ELCA for
OpenShift Group
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CloudTrust
Digitalization, Security and “CASB”

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Lead Architect Defense & CyberSecurity

ELCA

Who am I

I am a computer security enthusiast

Security contests, Malware, Web architecture

Open source contributor since 2001

Volunteer in multiple organizations

Addict to absurd & abstract arts

Sebastien Pasche
Twitter @braoru
@ELCA since 01.2017
Architect @leshop 2012-2017
Freelance (mainly biomed) Architect 2006-2017

“The corollary of constant change is ignorance. This is not often talked about: we computer experts barely know what we’re doing. We’re good at fussing and figuring out. We function well in a sea of unknowns. Our experience has only prepared us to deal with confusion. A programmer who denies this is probably lying, or else is densely unaware of himself.”

Ellen Ullman, Close to the Machine: Technophilia and Its Discontents

Agenda

- A Few words on ELCA, Security and Digitalization
- Digitalization and what problems we are facing with our customers
- The CloudTrust project and it’s current status

ELCA

We make it work.

Founded in 1968

Over 800 employees

Turnover of CHF 118.8 millions in 2016 (growth 11%)

1‘000 customer projects in ten years

ELCA conducted many digital migrations related project

- More than 100 (IDaaS, IAM , IGA, User Management Process) projects
- Infrastructure migration
- Developing private clouds for ELCA and customers
- Partner of center for digital trust @ EPFL

Nowady, we have to open to everybody services we formely only opened internaly

We have to bridge legacy, mobile and so on .. with newly hosted services and make them run somewhere

Digitalization

Lets Focus on Data & Runtime environment

Digitalization & Dreams

Externalize Runtime and/or Operating platform
Local PAAS, Remote PAAS, Hybrid PAAS

Reduce your operational cost on OPEX and CAPEX
Pure SAAS Software, Remotely managed PAAS

Ability to change from one providers to another
No Vendor lock-in, Keep your own key approach

Don't care about availability problematics
Let providers admin deal with my almost running containers

Simplify our architecture
Try to move from an assembly of product to an unified approach

What could go wrong

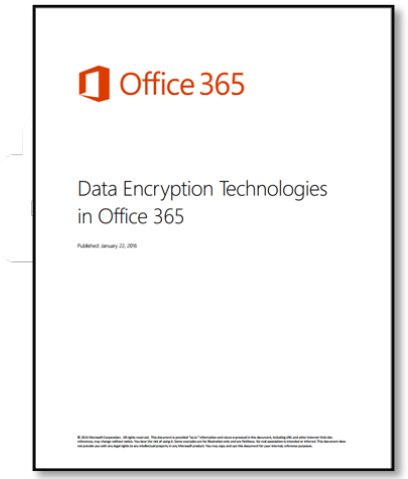
Data privacy
Ensure that sensible information is not disclosed

Access & location
Keep control over data access and its location

B2B collaboration
Allow secure collaboration with B2B while keeping lower costs

Compliance
Ensure compliance with legal regulations

What could go wrong



When you protect content with Azure RMS, Azure RMS uses a 2048-bit RSA asymmetric key with SHA-256 hash algorithm for integrity to encrypt the content. The symmetric key for Office documents and email is AES 128-bit (CBC mode with PKCS#7 padding).

In a default Azure RMS implementation, Microsoft generates and manages the root key that is unique for each tenant. Customers can manage the lifecycle of their root key in Azure RMS with SharePoint Online by using a method called Bring your Own Key (BYOK) that allows you to generate your key in on-premises HSMs, and stay in control of this key after transfer to Microsoft's FIPS 140-2 Level 2-validated HSMs. Access to the root key is always limited to Office 365 applications (such as Exchange Online and SharePoint Online) and is not given to any personnel. In addition, customers can access a near real-time log showing all access to the root key at any time. For more information, see Logging and Analyzing Azure Rights Management Usage. **Source : Data Encryption Technologies in Office 365**

Shield Platform Encryption allows Salesforce administrators to manage the lifecycles of their data encryption keys while protecting the keys from unauthorized access. To ensure this level of protection, data encryption keys are never persisted on disk. Instead, they're derived on demand from the master and tenant secrets.

The master secret is generated by a master HSM at the start of each release. The master HSM is "air-gapped" from Salesforce's production network and stored securely in a bank safety deposit box. Only designated Salesforce security officers can access the safety deposit box and the master HSM stored within.

Business <-> Technical words translators

Access SSO, ABAC, Access policy, MFA	Visibility, Compliance
Manage B2E, B2B, B2C, Users provisioning, Workflow, Branding	Visibility, Compliance, Identity management
Control Shadow IT, License metering, behavior analytics, reporting	Visibility, Compliance, Threats protection, Cost optimization
Protect Field Protection, Searchable encryption, Proxy/Reverse	Threats protection, Data Loss Prevention, Privacy

Business context

What is a CASB ?

Cloud Access Security Broker (CASB) is a visibility & control point between users of your organisation and the cloud

Visibility
who is using which app and which data is stored where

Threat protection
detects malware stored in the cloud and suspect behaviours

Data Loss Prevention
handle information according to its specificities (ciphering, tokenization)

Compliance
ensure compliance with specific industry regulations

CloudTrust

CloudTrust vision

OpenSource and Transparent

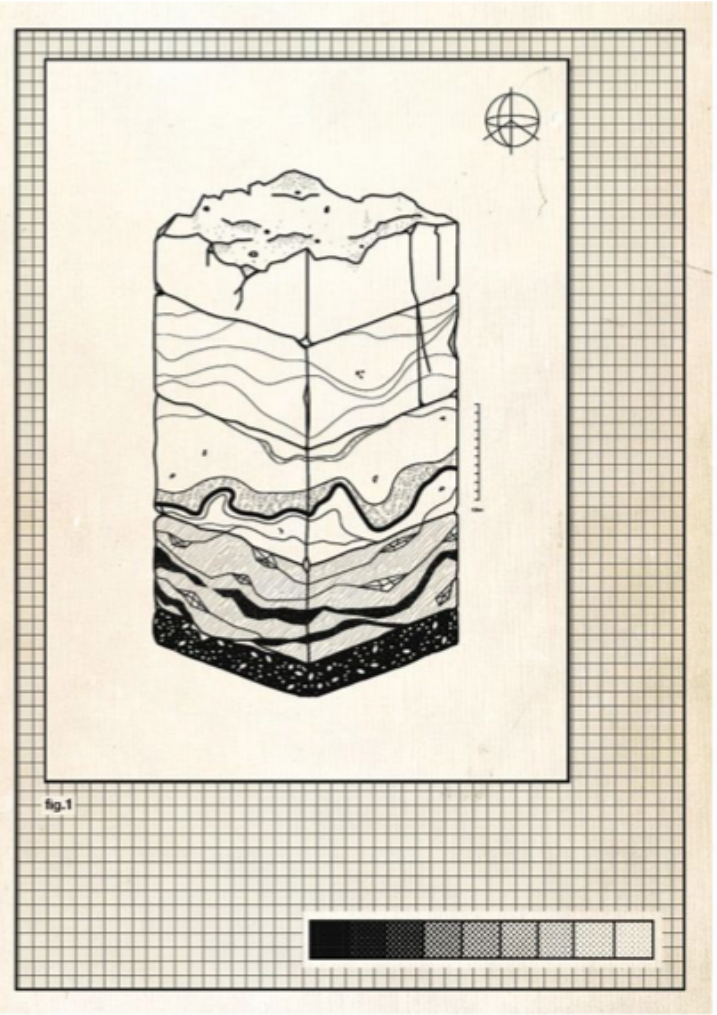
Support multiple deployment target
    SAAS, Appliances, Customer hosted PAAS, Hybrid

Organized as a toolkit with dedicated distribution

Fix gap between OpenSource product and our fields experiences

Keep OPEX stable
    Multi tenancy, Use vanilla technologies,
    Use/Improve open source, clustering.

Embark ELCA security knowledge and project experiences



Access

Because without authentication there is nothing

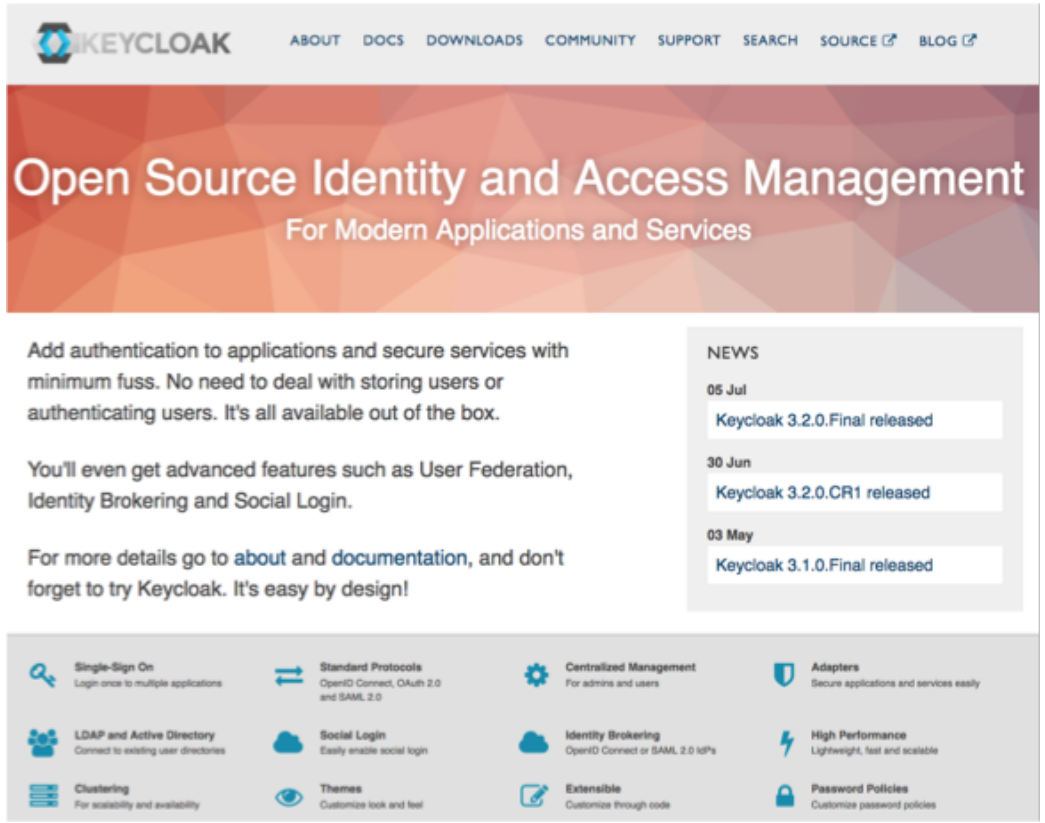
Choose a good elementary block

Offers most of required features

Clean codebase and architecture

Highly extensible and customizable
Modules, extensions, themes, …

Documented and complete REST API



Find the gaps

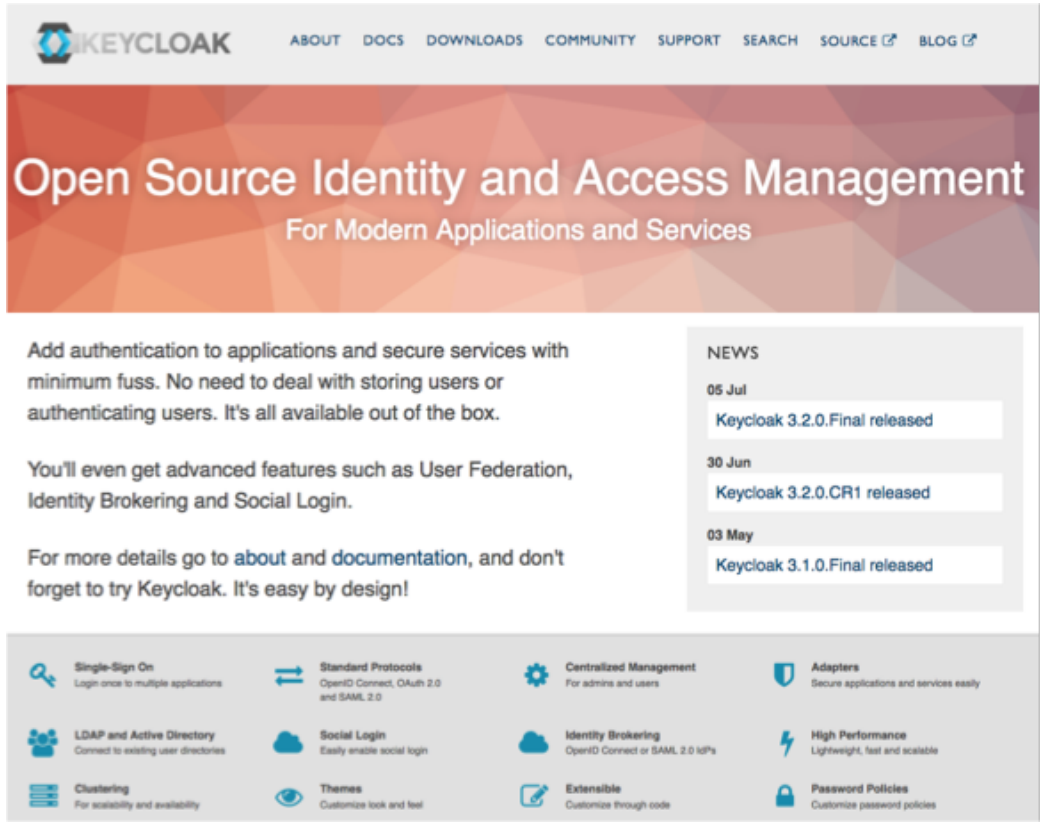
No easy hotplug clustering

No support of Microsoft WSFED

No support for Access control on SAML

No easy way to get Business & Technical audit logs & metrics

API not really adapted to Reactive programming patterns



Fill the holes

High availability, node hotplug and multi DC support

Make Keycloak work with cockroach-db
https://github.com/cloudtrust/keycloak-cockroach

Still work in progress (Should be released on June 2018)

Standalone mode with a shared but distributed DB

Require modification of SQL queries and a KeyCloak Data-Store module

Fill the holes

Audits logs and performances monitoring

Create a module to send everything happened within keycloak
https://github.com/cloudtrust/event-emitter

Handle retry and buffering messages

Can send event with in JSON or flat buffer

Embed a local snowflake to generate unique and non-colliding event id

Fill the holes

Microsoft WSFED support

Implement WSFED protocol within keycloak

https://github.com/cloudtrust/keycloak-wsfed

Working and release planned on April 2018 within a productive environnement

- Kerberos SSO with Microsoft Sharepoint
- Thousands of users

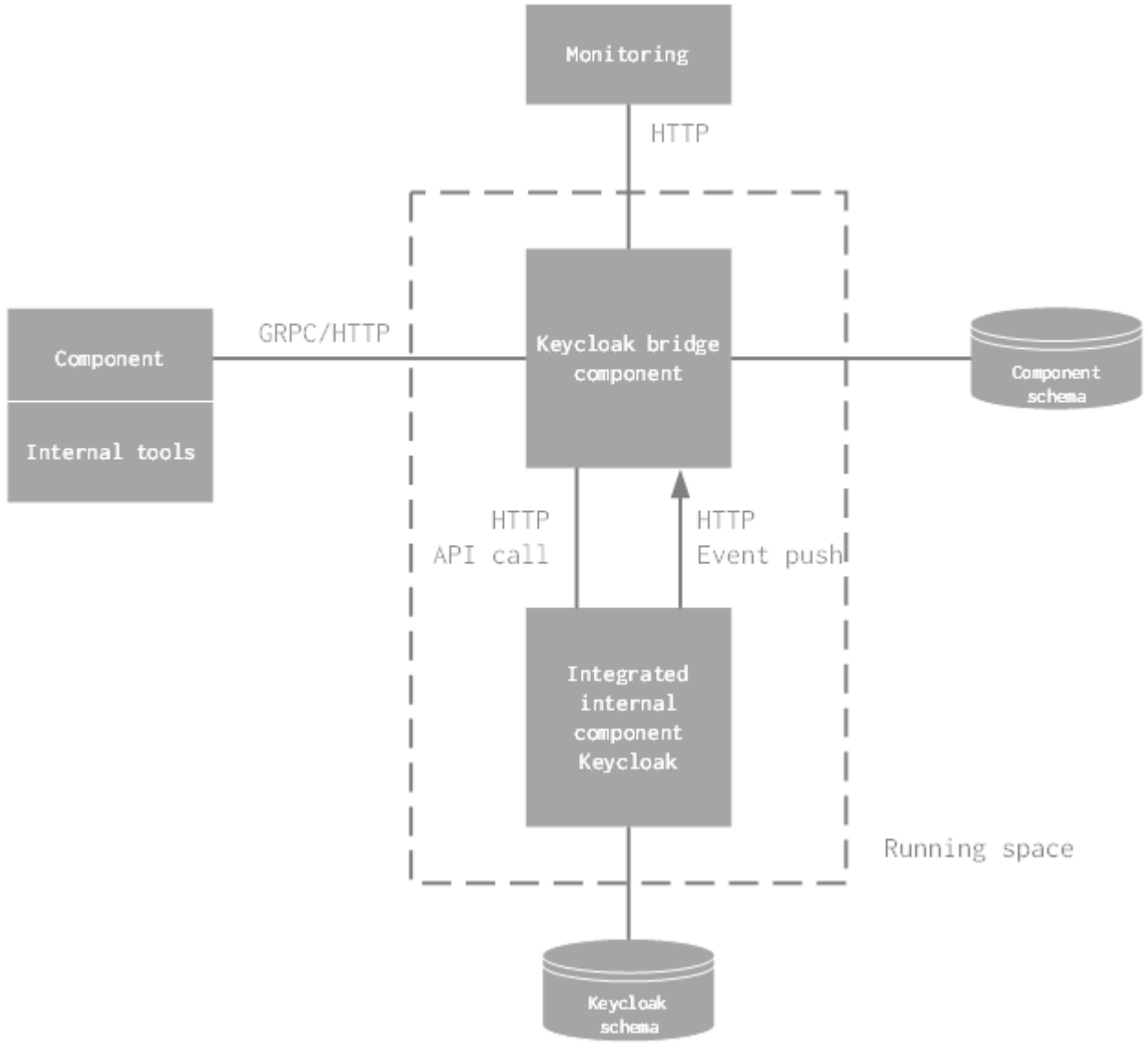
Able to replace Microsoft ADFS

Support Token claim mapping

Still not supporting sso Brokering from WSFED (in the roadmap)

Fill the holes

Reactive programming interface
& others missing features



Fill the holes

Reactive programming interface & others missing features

Create pet services

https://github.com/cloudtrust/keycloak-bridge

Work in progress and elementary release planned for April 2018

Normalize and store technical and business event to an Elasticsearch cluster

Normalize and store technical and business metric to an (Influx/DalmatinerDB) Cluster

Fill the holes

Reactive programming interface & others missing features

Implement interfaces for Metrics, Audit tracks & Keycloak API

Implement keycloak’s event receiver endpoints

Expose a reactive GRPC interface

Expose a reactive HTTP interface

Expose a business monitoring interface (Create-user, Fake Login, ..)

Expose a technical monitoring interface (DB, Keycloak status, …)

Fill the holes

Access control on SAML & WSFED

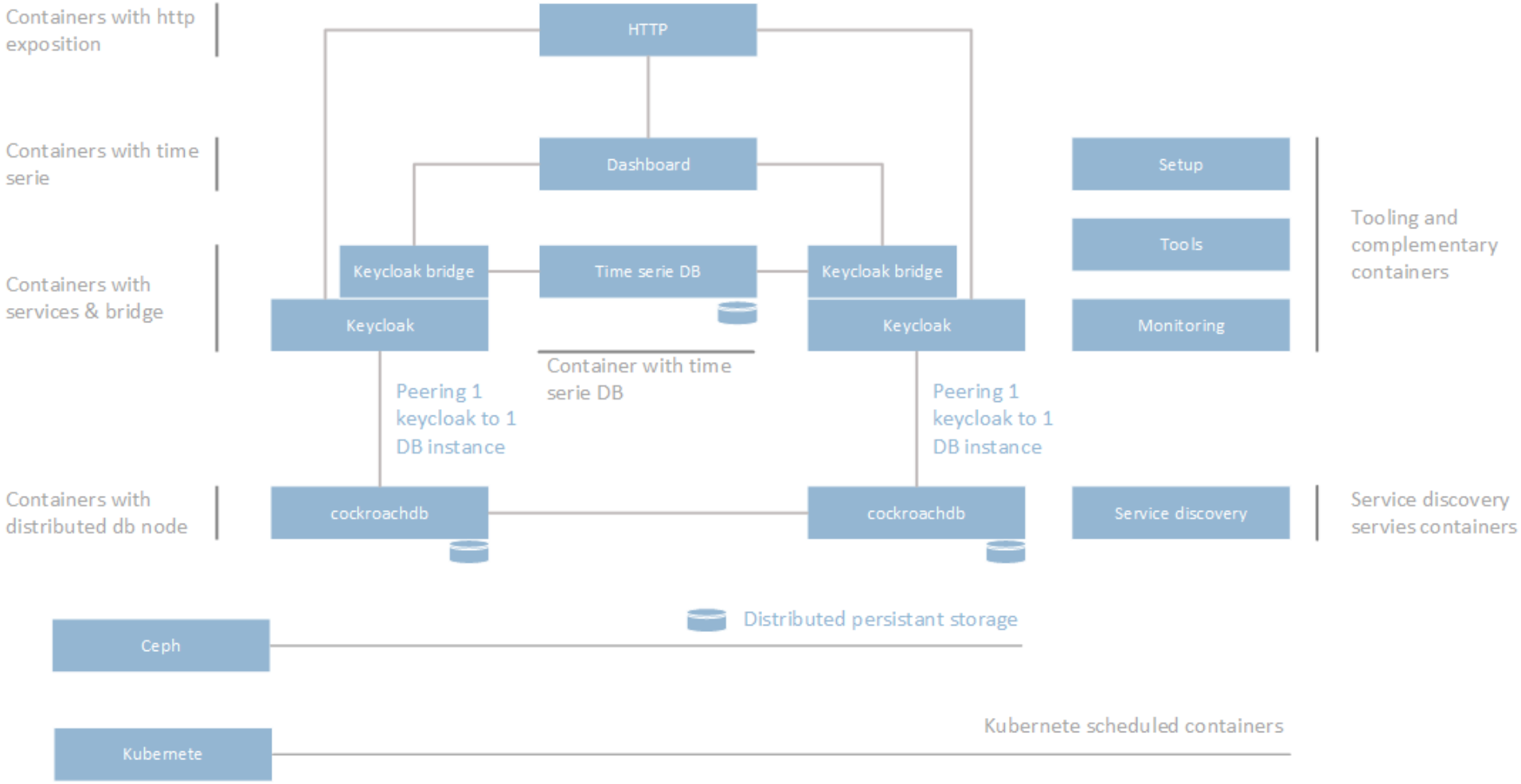
Extend access control available to OICD to SAML and WSFED

Planned to be released on April 2018

Our current runtime setup

First an appliance then, build your own saas

Appliance design



Conclusion

Federating Access and identity management is the first step to secure your new generation of services

By design it’s a very sensible and critical part

This talk focused only on 1 axes

- We are doing a lot of work on the protect axis

Digitalization implies lot of security tradeoff

Don’t hesitate to explore our GIT repositories

- We plan to release a lot of other current works

We would like to create a communities around security and digitalization

Questions ?

This slide deck is avaiable online
https://github.com/cloudtrust/talks