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Knight Foundation School of Computing and Information Sciences

Software Engineering Focus

Final Deliverable

NextAD: Profile Management Integration App

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Abstract

This document outlines the development of the NextCloud integration app: NextAD. NextAD is an app that uses LDAP protocol communication to interact with Microsoft's Active Directory service. We discuss the requirement gatherings, development process, testing, and final stages of the app throughout this piece. The Scrum workflow and user stories are also included to provide a general timeline of how long it took to conceive the application. The technologies and languages used are also mentioned.

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INTRODUCTION

Welcome to NextAD, a revolutionary application designed to seamlessly integrate with NextCloud, addressing the critical need for advanced interaction with Active Directory (AD) servers. In the contemporary digital workspace, Active Directory has become a cornerstone for user management, housing critical information and various user attributes. However, a notable gap exists in the NextCloud environment - the lack of robust applications capable of delving deeper into Active Directory functionalities beyond the basic connection setup.

Recognizing this gap and the escalating number of users relying on Active Directory, we developed NextAD. This application is not just about establishing a connection with Active Directory; it's about enhancing the way you interact with it. NextAD is engineered to sync effortlessly with a user's attribute editor within Active Directory, enabling not just a preview of these attributes but also their modification, all from within the familiar confines of NextCloud.

At the heart of NextAD is the goal to simplify and streamline the interaction between NextCloud and Active Directory. By leveraging the LDAP (Lightweight Directory Access Protocol) protocol, NextAD creates a user-friendly interface, making the management of AD attributes more intuitive and accessible. This integration empowers administrators and users alike, offering a more dynamic and responsive experience in managing user data and configurations.

Through NextAD, we aim to transform how Active Directory is utilized within NextCloud, ensuring a more efficient, seamless, and integrated user experience. Whether you are looking to preview, update, or manage Active Directory configurations, NextAD stands as your go-to solution, bridging the gap and bringing a new level of functionality and ease to your NextCloud environment.

Current System

The current iteration of NextAD, integrated within the NextCloud platform, introduces a suite of functionalities designed to enhance the interaction with Active Directory (AD). This version has been developed with a focus on user-friendliness and real-time data management, ensuring that users and administrators can efficiently manage AD attributes within NextCloud. Below is an overview of the key functionalities currently available in NextAD:

1. Automatic Active Directory User Recognition

By User ID (UID): NextAD is equipped with the capability to automatically recognize users based on the User ID (UID) of the logged-in account. This feature streamlines the process of user

identification, negating the need for manual entry or verification, thereby enhancing both security and convenience.

2. Preview of Active Directory User Attributes

Request-Based Preview: Users have the ability to request previews of Active Directory user attributes. This function allows for a thorough review of attribute settings, enabling users to verify and understand current configurations before making any changes. It serves as a critical step in ensuring data accuracy and integrity.

3. Real-Time Modification of Active Directory Attributes

User-Centric Attribute Management: NextAD empowers users to modify Active Directory attributes in real-time. This dynamic feature facilitates immediate updates and changes, reflecting the evolving needs of users and administrators. The real-time aspect ensures that changes are promptly applied, keeping user data current and relevant.

4. Reset Functionality for Attribute Settings

Wipe Clean Before Confirmation: A notable safety feature of NextAD is the ability to wipe clean all attribute settings before they are confirmed in Active Directory. This functionality acts as a safeguard, allowing users to revert changes if needed, ensuring that only fully reviewed and intended modifications are applied to the Active Directory.

Purpose of New System

The current iteration of NextAD, integrated within the NextCloud platform, introduces a suite of functionalities designed to enhance the interaction with Active Directory (AD). This version has been developed with a focus on user-friendliness and real-time data management, ensuring that users and administrators can efficiently manage AD attributes within NextCloud. Below is an overview of the key functionalities currently available in NextAD:

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USER STORIES

The following section provides the detailed user stories that were implemented in this iteration of the project. These user stories served as the basis for the implementation of the project's features. This section also shows the user stories that are to be considered for future development.

Implemented User Stories

- Setup a local NextCloud server with Docker
- Create a Local Active Directory Server
- Populate the Active Directory server with test users
- Establish a connection through LDAP in the NextCloud Admin Settings
- Develop the front end of the NextAD app including text fields and button
- Use LDAPProvider class to get a connection inside the NextAD app
- Define the index and API routes for the NextAD application
- Register the controller and LDAPService class inside NextAD
- Create the GET API route in the page controller class and fetch contents
- Implement the PUT API route inside the PageController using ILogger and fetch contents
- Design a wipe button to remove any attribute inputs before submitting them to AD
- Fetch user ID (UID) in NextAD dynamically using the user's current session

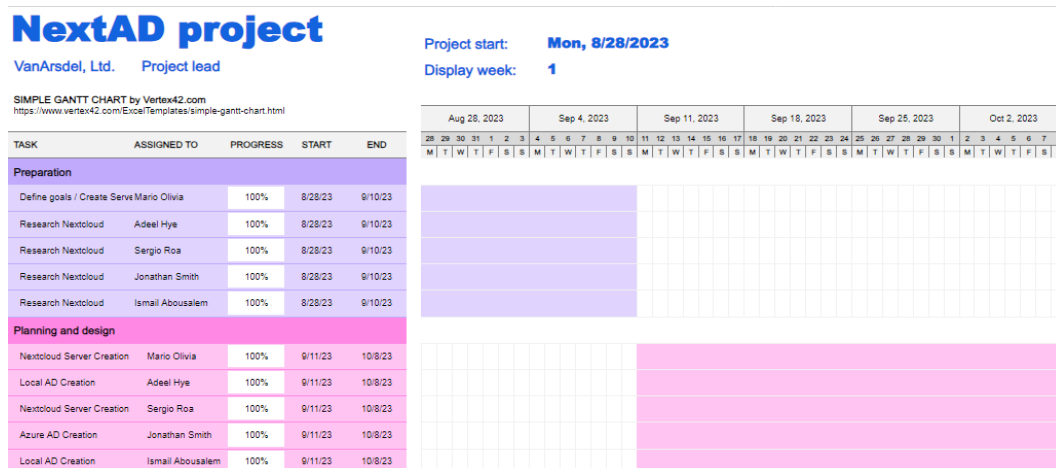
Pending User Stories

- Establish an Active Directory connection inside a remote-based Azure virtual machine

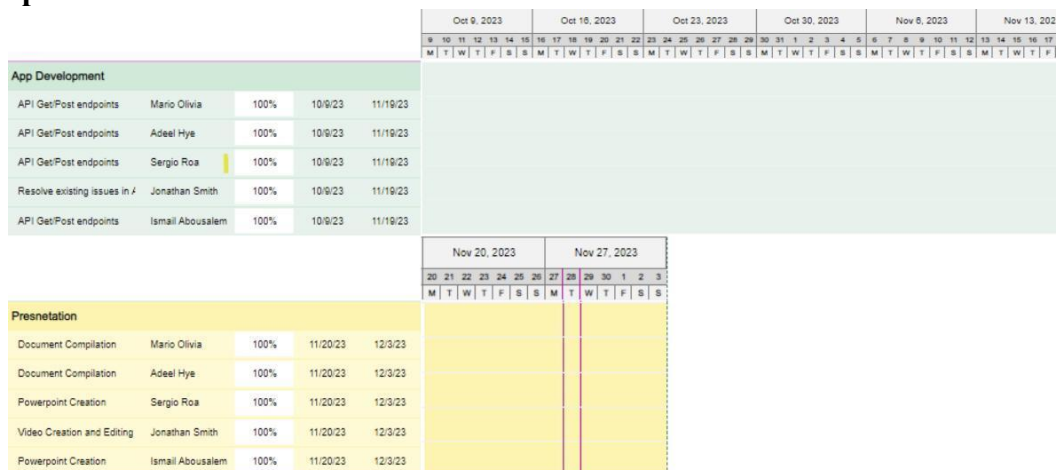
PROJECT PLAN

This section describes the planning that went into the realization of this project. This project incorporated the agile development techniques and as such required the sprints to be planned. These sprint plannings are detailed in the section. This section also describes the components, both software and hardware, chosen for this project.

Sprints 1 - 3:



Sprints 4 - 6:



Hardware and Software Resources

The following is a list of all hardware and software resources that were used in this project:

1. **Computer / PC:** We needed a laptop or desktop computer to set up our NextCloud environment in Docker and do all of our development for the NextAD.
2. **Linux or a Docker-based Snapshot:** To set up a NextCloud server and do any development, we needed to use the Linux operating system. Most of our group members worked with the MacOS or Windows system, and therefore needed to create a Docker environment with a Linux snapshot that could be used to run NextCloud. We then used a Docker Compose file to get the NextCloud server and database hosted
3. **Virtual Machine:** We needed a local virtual machine running Windows server to setup an Active Directory Service Manager server. We used an Oracle VirtualBox to setup machine's servers and pinged its IP inside the command line to test connectivity.
4. **Code Editor:** After creating the outline for the app within NextCloud's app installation interface, we needed to access a code editor, such as Visual Studio Code, to start developing the frontend and backend of the NextAD application. We moved the app's content inside the 'apps' folder in NextCloud and opened each of the application's files inside a code editor to begin development.

Sprints Plan

Sprint 1

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye

Start time: 10:30AM

End time: 11:00AM

After discussion, the velocity of the team was estimated to be 3 hours for each daily scrum.

The product owner chose the following user stories to be done during the next sprint. They are ordered based on their priority.

- #1: Get Familiar with NextCloud's interface

- #2: Look into past NextCloud open source projects for inspiration
- #3: Start setting up development environment with NextCloud

The team members indicated their willingness to work on the following user stories.

- Mario Oliva
 - User story #1: Get Familiar with NextCloud's interface
 - User story #2: Look into past NextCloud open source projects for inspiration
 - User story #3: Start setting up development environment with NextCloud
- Adeel Hye
 - User story #1: Get Familiar with NextCloud's interface
 - User story #2: Look into past NextCloud open source projects for inspiration
 - User story #3: Start setting up development environment with NextCloud
- Jonathan Smith
 - User story #1: Get Familiar with NextCloud's interface
 - User story #2: Look into past NextCloud open source projects for inspiration
 - User story #3: Start setting up development environment with NextCloud

Sprint 2

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye

Start time: 10:30AM

End time: 11:00AM

After discussion, the velocity of the team was estimated to be 3 hours for each daily scrum.

The product owner chose the following user stories to be done during the next sprint. They are ordered based on their priority.

- #1: Clone existing NextCloud repository
- #2: Integrate Azure inside NextCloud app
- #3: Integrate Office 365 in NextCloud app
- #4: Integrate Active Directory in NextCloud

The team members indicated their willingness to work on the following user stories.

- Mario Oliva
 - User story #1: Clone Existing NextCloud repository
 - User story #2: Integrate Azure inside NextCloud app
 - User story #3: Integrate Office 365 in NextCloud app

- Adeel Hye
 - #1: Clone existing NextCloud repository
 - #2: Integrate Azure inside NextCloud app
 - #3: Integrate Office 365 in NextCloud app
 - #4: Integrate Active Directory in NextCloud
- Jonathan Smith
 - #1: Clone existing NextCloud repository
 - #2: Integrate Azure inside NextCloud app
 - #3: Integrate Office 365 in NextCloud app
 - #4: Integrate Active Directory in NextCloud

Sprint 3

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye

Start time: 10:30AM

End time: 11:00AM

After discussion, the velocity of the team was estimated to be 3 hours for each daily scrum.

The product owner chose the following user stories to be done during the next sprint. They are ordered based on their priority.

- #1: Have all members sign in to NextCloud locally using admin privileges (5 pts)
- #2: Upload NextCloud repository with latest code changes to GitHub for server access (3pts)
- #3: Integrate an Office 365 version provided in the NextCloud store (8pts)
- #4: Integrate a specific Azure service to work in NextCloud
- #5: Integrate Microsoft AD to work with authenticating Office 365 usage

The team members indicated their willingness to work on the following user stories.

- Mario Oliva
 - User story #1: Have all members sign in to NextCloud locally using admin privileges (5pts)
 - User story #2: Upload NextCloud repository with latest code changes to GitHub for server access (3 pts)
 - User story #3: Integrate an Office 365 version provided in the NextCloud store NextCloud's interface (8 pts)

- Adeel Hye
 - #1: Have all members sign in to NextCloud locally using admin privileges
 - #4: Integrate a specific Azure service to work in NextCloud
 - #5: Integrate Microsoft AD to work with authenticating Office 365 usage
- Jonathan Smith
 - #1: Have all members sign in to NextCloud locally using admin privileges
 - #3: Integrate an Office 365 version provided in the NextCloud store
 - #5: Integrate Microsoft AD to work with authenticating Office 365 usage

Sprint 4

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye

Start time: 10:30AM

End time: 11:00AM

After discussion, the velocity of the team was estimated to be 3 hours for each daily scrum.

The product owner chose the following user stories to be done during the next sprint. They are ordered based on their priority.

- #1: Upload NextCloud repository with latest code changes to GitHub for server access
- #2: Integrate an Office 365 version provided in the NextCloud store
- #3: Provide authentication layer to use Microsoft Office account instance inside app integration
- #4: Establish an NGINX reverse proxy to access OnlyOffice and Collabora servers through NextCloud
- #5: Establish LDAP Domain Controller service
- #6: Integrate a specific Azure service to work in NextCloud

The team members indicated their willingness to work on the following user stories.

- Mario Oliva
 - #1: Upload NextCloud repository with latest code changes to GitHub for server access
 - #2: Integrate an Office 365 version provided in the NextCloud store
 - #3: Provide authentication layer to use Microsoft Office account instance inside app integration

- #4: Establish an NGINX reverse proxy to access OnlyOffice and Collabora servers through NextCloud
- Adeel Hye
 - #4: Establish an NGINX reverse proxy to access OnlyOffice and Collabora servers through NextCloud
 - #6: Integrate a specific Azure service to work in NextCloud
- Jonathan Smith
 - #5: Establish LDAP Domain Controller service
 - #6: Integrate a specific Azure service to work in NextCloud

Sprint 5

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye

Start time: 10:30AM

End time: 11:00AM

After discussion, the velocity of the team was estimated to be 3 hours for each daily scrum.

The product owner chose the following user stories to be done during the next sprint. They are ordered based on their priority.

- #1: Debug NextCloud office load problems with Collabora
- #2: Provide custom app on NextCloud dashboard showing NextCloud Office integration
- #3: Provide custom app on NextCloud dashboard showing NextCloud user-side Active Directory integration

The team members indicated their willingness to work on the following user stories.

- Mario Oliva
 - #1: Debug NextCloud office load problems with Collabora
 - #2: Provide custom app on NextCloud dashboard showing NextCloud Office integration
- Adeel Hye
 - #1: Debug NextCloud office load problems with collabora and NextCloud office
- Jonathan Smith
 - #3: Provide custom app on NextCloud dashboard showing NextCloud user-side Active Directory integration.

Sprint 6

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye

Start time: 10:30AM

End time: 11:00AM

After discussion, the velocity of the team was estimated to be 3 hours for each daily scrum.

The product owner chose the following user stories to be done during the next sprint. They are ordered based on their priority.

- #1: Finishing routing the API endpoints for the NextAD app to change user attributes in AD
- #2: Establish a successful LDAP connection to an Azure VM using NextCloud

The team members indicated their willingness to work on the following user stories.

- Mario Oliva
 - #1: Finishing routing the API endpoints for the NextAD app to change user attributes in AD
- Adeel Hye
 - #1: Finishing routing the API endpoints for the NextAD app to change user attributes in AD
 - #2: Establish a successful LDAP connection to an Azure VM using NextCloud
- Jonathan Smith
 - #2 Establish a successful LDAP connection to an Azure VM using NextCloud

Sprint 7

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye, Sergio Roa, Ismail

Start time: 10:30AM

End time: 11:00AM

After discussion, the velocity of the team was estimated to be 3 hours for each daily scrum.

The product owner chose the following user stories to be done during the next sprint. They are ordered based on their priority.

- #1: Work on video presentation detailing what was done in the project
- #2: Design the individual poster for the Showcase event with the proper information

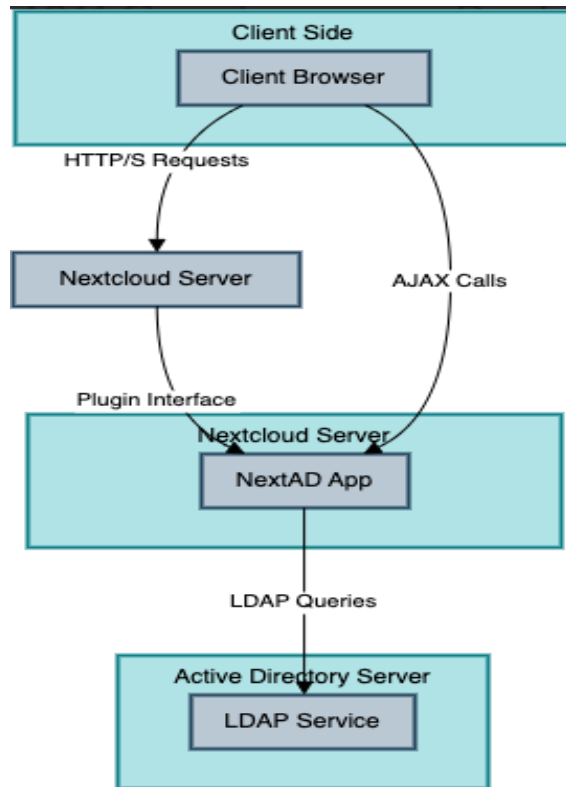
- #3: Collect and organize all the Scrum ceremony meetings for a final evaluation
- The team members indicated their willingness to work on the following user stories.
- Mario Oliva
 - #1: Work on video presentation detailing what was done in the project
 - #2: Design the individual poster for the Showcase event with the proper information
 - #3: Collect and organize all the Scrum ceremony meetings for a final evaluation
 - Adeel Hye
 - #1: Work on video presentation detailing what was done in the project
 - #2: Design the individual poster for the Showcase event with the proper information
 - Jonathan Smith
 - #1: Work on video presentation detailing what was done in the project
 - #2: Design the individual poster for the Showcase event with the proper information
 - Sergio Roa
 - #1: Work on video presentation detailing what was done in the project
 - #2: Design the individual poster for the Showcase event with the proper information
 - Ismail
 - #1: Work on creating individual poster for Showcase event
 - #2: Work on video presentation detailing what was done in the project.

SYSTEM DESIGN

This section contains information on the design decisions that went into this project. The architecture patterns are outlined and explained. The entire system is shown in a package diagram and the subsystems are explained. Finally, the design patterns used in the project are discussed.

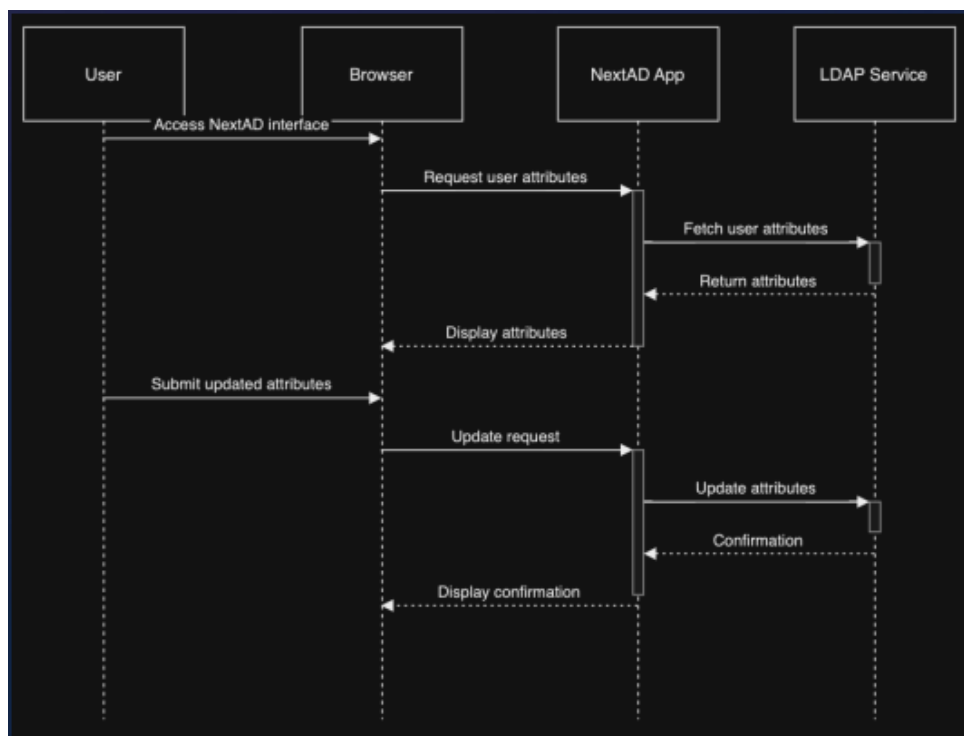
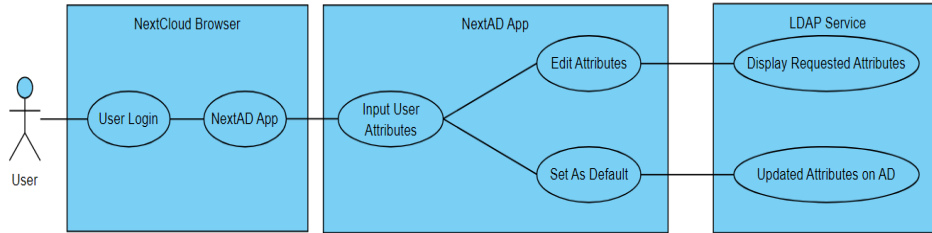
Architectural Patterns

The following diagram details the architectural structure of the NextAD app.



Design Patterns

The following are the use case and sequence diagram for the patterns found inside the NextAD application.



SYSTEM VALIDATION

Introduction

The System Validation section outlines the rigorous testing and validation processes undertaken to ensure that NextAD functions as intended within the NextCloud environment. This validation is crucial for guaranteeing the reliability, security, and efficiency of NextAD, particularly in its interactions with Active Directory (AD).

Objectives of Validation

Purpose: The primary goal of the validation process was to verify NextAD's compatibility with various AD configurations, assess its attribute editing functionality, and ensure overall performance and reliability.

Criteria: Validation criteria were established based on NextAD's functional requirements, performance benchmarks, and user experience standards.

Testing Methodologies

Test Scenarios: We conducted a series of comprehensive tests covering all key functionalities of NextAD, including user recognition, attribute preview and editing, and real-time updates.

Testing Environment: Validation was performed in controlled environments mimicking typical NextCloud and AD configurations.

API Response Testing

Network Tab Analysis: A critical part of our testing involved monitoring API responses via the Network tab in the developer tool. This method allowed us to inspect the real-time interaction between NextAD and Active Directory.

Handling Errors: In instances of receiving a bad response, such as a '500 Internal Server Error', we performed detailed troubleshooting. This process helped in identifying and rectifying underlying issues, enhancing the robustness of NextAD.

Results and Analysis

Validation Outcomes: The results showed that NextAD meets all its defined functional and performance criteria, with efficient handling of AD attributes within NextCloud.

Issues and Resolutions: Where issues were encountered, such as response errors or attribute synchronization problems, they were systematically addressed and resolved.

User Acceptance Testing

End-User Involvement: Feedback from end-users was an integral part of our validation, ensuring that NextAD is not only technically sound but also user-friendly and practical.

Feedback Implementation: User insights significantly contributed to refining NextAD, particularly in enhancing the user interface and streamlining attribute management processes.

Compliance and Security

Regulatory Standards: NextAD was tested for compliance with relevant security and data privacy standards.

Security Assurance: Security testing confirmed that NextAD maintains the integrity of the NextCloud environment without introducing vulnerabilities.

Performance Metrics

Efficiency and Reliability: Testing revealed that NextAD performs reliably, with quick response times and efficient handling of AD interactions.

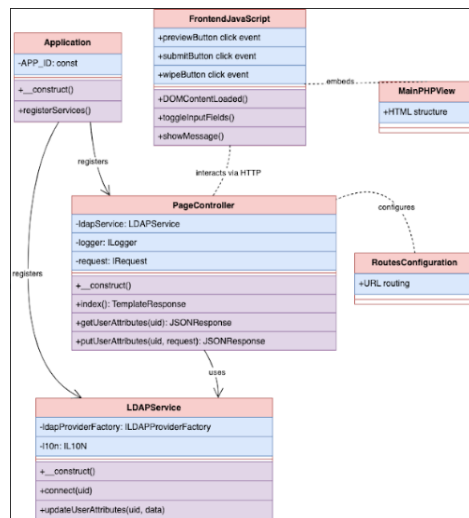
Conclusion

Validation Summary: NextAD has successfully passed all validation tests, affirming its readiness for deployment and operational use.

Future Directions: Continuous improvement is a cornerstone of our approach, and we aim to further enhance NextAD based on user feedback and technological advancements.

APPENDIX

Appendix A - UML Diagram



Application Class: Represents the core of the NextAD application. It is responsible for initializing and configuring the app within the Nextcloud environment.

- Attributes: `APP_ID: const` - A constant value representing the unique identifier of the application.

- Methods: `__construct()` - Constructor method for initializing the application.
`registerServices()` - Responsible for setting up and registering various services and components required by the app.

PageController Class: Manages HTTP requests related to user interface actions and serves as the primary controller for the application.

- Attributes: `LDAPService` - An instance of the `LDAPService` class to handle LDAP operations. `ILogger` - Logging service for recording application activities. `IRequest` - Represents an HTTP request to the controller.

- Methods: `__construct()` - Initializes the PageController with necessary dependencies. `index()`: `TemplateResponse` - Renders the main page of the app.- `getUserAttributes(uid)`: `JSONResponse` - Handles requests to fetch user attributes from LDAP. `putUserAttributes(uid, request)`: `JSONResponse` - Manages requests to update user attributes in LDAP.

LDAPService Class: Encapsulates all LDAP-related operations, acting as a service layer for LDAP connectivity and data manipulation.

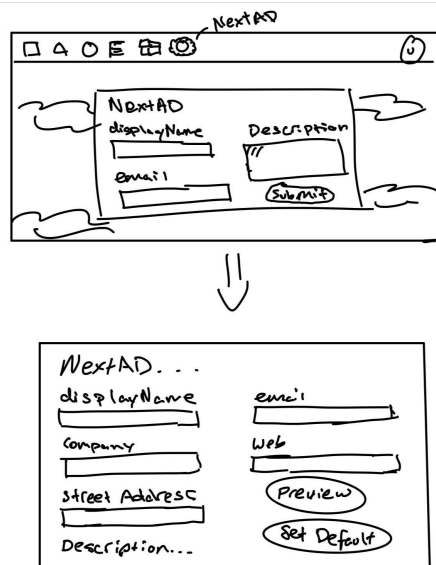
Attributes: `ILDAPProviderFactory` - Factory class to provide LDAP provider instances. `IL10N` - Localization service for internationalization support.

Methods: `__construct()` - Constructor to set up LDAP service with necessary components.
`connect(uid)` - Establishes a connection with the LDAP server and retrieves user data.
`updateUserAttributes(uid, data)` - Updates user attributes in the LDAP directory.

Appendix B - User Interface Design

Sketches

The following sketches illustrate the original vision for NextAD. These drafts showcase how we wanted the attribute input form to look like originally. It is worthy to note that throughout the development of the app, we changed attribute field labels and added some that were not originally included. This was done to maximize the app's utility.



Designs

The following images illustrate a couple of the designs we had envisioned for the application. We started with some input fields that we did not know we would not use originally, like user password. We decided to change that input field for security reasons. We also added a few extra buttons in the final version of the app, mainly a preview feature to see current attributes in Active Directory and a wipe button to clean previewed or customized attributes. The app's form was made using HTML embedded in the main.php file, located in the templates directory. For styling the frontend, we used Cascading Style Sheets (CSS).

Customize LDAP User Settings
Note: Changed user settings will be reflected as part of the user's newest Active Directory attributes.

Display Name: test	Email: myemail@ma...
Password: 	Telephone: 534-454-4536
Address: 123 ave	Web Page: nextcloud.com
Description: ab cdn	

[SET AS DEFAULT](#)

Customize Active Directory User Settings. That's *NextAD*.
Changed user settings will be reflected as part of the user's newest Active Directory attributes.

Display Name: test user1	Email: test.user1@nextcloudw.local
Company: NextAD	Telephone: 123-456-7890
Street Address: 123 Sunny Ave	Web Page: www.google.com
Description: My name is Lauren.	

[EDIT ATTRIBUTES](#)
[WIPE ENTRIES](#)
[SET AS DEFAULT](#)

Appendix C - Sprint Review Reports

Sprint 1

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye

Start time: 7:00PM

End time: 8:00PM

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- Get Familiar with NextCloud's interface
- Look into past NextCloud open source projects for inspiration
- Start setting up development environment with NextCloud
- The product owner and team found no user stories to reject based on the past sprint's work.

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Spring Planning meeting.

- None. All user stories assigned in the previous sprint were successfully implemented and accepted.
 - For the accepted user stories, the status should be updated to "Completed" or "Done." Given no rejected user stories, no changes are necessary in that category. Any additional feedback or improvements suggested by the product owner during the sprint review should be added as comments or annotations to the respective user stories for future reference.

Sprint 2

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye

Start time: 7:00PM

End time: 8:00PM

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- Connect to the NextCloud Server
- Integrate Microsoft Active Directory in NextCloud
- Integrate Azure in NextCloud
- Integrate Office 365 in NextCloud

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Spring Planning meeting.

- No user stories were rejected in this sprint. All implementations were up to the mark and were approved by the product owners. They will not be moved back to the product backlog, and there is currently no need for reassignment in the future sprint planning meetings.

Sprint 3

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye

Start time: 7:00PM

End time: 8:00PM

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- #1: Explore Collabora, OnlyOffice, and Office 365 integrations in NextCloud
- #2: Connect to Collabora / OnlyOffice online server
- #3: Work on Azure service in NextCloud
- #4: Update on Microsoft AD in NextCloud for user permissions

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Spring Planning meeting.

- No user stories were rejected in this sprint. All implementations were up to the mark and were approved by the product owner. They will not be moved back to the product backlog, and there is currently no need for reassignment in the future sprint planning meetings.

Sprint 4

Sprint Review Meeting Minutes

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye

Start time: 7:00PM

End time: 8:00PM

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- #1: Upload NextCloud repository with latest code changes to GitHub for server access
- #2: Integrate a Collabora Office version provided in the NextCloud store
- #3: Provide authentication layer to use Microsoft Office account instance inside app integration
- #4: Establish an NGINX reverse proxy to access OnlyOffice and Collabora servers through NextCloud
- #5: Establish LDAP Domain Controller service
- #6: Integrate a specific Azure service to work in NextCloud

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Spring Planning meeting.

- No user stories were rejected in this sprint. All implementations were up to the mark and were approved by the product owner. They will not be moved back to the product backlog, and there is currently no need for reassignment in the future sprint planning meetings.

Sprint 5

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye

Start time: 7:00PM

End time: 8:00PM

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- #1: Attempt to fix the error using NextOffice server or switch focus and integrate with LDAP
- #2: Using the developer manual, Install Active Directory app on the NextCloud dashboard with integration details

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Spring Planning meeting.

- No user stories were rejected in this sprint. All implementations were up to the mark and were approved by the product owner. They will not be moved back to the product backlog, and there is currently no need for reassignment in the future sprint planning meetings.

Sprint 6

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye

Start time: 7:00PM

End time: 8:00PM

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- #1: Finishing routing the API endpoints for the NextAD app to change user attributes in AD
- #2: Make a service class and use dependency injection to get NextAD to recognize the VM server
- #3: Establish a successful LDAP connection to an Azure VM using NextCloud

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Spring Planning meeting.

- No user stories were rejected in this sprint. All implementations were up to the mark and were approved by the product owner. They will not be moved back to the product backlog, and there is currently no need for reassignment in the future sprint planning meetings.

Sprint 7

Attendees: Mario Oliva, Jonathan Smith, Adeel Hye, Serigo Roa, Ismail Abousalem

Start time: 7:00PM

End time: 8:00PM

After a show and tell presentation, the implementation of the following user stories were accepted by the product owners: All.

- #1: Work on video presentation detailing what was done in the project
- #2: Design the individual poster for the Showcase event with the proper information
- #3: Collect and organize all the Scrum ceremony meetings for a final evaluation

The following ones were rejected and moved back to the product backlog to be assigned to a future sprint at a future Spring Planning meeting.

- No user stories were rejected this sprint. All implementations were up to the mark and were approved by the product owner. They will not be moved back to the product backlog, and there is currently no need for reassignment in the future sprint planning meetings.

Appendix D - App Installation/Maintenance & Shortcomings

Getting Started - Installation

Prerequisites

- A working PC or Desktop Computer
- A running Nextcloud server, which you can set up using Docker and the Docker Compose file from our GitHub repository
- Remote virtual machine for Active Directory Access
- Administrative access to your Nextcloud instance

Initial Setup

Start the Nextcloud server using the docker-compose up command. Make sure your container is running and using the proper server name and port. Follow the on-screen instructions in the Nextcloud setup wizard. You will need to use the credentials found inside the compose file to provide the server and database information. Once you have access to the NextCloud dashboard, download the NextAD application zip file from our GitHub repository. Extract the zip file and copy the NextAD app folder into the apps directory of your Nextcloud instance.

Using NextAD

Accessing the App

Log in to your Nextcloud instance with your user credentials. Navigate to the Apps section and locate the NextAD application. If the NextAD application is disabled, hit the enable button and get the latest version of the app running on your instance. Then, from your dashboard you can open the NextAD app to start managing AD user attributes.

Editing User Attributes

Within the NextAD interface, you will find input fields for the following user attributes:

1. Display Name: The full name of the AD user.
2. Company: The company associated with the AD user.
3. Street Address: The physical address of the AD user.
4. Description: A brief description or notes about the AD user.
5. Email: The email address associated with the AD user.
6. Telephone: The phone number of the AD user.
7. Web Page: The professional or business page of the AD user.

To edit any of these attributes, the user will simply navigate to an input associated with one of the above labels and add their information there.

Previewing and Submitting Changes

The steps to preview and submit changes inside the NextAD app are fairly straightforward. Here is a general guide:

- I. Click the Preview button to see what attributes values are currently in Active Directory.

- II. Click the Edit Attributes button to select which attributes to change. If an attribute is not changed the default value from when it was previewed will be used in AD.
- III. Optionally, the user can select Wipe Entries to edit all the attributes using a clean slate of inputs after they have previewed them.
- IV. Once satisfied with changed user attributes, click the Set As Default button to apply the changes to the AD user's profile.
- V. Wipe attributes and reselect Preview Attributes to test that the changes have taken effect and are in the user's Active Directory profile. If the user is an administrator, logging into Active Directory through a virtual machine and going to the user's settings also works to verify the attributes have changed.

App Maintenance

To maintain and the NextAD app, the administrator has 2 tools that they can use:

1. They can monitor who to give access to the NextAD app using the LDAP Admin settings. In those settings, the administrator can perform queries for which user groups to give access to NextAD, as those will be the only users that will be recognized once they log into NextCloud. This could be a good way to maintain the app as it restricts access to certain LDAP users who do not meet the minimum permission requirements.
2. The other way to monitor the NextAD app is using a virtual machine to change any modified attributes by NextAD users. If the modified attribute is either inappropriate or not allowed to be use, the administrator can access the Active Directory service, locate the user's credentials, and manually change their attributes through there.

App Shortcomings

- For the next revision, we want to be able to change the UI to add more attributes so the user can modify them.
- Another important feature we should include in a future update is a search function to filter by attribute name while keeping the most used attributes as part of the main UI.
- We were not able to add new attributes for the user and assign them values in Active Directory, this part would be done through NextAD
- We also did not get a chance to give the user an option to delete these custom Attributes along with their values if they so choose, which would involve doing LDAP queries inside the NextAD app