EUROPEAN COMMISSION
Directorate-General for Communications Networks, Content and Technology

CNECT.E – Future Networks
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Horizon Europe (HORIZON)

D2.2 Software Release Beta Environment – Epics and User Stories

COVER PAGE

PROJECT *Grant Preparation (General Information screen) — Enter the info.*	
Project number:	101136078
Project name:	Fediversity
Project acronym:	Fediversity
Call:	HORIZON-CL4-2023-HUMAN-01-CNECT
Topic:	HORIZON-CL4-2023-HUMAN-01-12
Type of action:	HORIZON-IA
Service:	CNECT/E/03
Project starting date:	fixed date: 1 December 2023
Project duration:	36 months

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c. Implement the collaboration between the **Orchestrator** architectural component and the **Virtualization** architectural group of components.
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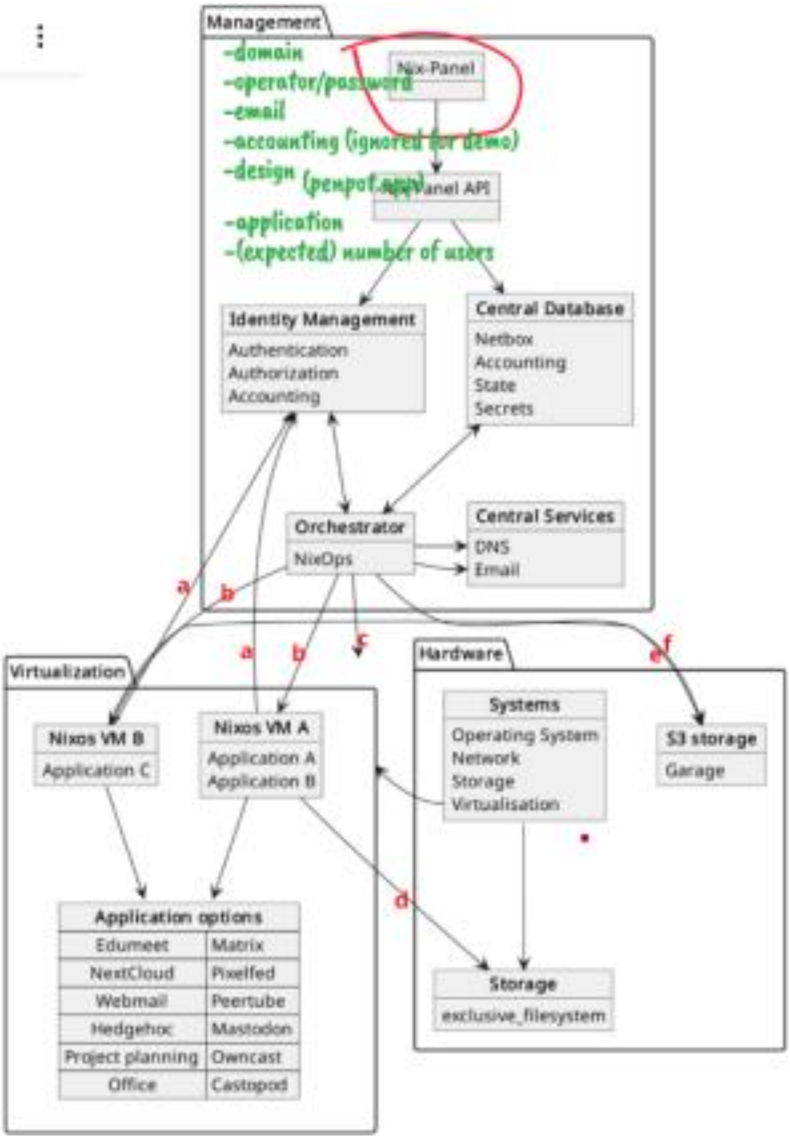
e. Implement the collaboration between the **Virtualization** and the **S3 storage** architectural components.
f. Implement the collaboration between the **Orchestrator** and the **S3 storage** architectural components.



Application options	
Edumeet	Matrix
NextCloud	Pixelfed
Webmail	Peertube
Hedgehoc	Mastodon
Project planning	Owncast
Office	Castopod

Epics details

1. Implement the collaboration between the **Nixos VM** and the **Identity Management** architectural components.

It means we can create an admin account for the services, and configurations can get this information from the hosting provider’s databases.

It is not within the scope of the April MVP because the Identity Management architectural component is not included there.

2. Implement the collaboration between the **Orchestrator** and the **Nixos VM** architectural components.

We can deploy NixOS configurations onto existing VMs.

This comprises several layers:

1. The deployment software must know how to do this. This is the perimeter of NixOps4 (by Robert Hensing), which already works well in this situation.
2. We know how to inform NixOps4 about what it should be doing and what basic configurations to write for the provided VMs. In the past months (particularly with the demo in November), we have shown that we know how to do both.
3. We have well-working multi-machine configurations of Fediverse services. However, this point needs more work. We are only at the proof-of-concept level, and the multi-machine handling is still relatively poor (we are currently working on it).

3. Implement the collaboration between the **Orchestrator** architectural component and the **Virtualization** architectural group of components.

This epic is not Tweag, a Modus Create company's responsibility, but of OID.

We want to provision VMs based on a declarative configuration, which is impossible now. NixOps4 does not have a Proxmox provider. Proxmox is the software Procolix runs to provision and manages VMs; a provider is NixOps4's way of interacting with the real world. Tweag has already done some work in that direction since it was needed for testing, and we can use it for the April MVP.

In the Fediversity refinement session deliverable two from Thursday, February 13, we established that we would not expect anything of this component interaction by April and would use pre-deployed VMs as a temporary workaround.

4. Implement the collaboration between the **Nixos VM** and the **Storage** architectural components.

This epic is not the responsibility of Tweag, a Modus Create company, but of OID in collaboration with NixOps.

It means that whoever handles the hardware (ProcoliX, in our case) needs to provide shared storage for the VMs. ProcoliX already does that, we think, the so-called "Linstor storage."

We don't think there is much to do on our end.

5. Implement the collaboration between the Virtualization and the S3 storage architectural components.

The Fediverse services rely on external S3 storage for large objects (e.g., pictures, videos, etc.)

This is the case for the three services we have worked on. It can sometimes be clunky, mainly because it currently relies on a Garage instance on the same machine as the service.

We'll separate the service machines from the S3 machines and will have that done before April.

6. Implement the collaboration between the **Orchestrator** and the **S3 storage** architectural components.

It is unclear to us what this is. It could be two things:

1. The orchestrator knows how to inform the external S3 storage of the new bucket creation.
2. We can deploy resilient S3 storage from the orchestrator, and this is between the Orchestrator and the OID partner team members.

In Case 1.: Do we ask the hosting provider (e.g., Procolix) to provide one big S3 storage (e.g., Garage) that all the operators will share, or do we only ask the hosting provider to provide disk space, and we spin up an S3 cluster as part of all the VMs that we deploy?

MVP since we can already deploy Garage as part of our experiments.

This is closer to the second option specified above, and there are **two main limitations**:

- It is not **resilient and robust**, but we are discussing a prototype, not a final product.
- For now, it **is deployed on the same machine as the servic**e, which is quite a limitation. **This is a work in progress.**

Epics, User Stories, and Tasks

Epic 1: Implement the collaboration between the Nixos VM and the Identity Management architectural components.

1. **User Story 1.1: #160 [stretch goal for April MVP]** As an operator, I want an admin account for all the services I deploy created automatically (where it makes sense).

   - **Test:**
     - Given I have an operator account in FediPanel
     - When I make a deployment
     - Then, I can access all deployed services with my admin account credentials
   - Tasks:
     - Wire up passing credentials from FediPanel to each service configuration (one task per service) (estimate: 1 day per service)
     - Write a test that validates credentials are indeed valid (one task per service) (estimate: 2 days per service)

2. **User Story 1.2: #161 [not in April MVP]** As an operator, I want to connect my existing Identity Management service with the Fediversity deployment system.

   - **Test:**
     - Given I have an existing Identity Management service (TBD specify a protocol, e.g., LDAP)
     - When I submit its connection parameters to the Fediversity deployment system and run a deployment
     - Then, all existing users and permissions are mapped to deployed services and synced automatically.

Epic 2: Implement the collaboration between the Orchestrator and the Nixos VM architectural components.

1. **User Story 2.1: #76 [Not Tweag's responsibility]**

   - **Story:** As an operator, I want to deploy my initial specified configuration on the hosting provider's VMs.
   - **Test:**
   - Given I have a configuration in the FediPanel but no deployment yet
   - When I run the deployment
   - Then, all configured services are accessible under the specified domain.
   - Tasks:
     - Trigger the orchestrator from the FediPanel (estimate: 1 day)

    - Pass configuration parameters from the FediPanel to the orchestrator (estimate: 1-3 days)
    - Design and implement progress indicator interface to the orchestrator (TBD: how do we capture state from NixOps4?) (estimate: 3 days)

2. **User Story 2.2:** #158 [Not for April MVP] As an operator, I want to be able to update my deployed configuration
    - **Test:**
        - Given I have an existing deployment
        - When I change my configuration in the FediPanel and run the deployment
        - Then, all configured services are accessible in the new configuration
    - Tasks:
        - **NixOps4: Support stateful deployment ???**
        - **Ensure services support configuration changes (estimate: 14 days per service)**

3. User Story 2.3: #159 [not for April MVP] As a hosting provider, I want to be able to update my operators' deployment when needed.
    - Test:
        - Given I have global configuration updates (e.g., rekeying, security updates, university updates) that affect all operators
        - When I request a re-deployment of all my operators' configurations
        - Then, each operator is notified and provided with a means to specify a maintenance shutdown period during which their configuration will be automatically re-deployed

Epic 3: Implement the collaboration between the Orchestrator architectural component and the Virtualization architectural group of components. [not Tweag', a Modus Create company, responsibility]

1. User Story 3.1:
    - **Story:** As a hosting provider, I want my operator's deployment to provision their VMs automatically
    - **Test:**
    - Given my operator has a configuration in FediPanel but no deployment yet
    - When they run the deployment
    - Then, the necessary VMs are provisioned within specified resource constraints

2. User Story 3.2:
    - **Story:** As a hosting provider, I want my operator's configuration changes to remove existing VMs or provision new VMs automatically
    - **Test:**
    - Given my operator has an existing deployment

- When they change their configuration in the FediPanel and run the deployment
- Then, the state of the virtualization component is updated according to (e.g., removing VMs, provisioning VMs, changing VM parameters)

3. User Story 3.3:

- Story: As a hosting provider, I want to be able to update my operators' virtualization parameters when needed.
- Test:
- Given I have global virtualization updates (e.g., Fediversity update, resource constraints update)
- When I request a re-deployment of all my operators' configurations
- Then, each operator is notified and provided with a means to specify a maintenance shutdown period during which the state of their virtualization component will be automatically updated

Epic 4: Implement the collaboration between the Nixos VM and the Storage architectural components.[not Tweag's responsibility]

All the VMs have virtual storage backed by concrete shared storage. We don't know if this will need any configuration from the hosting provider, an update in configuration, etc., and we don't know if there are any related hosting provider user stories.

In any case, not Tweag.

1. User Story 4.1:

- Story: As a hardware manager, I want to provide shared storage for the VMs so that the VMs can access the necessary storage resources.
- Test:
- Given I am a hardware manager
- When I provide shared storage for the VMs
- Then, the VMs should access the necessary storage resources

2. User Story 4.2:

- Story: As a developer, I want to ensure that the storage provided by Procolix (Linstor storage) is integrated with Nixos VM to make the storage system functional.
- Test:
- Given I am a developer
- When I ensure the storage provided by Procolix (Linstor storage) is integrated with Nixos VM
- Then, the storage system should be functional.

Epic 5: Implement the collaboration between the Virtualization and the S3 storage architectural components.

1. User Story 5.1: [not for April MVP]

- **Story:** As a hosting provider, I want my operator's deployment to hook up to existing S3 buckets as needed for each service (TBD exact services)
- **Test:**
- Given I have pre-configured S3 buckets for my operators
- When an operator triggers a deployment
- Then, their services will use the pre-configured buckets
- Tasks:

1. Accept S3 bucket parameters in the configuration of a service. (done as part of #173)

Epic 6: Implement the collaboration between the Orchestrator and the S3 storage architectural components. [not Tweag's responsibility]

1. User Story 6.1: [not for April MVP]

- **Story:** As an operator, I want to have the option to keep or delete associated data when turning off a service
- **Test:**
- Given I have a deployed service using S3 storage
- When I turn off the service using FediPanel
- Then, there is an option to select retention or deletion of data that will be realized on deployment

2. User Story 6.2: [not for April MVP]

- **Story:** As a hosting provider, I want the S3 buckets necessary for my operators' services to be created automatically
- **Test:**
- Given my operator has a configuration in the FediPanel
- When my operator runs a deployment
- Then, the S3 buckets necessary for their selected services are created automatically

3. User Story 6.3: [not for April MVP]

- **Story:** As a hosting provider, if my operator deletes their account, I want all their resources to be removed
- **Test:**
- Given my operator has some deployment going
- When they remove their account on the FediPanel
- Then, all their resources (S3 buckets, VMs, DNS entries, e-mails, accounting documents, logs, etc.) will be removed as needed or possible (e.g., accounting documents might need to be kept for a while)

Epic 7: Implement the cluster configurator and its collaboration with the orchestrator

1. User Story 7.1:

- **Story:** As a hosting provider, I want my operator’s high-level configuration to be passed to the cluster configurator
- **Test:**

  Given my operator has a high-level configuration in the FediPanel

  When they run a deployment

  Then, their high-level configuration is passed down to the cluster configurator.
- **Tasks:**
  1. **Write a set of module options that can be consumed from the FediPanel via a simple JSON. (estimate: 4 days)**

2. **User Story 7.2:**
   - **Story:** As a hosting provider, I want my operator’s high-level configuration converted into a precise one, down to the resource.
   - **Test:**

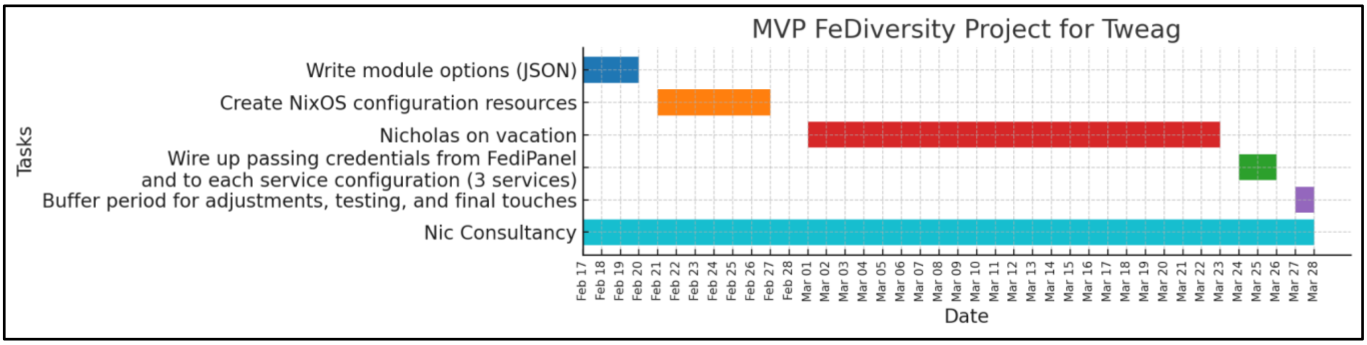
     Given my operator has a high-level configuration in the FediPanel

     When they run a deployment

     Then, their high-level configuration gets converted into a granular one by the cluster configurator
   - **Tasks:**
     - i. Create DNS entry resources from the high-level configuration [blocked on a NixOps4 provider for that type of resources] (estimate: 5 days; not for April MVP)
     - ii. Create e-mail resources from the high-level configuration [blocked on a NixOps4 provider for that type of resources] (estimate: 5 days; not for April MVP)
     - iii. Create S3 bucket resources from the high-level configuration [blocked on a NixOps4 provider for that type of resources] (estimate: 5 days; not for April MVP)
     - iv. Create SSH key resources from the high-level configuration [blocked on a NixOps4 provider for that type of resources] (estimate: 5 days; not for April MVP)
     - v. Create VM resources from the high-level configuration [blocked on a NixOps4 provider for that type of resources] (estimate: 5 days; not for April MVP)
     - vi. **Create NixOS configuration resources from the high-level configuration (estimate: 5 days)**
     - vii. …

Planning of the first Most Viable Prototype - April 2025, Tweag Team

Task Description	Start Date	End Date	Duration (Days)
Write module options (JSON)	Feb 17, 2025	Feb 20, 2025	4
Create NixOS configuration resources	Feb 21, 2025	Feb 27, 2025	5
Nicholas on vacation	Mar 1, 2025	Mar 23, 2025	15
Wire up passing credentials from FediPanel to each service configuration (3 services)	Mar 24, 2025	Mar 26, 2025	3
Buffer period for adjustments, testing, and final touches	Mar 27, 2025	Mar 28, 2025	2
Nix technology consulting on specification, analysis, design, testing, integration, deployment, quality assurance, and implementation.	Feb 17, 2025	Mar 28, 2025	29


MVP FeDiversity Project for Tweag
Tasks
Write module options (JSON)
Create NixOS configuration resources
Nicholas on vacation
Wire up passing credentials from FediPanel
and to each service configuration (3 services)
Buffer period for adjustments, testing, and final touches
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