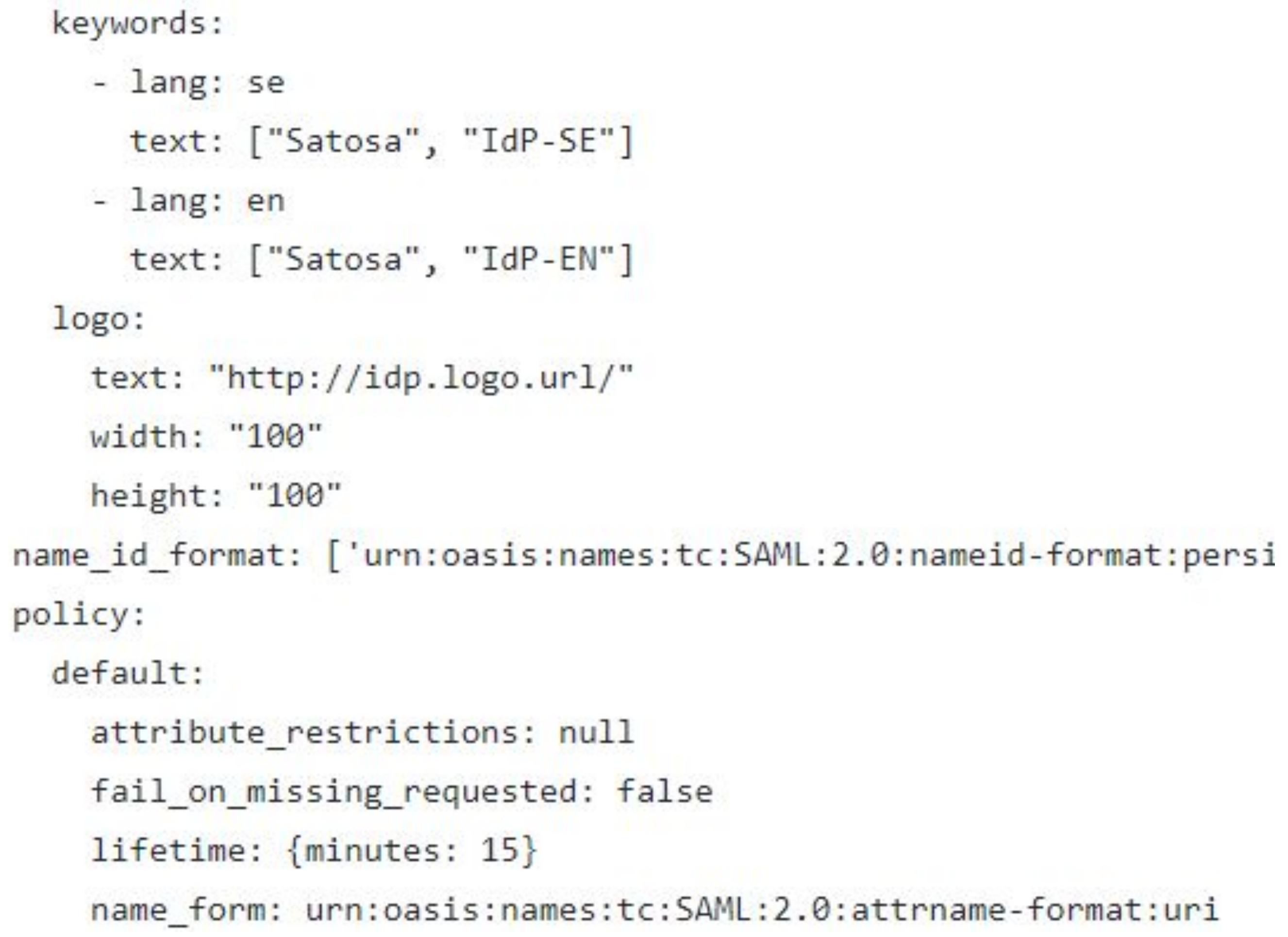
```
module: satosa.frontends.saml2.SAMLFrontend
name: Saml2IDP
config:
  idp_config:
    organization: {display_name: Example Identities, name: Example Identities Org., url: 'http://www.example.com'}
    contact_person:
    - {contact_type: technical, email_address: technical@example.com, given_name: Technical}
    - {contact_type: support, email_address: support@example.com, given_name: Support}
    key_file: frontend.key
    cert_file: frontend.crt
    metadata:
      local: [sp.xml]

    entityid: <base_url>/<name>/proxy.xml
    accepted_time_diff: 60
```

Saml2 Frontend Plugin\Example(2/3)



```
service:
  idp:
    endpoints:
      single_sign_on_service: []
    name: Proxy IdP
    ui_info:
      display_name:
        - lang: en
          text: "IdP Display Name"
      description:
        - lang: en
          text: "IdP Description"
      information_url:
        - lang: en
          text: "http://idp.information.url/"
      privacy_statement_url:
        - lang: en
          text: "http://idp.privacy.url/"
```



```
  keywords:
    - lang: se
      text: ["Satosa", "IdP-SE"]
    - lang: en
      text: ["Satosa", "IdP-EN"]
  logo:
    text: "http://idp.logo.url/"
    width: "100"
    height: "100"
name_id_format: ['urn:oasis:names:tc:SAML:2.0:nameid-format:persi
policy:
  default:
    attribute_restrictions: null
    fail_on_missing_requested: false
    lifetime: {minutes: 15}
    name_form: urn:oasis:names:tc:SAML:2.0:attrname-format:uri
```

Saml2 Frontend Plugin\Example(3/3)

```
endpoints:
  single_sign_on_service: {'urn:oasis:names:tc:SAML:2.0:bindings:HTTP-POST': sso/post,
    'urn:oasis:names:tc:SAML:2.0:bindings:HTTP-Redirect': sso/redirect}
```

Saml2 backend Plugin\Example(1/2)

```
module: satosa.backends.saml2.SAMLBackend
name: Saml2
config:
  idp_blacklist_file: /path/to/blacklist.json
  sp_config:
    key_file: backend.key
    cert_file: backend.crt
    organization: {display_name: Example Identities, name: Example Identities Org., url: 'http://www.example.com'}
    contact_person:
    - {contact_type: technical, email_address: technical@example.com, given_name: Technical}
    - {contact_type: support, email_address: support@example.com, given_name: Support}

    metadata:
      local: [idp.xml]

    entityid: <base_url>/<name>/proxy_saml2_backend.xml
    accepted_time_diff: 60
```

Saml2 backend Plugin\Example(2/2)

```
service:
  sp:
    ui_info:
      display_name:
        - lang: en
          text: "SP Display Name"
      description:
        - lang: en
          text: "SP Description"
      information_url:
        - lang: en
          text: "http://sp.information.url/"
      privacy_statement_url:
        - lang: en
          text: "http://sp.privacy.url/"
      keywords:
        - lang: se
          text: ["Satosa", "SP-SE"]
        - lang: en
          text: ["Satosa", "SP-EN"]
```

```
        logo:
          text: "http://sp.logo.url/"
          width: "100"
          height: "100"
      want_response_signed: true
      allow_unsolicited: true
      endpoints:
        assertion_consumer_service:
        - [<base_url>/<name>/acs/post, 'urn:oasis:names:tc:SAML:2.0:bindings:HTTP-POST']
        - [<base_url>/<name>/acs/redirect, 'urn:oasis:names:tc:SAML:2.0:bindings:HTTP-Redirect']
        discovery_response:
        - [<base_url>/<name>/disco, 'urn:oasis:names:tc:SAML:profiles:SSO:idp-discovery-protocol']
      name_id_format: 'urn:oasis:names:tc:SAML:2.0:nameid-format:transient'
# disco_srv must be defined if there is more than one IdP in the metadata specified above
disco_srv: http://disco.example.com
```

OIDC Plugin

- OpenID Connect backend acts as an OpenID Connect Relying Party (RP), making authentication requests to OpenID Connect Provider (OP)
  - supports discovery and dynamic client registration
- OpenID Connect frontend acts as and OpenID Connect Provider (OP), accepting requests from OpenID Connect Relying Parties (RPs).
  - this plugin is NOT stateless

OpenID Frontend\Example

```
module: satosa.frontends.openid_connect.OpenIDConnectFrontend
name: OIDC
config:
  signing_key_path: frontend.key
  db_uri: mongodb://db.example.com # optional: only support MongoDB, will default to in-memory storage if not specified
  client_db_path: /path/to/your/cdb.json
  provider:
    client_registration_supported: Yes
    response_types_supported: ["code", "id_token token"]
    subject_types_supported: ["pairwise"]
    scopes_supported: ["openid", "email"]
```

OpenID Backend\Example

```
module: satosa.backends.openid_connect.OpenIDConnectBackend
name: openid_connect
config:
  provider_metadata:
    issuer: https://op.example.com
  client:
    auth_req_params:
      response_type: code
      scope: [openid, profile, email, address, phone]
    client_metadata:
      application_name: SATOSA
      application_type: web
      contacts: [ops@example.com]
      redirect_uris: [<base_url>/<name>]
      subject_type: public
```

```
entity_info:
  contact_person:
    - contact_type: "technical"
      email_address: ["technical_test@example.com", "support_test@example.com"]
      given_name: "Test"
      sur_name: "OP"
    - contact_type: "support"
      email_address: ["support_test@example.com"]
      given_name: "Support_test"
  organization:
    display_name:
    - ["OP Identities", "en"]
    name:
    - ["En test-OP", "se"]
    - ["A test OP", "en"]
    url:
    - ["http://www.example.com", "en"]
    - ["http://www.example.se", "se"]
  ui_info:
    description:
    - ["This is a test OP", "en"]
    display_name:
    - ["OP - TEST", "en"]
```

Social login

- Social login plugins can be used as backends for the proxy, allowing the proxy to act as a client to the social login services.
- Available social:
  - Google
  - Facebook
  - Github
  - Linkedin
  - OrcID
  - Oauth

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Micro services

- Micro services allow additional behaviour, configured inside proxy.
- Two different types of micro services:
  - request micro services, which are applied to the incoming request
  - response micro services, which are applied to the incoming response from the target provider.
- Bundled micro services in SaToSa:
  - AddStaticAttributes
  - FilterAttributeValues
  - DecideBackendByRequester
  - DecideIfRequesterIsAllowed
  - Account linking
  - User consent management
  - LDAP attribute store

Custom plugins

- It's possible to write custom plugins which can be loaded by SaToSa
- Depending on which type of plugin it is, it has to inherit from the correct base class and implement the specified methods:
  - Frontends must inherit satosa.frontends.base.FrontendModule
  - Backends must inherit satosa.backends.base.BackendModule
  - Request micro services must inherit satosa.micro_services.base.RequestMicroService
  - Response micro services must inherit satosa.micro_services.base.ResponseMicroService

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Generate metadata

- Proxy metadata is generated based on the front-/backend plugins listed in proxy_conf.yaml using the *satosa-saml-metadata*
    - installed globally by SATOSA installation
- *satosa-saml-metadata <path to proxy_conf.yaml> <path to key for signing> <path to cert for signing>*

Running proxy application

- SATOSA proxy is a Python WSGI application and so it requires to be run using any WSGI compliant web server.
- Different solutions:
  - Using Gunicorn
  - Using Apache HTTP Server and mod_wsgi

Gunicorn

- Python WSGI HTTP Server for UNIX
- Often proxied by a full featured general purpose web server(Nginx or Apache) for:
  - to help buffer slow clients
  - To enable more sophisticated error page rendering
  - To handle SSL sessions
- Start with the following command:
  - `gunicorn -b<socket address> satosa.wsgi:app --keyfile=<https key> --certfile=<https cert>`

Apache HTTP Server and mod_wsgi

- Full guide available at the following link:
  - https://github.com/IdentityPython/SATOSA/blob/master/doc/mod_wsgi.md

Thank you

Any Questions?

https://aarc-project.eu

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