

# **Beyond Technical Fulfillment**

*SambaXP 2014*

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Julien Kerihuel  
[j.kerihuel@openchange.org](mailto:j.kerihuel@openchange.org)

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**Julien Kerihuel** - Zentyal CTO

 @jkerihuel



**OpenChange Project Founder**  
> 10 years of my life



Free Software foundations:  
wireshark, samba



December 2003 – February 2005:  
OpenChange - End of Study Project

# *Introduction*

# What is OpenChange?

- Started in 2004
- Free Software released under GPLv3 or later
- Portable Implementation of Microsoft Exchange Server and Exchange protocols
- Complete solution to interoperate with Microsoft Outlook clients and Microsoft Exchange Servers
- Plugin for Samba4

**NO OUTLOOK PLUGIN REQUIRED**

# Interoperability and coverage

- OpenChange server works with:

**MICROSOFT  
OUTLOOK 2003**

**MICROSOFT  
OUTLOOK 2007**

**MICROSOFT  
OUTLOOK 2010**

**MICROSOFT  
OUTLOOK 2013**

- OpenChange client stack works with:

**EXCHANGE 5.5**

**EXCHANGE 2000**

**EXCHANGE 2003**

**EXCHANGE 2007**

**SBS 2003**

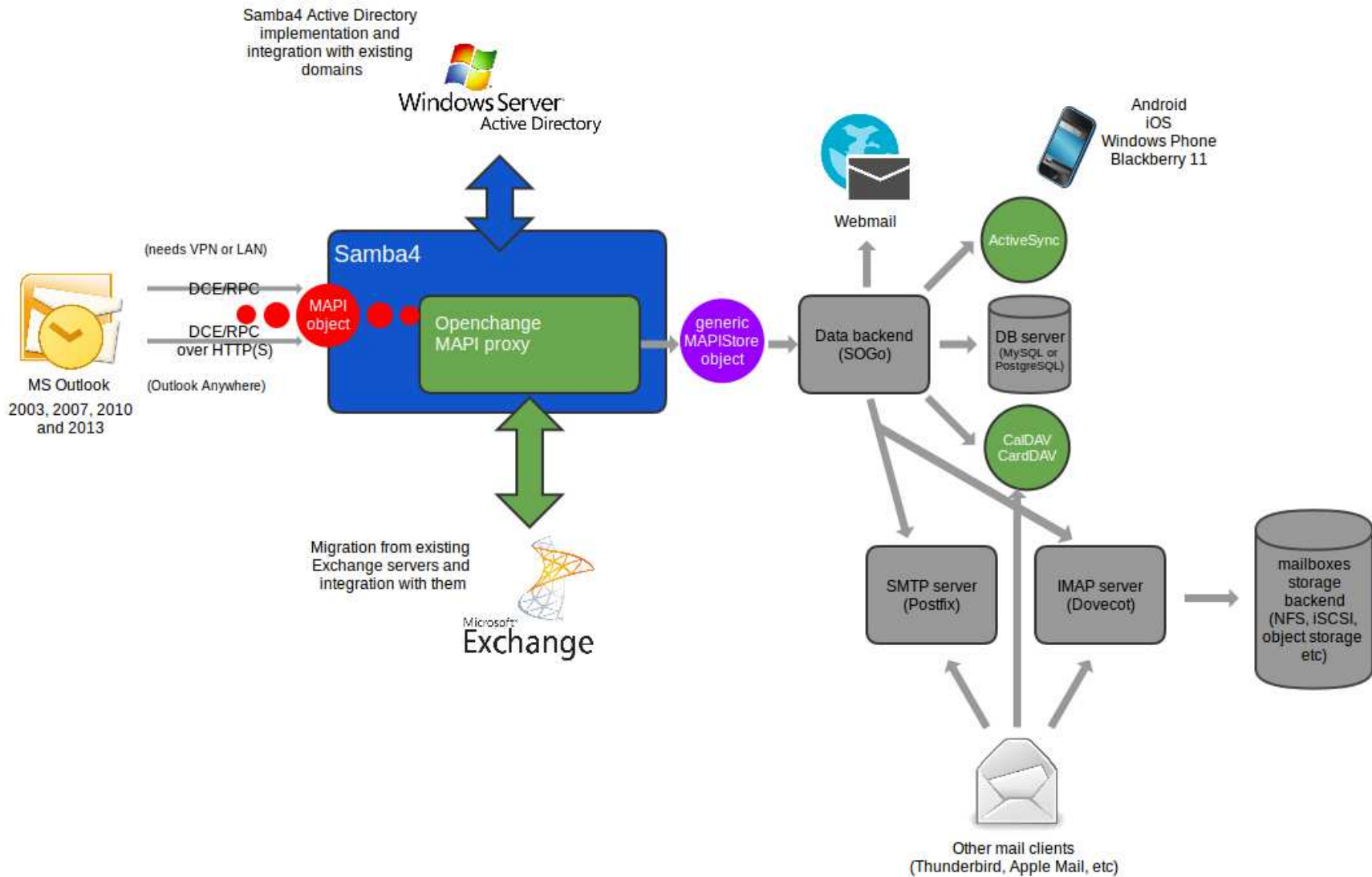
**SBS 2007**

**SBS 2010**

**EXCHANGE 2010**

**EXCHANGE 2013**

# Server Architecture Overview



# *Yesterday*

*Since SambaXP 2013*



# The nightmare

- Full OpenChange deployment required:

|  |   |                        |                               |
|--|---|------------------------|-------------------------------|
| Dovecot<br>Courier-IMAP                            | Postfix<br>Exim4                                | MySQL or<br>PostgreSQL | SOGGo                         |
| Samba4<br>(sometimes<br>specific<br>build/version) | Samba<br>dependencies<br>(bundled<br>libraries) | DNS                    | SOGGo<br>MAPIStore<br>backend |
| Apache   | mod_wsgi  | ocsmanager             | rpcproxy                      |

**MINIMUM OF 3 HOURS TO COMPLETE**

# The nightmare continues



- Extremely complex to setup
- rare

**MANY TRIED ... FEW SUCCEEDED**

source: [www.reddit.com](http://www.reddit.com)

# The nightmare ends?



**WINNERS WERE ACCLAIMED EVERYWHERE**

source: [www.reddit.com](http://www.reddit.com)

# Workarounds

- **ZEG (Zero Effort Groupware)**
  - Virtualization image (vmdk, vdi)
  - Pre-defined environment
  - Lacks flexibility and customization
- **OpenChange cookbook**
  - Step by Step deployment guide
  - 3 hours required
  - not suitable for mass adoption

# The promise



- 6 months after SambaXP 2013
- OpenChange integration into Zentyal Server
- Leverage existing infrastructure and community
- 400K bootstrap users potential target

**FROM 3 HOURS TO 3 MINUTES DEPLOYMENT**

# The truth

**PEOPLE DID NOT KNOW OPENCHANGE EXISTED**

# Moreover ...



**PEOPLE DID NOT BELIEVE IT WAS WORKING ...**

source: [www.reddit.com](http://www.reddit.com)

# Welcome to the real world

- **Began to be tested ... like never before**
- **Began to get bug reports ... like never before**
- Classical bug reporting not enough:
  - Tracker tickets
  - Forum posts describing the issues
  - Emails

**NEEDED TO ADDRESS THE SITUATION GLOBALLY**



# Chaining paradox

- OpenChange is a Samba DSO
- SOGo is an OpenChange DSO
- If SOGo backend abort(), OpenChange dies
- If SOGo backend SIGSEGV, Samba dies

# Addressing bugfixing plan

|   |                         |                               |
|---|-------------------------|-------------------------------|
| <b>FINAL USER</b>                       | <b>DEVELOPER</b>        | <b>QA</b>                     |
| <b>APPORT SYSTEM</b>                    | <b>DEBUGGING SCRIPT</b> | <b>MANUAL TESTING</b>         |
| <b>INTEGRATED TO DASHBOARD</b>          |                         | <b>AUTOMATIC TESTING</b>      |
| <b>CRASH REPORT SUBMISSION PLATFORM</b> |                         | <b>CONTINUOUS INTEGRATION</b> |

# Final User: Apport system

- Samba4 added to apport list
- Submission button available from Zentyal dashboard
- Crash report platform on Zentyal Servers
- “Foire aux crash report”
- **apport-retrace -g <crash\_file>**
- Extremely powerful but:
  - Simple repository
  - No management of duplicate
  - Not anonymous enough – Not personalized enough

# Developer bugfixing

- Post-process vs live-process analysis
- **single mode not working**
  - SOGo backend is doing reentrant LDAP calls
  - event loop issue not addressed in OpenChange
- **multi-forked model debugging**
  - attach to the correct process BEFORE it crashes

# Developer bugfixing

## DEBUGOC.PY SCRIPT

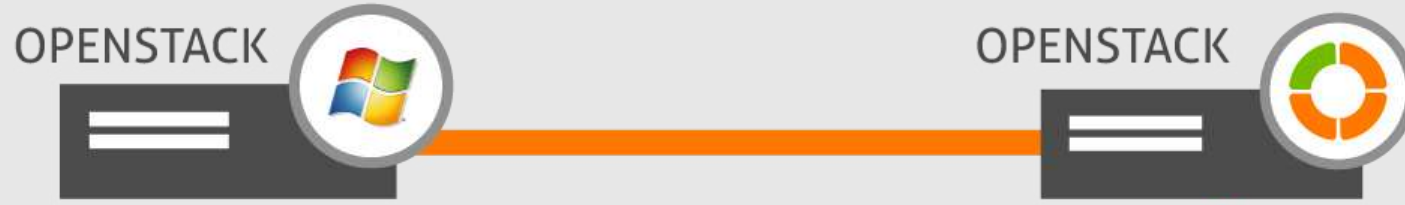
- Go through samba processes
- Read maps file
- Locate OpenChange libraries mapped in process address space
- Launch gdb instance

# Quality Assurance

- Early bug detection
- Prevent regression
- **Anticipate problems**
- Two methodologies:
  - **Automated testing**
    - Sikuli, OpenStack, ANSTE
  - **Manual testing**
    - Find what you are not looking for
    - Very valuable because of the entropy

# Quality Assurance

**Wintest** - Framework for testing Zentyal against Windows virtual machines



# *Today*



# In a nutshell

**WE KNOW WHAT IS WORKING**

**WE KNOW WHAT IS NOT WORKING**

**WE DO ANTICIPATE**

**GROWING DEVELOPMENT TEAM**

# In a nutshell

**WE HAVE NEW FEATURES**

**WE HAVE NEW DESIGN &  
ARCHITECTURE POSSIBILITIES**

**WE HAVE NEW PROCESSES &  
INFRASTRUCTURE**

# New Features

## RPC OVER HTTP/HTTPS FOR SAMBA DCERPC CLIENT LIBRARIES

- Extends OpenChange client stack coverage:
  - Microsoft Exchange 2013
  - Office 365
  - Hosted Provider with Outlook anywhere support
- Work available on github branch

# New Features

## PROVISION AS ADDITIONAL EXCHANGE SERVER

New Object - User

Create in: zentyal-qa.lan/Users

Create an Exchange mailbox

Alias:  
testuser

Server:  
Exchange First Organization/First Administrative Group/ZENTYAL  
Exchange First Organization/First Administrative Group/WIN2K3EX2K3  
Exchange First Organization/First Administrative Group/ZENTYAL-34  
First Storage Group/Mailbox Store (ZENTYAL-34)

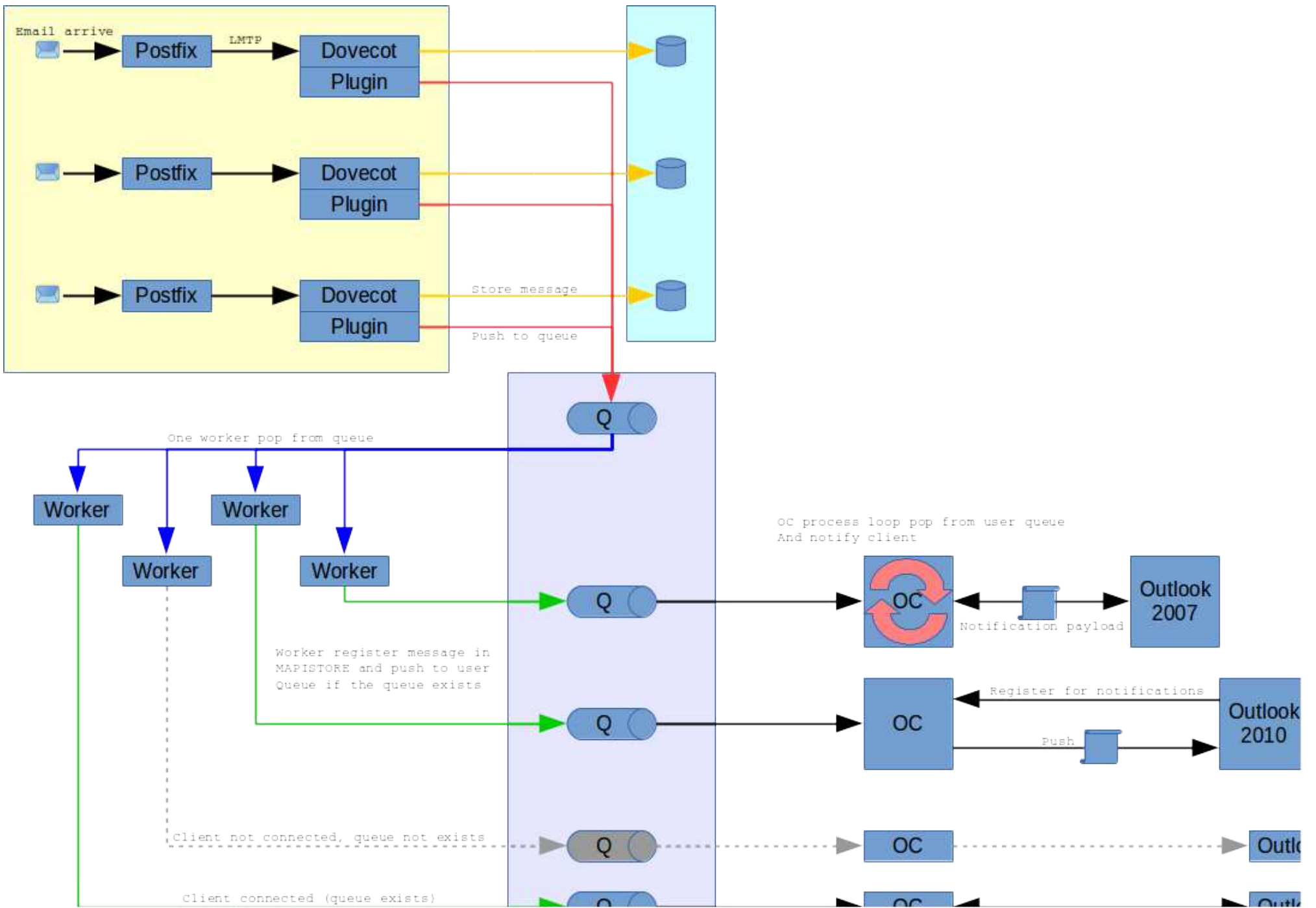
< Back Next > Cancel

- OpenChange can use existing Microsoft Exchange schema
- Mailboxes can be migrated from Exchange to OpenChange

# New Features-Architecture

## NEWMAIL NOTIFICATION AND RABBITMQ

- OpenChange a synchronous process
- No way to notify Outlook a new mail has arrived
- Situation addressed with:
  - Dovecot plugin to trigger notification
  - RabbitMQ to transport notifications
  - Python worker to process notifications
  - Make use of Outlook idle loop to update client



# New Design and Architecture

## OPENCHANGE IN DOCKER

- OpenChange deployed in containers:
  - **openchange/mysql**: indexing, mailbox structure and everything but mail data
  - **openchange/mta**: postfix/dovecot
  - **openchange/sogo**: sogo server
  - Launcher script available
- \$ git clone **<https://github.com/openchange/docker>**

# New Design and Architecture

## OPENCHANGE IN THE CLOUD

- Decomposable, ideal for orchestration:
  - **rpcproxy:**
    - Handle MAPI over HTTP/HTTPS flow
    - Turn it into regular MAPI
  - **samba4:**
    - Dummy DC
    - MAPI processing
  - **mysql:**
    - Data storage (but email)
  - **samba4 “real” AD**



# New Design and Architecture

## OPENCHANGE IN THE CLOUD

- multi-tenancy (multi-company support)
- provisioned AD different from samba workers – containers
- unified storage in MySQL but email
- Load-Balancing and scalability

# New Infrastructure

## INTEGRATION WITH TRAVIS-CI

- Every OpenChange commits triggers travis-ci build
- We bridge the gap with unit testing's lack of coverage

# *Tomorrow*

# Work in Progress

## APPORT DATA MINING TOOL

- Improve apport usefulness
- Handle duplicates (detection, database)
- Order crash reports based on code path

# Work in Progress

## MAPISTORE PYTHON BACKENDS

- Developing OpenChange backend takes time
- C developers are rare
- Objective: Be able to write a backend in 2-3 days
- C to Python gateway
- Slower than C backend but acceptable compromise
- Exchange is not realtime, therefore speed is not the issue

# Possibility

## MAPISTORE WEB SERVICE BACKENDS

- Dissociate OpenChange/MAPIStore from backends
- JSON communication between OpenChange and backends
- Make Samba/OpenChange more robust and fault tolerant to backend implementors code
- Suits modern object store models

# Possibility

## PUBLIC FOLDERS

- **CIFS backend**
  - Immediate access
  - Storage unified
  - Advanced ACLs
- **Zentyal Cloud backend**
  - Revision history
  - Point in time recovery

# Possibility

## INCREASE SUPPORT OF EXCHANGE WEB SERVICES

- We currently support:
  - autodiscovery
  - free/busy
  - out of office



# Possibility

## MAPIROPS COMPILER

- MAPI is not NDR encoded
- NDR generated code is too low-level in some cases
- MAPIROPS compiler pack/unpack MAPI as a buffer
- Add more Exchange processing logic at compiler level
- Auto-generate unit tests



# Questions?

*Julien Kerihuel,*

*OpenChange Founder*

*[j.kerihuel@openchange.org](mailto:j.kerihuel@openchange.org)*

*[www.openchange.org](http://www.openchange.org)*

 [@OpenChangeProj](https://twitter.com/OpenChangeProj)  
[@jkerihuel](https://twitter.com/jkerihuel)