Knowledge Sharing with Partner
Application Architecture

3DEXPERIENCE®

DASSAULT SYSTEMES | The 3DEXPERIENCE® Company

The path to **3D**EXPERIENCE

3DEXPERIENCE
Platform/Apps/Industry Solutions

V6 Architecture
Platform & Apps
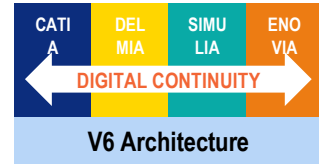
PDM/PLM
V5, SmarTeam, MatrixOne

Business experience platform
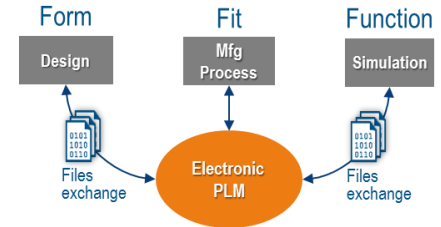Define and simulate digitally the complete experience under multiple operating conditions

Engineering platform
Modeling and simulation platform for the product lifecycle

CATIA	DELMIA	SIMULIA	ENOVIA

DIGITAL CONTINUITY

V6 Architecture

PDM / PLM connecting systems
Flexible data model and process foundation

Form — Design
Fit — Mfg Process
Function — Simulation

Files exchange — Electronic PLM — Files exchange

3DEXPERIENCE Platform: 1 Platform, 2 Configurations

3DEXPERIENCE®

2 Configurations

① Business Innovation (IFW)
Digitally connect all users in the value stream

3DPassport	3DCompass	3DDashboard	3DSwym	3DPlay	3DDrive	3DSearch	6Wtags	3DMessaging	Users Group

② Industry Innovation (CSV)
Collaborate across disciplines with full flexibility and traceability to define and develop innovative products

3DSpace	ENOVIA Collaboration & Approvals	ENOVIA Collaborative Lifecycle	ENOVIA Product Explorer	ENOVIA Compare	ENOVIA Bookmark Editor	ENOVIA Classification & Reuse	ENOVIA Collaborative Tasks	ENOVIA Route Management	Collaboration for Microsoft

Business Innovation (IFW) – apps and services

3DPassport
Identity and authentication management.

3DCompass
One-click access to Service, Roles & Apps.

3DDrive
Organize, share and manage files. Cloud only

3DSwym
Share expertise, knowledge and skills in communities.

3DMessaging
Connect instantly in context and share designs with 3D snapshot.

3DComment
Share your thoughts, engage in discussion with peers.

3DNotification
Update users about any activity on the platform.

Users Group*
Collaborate with Users and Groups of Users.

NEW APP

3DPlay
Visualize and review 3D designs in real-time.

3DEXPERIENCE®

3DDashboard
Aggregate all the information that matters to your business.

3DSearch & 6WTags
Search and discover content. Tag content along 6 dimensions (Who–What–When–How–Where–Why)

Platform Manager
Enterprise Modeling & Control Centers
Apps licensed by IFW for Admins only

Communities Control Center
Enterprise Control Center
Members Control Center
Drives Control Center
3DPassport Control Center

Mobile apps
3DPlay iOS
3DPlay Windows 10
3DDrive

***Users Group** will be available in FD01

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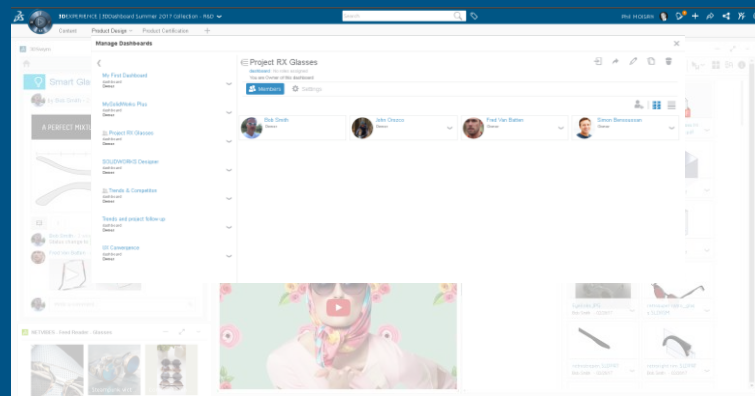
Aggregate all the information that matters to your business

▶ Create your dashboard to monitor the things you care about (enterprise systems, web, projects, …)

▶ Follow trends, be alerted by data feeds, and at the same time monitor enterprise processes and data

▶ As **3D**EXPERIENCE apps continue to **leverage the 3DDashboard**, the user experience is enhanced significantly

3DDashboard
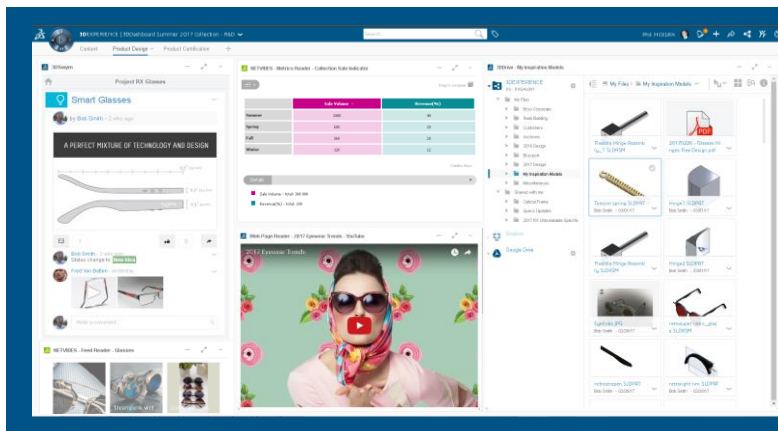
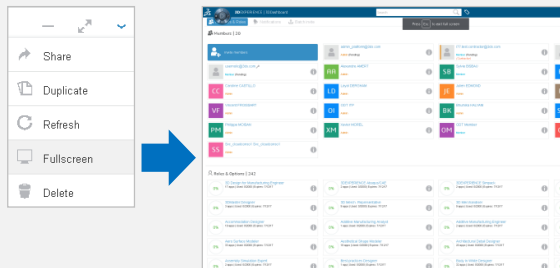*Collect data from your company and the web…*   *and share it on a dashboard with other users*

3DDashboard

Full-screen mode for widgets in dashboard

▷ Focus on your widget app

▷ Remove noise from dashboard/tabs/widgets

▷ No more dashboard tabs, no more widgets header

Undo for delete in Dashboard

Deleting a widget, a tab or even a dashboard can now **Click to Undo**
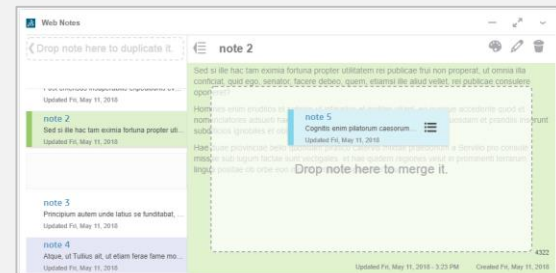

A dedicated pop up is displayed (10 seconds only) if user wants to Undo

Web Notes app

▷ Concurrent edition (prevent erase of content previously added by another user on same app instance)

▷ Rich Text Editor enhancements

▷ Merge note (by drag & drop)

▷ Duplicate note (by drag & drop)

▷ Search – filter notes and highlight content in notes

❷ Social Collaboration

▶ Create and participate in communities around common areas of interest, post blogs, review- comment- and exchange observations and findings with a broader audience

▶ Collaborate in real time and share 3D content and markups

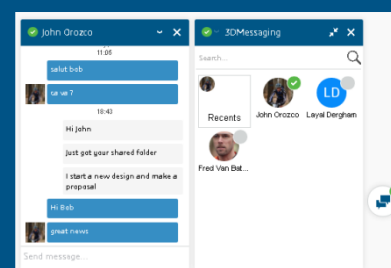▶ Receive notifications about new content or activity on the platform

3DSwym

3DComment
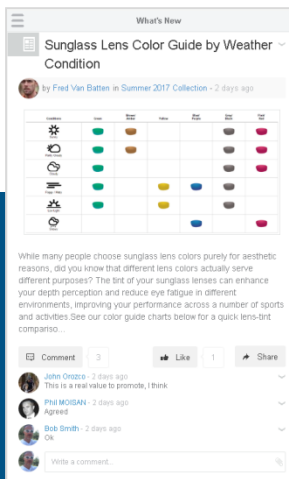
3DNotification

3DMessaging

I The **3DEXPERIENCE**® Company
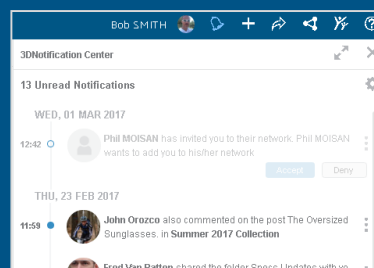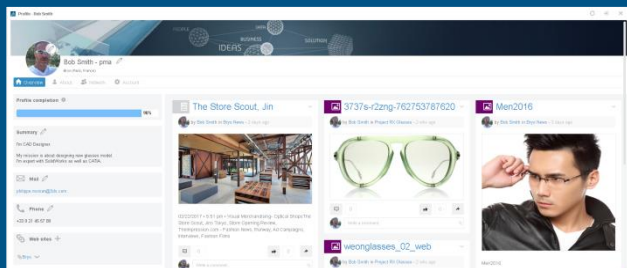
3DSwym community experiences

Explore Ideas

Improved UX for managing ideation funnels

Browse the Gallery

Engaging user experience, leveraging latest technology

Reveal & Manage Members

Best-in-Class Mobile Experience

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3DComment for engaging with peers

Display Content
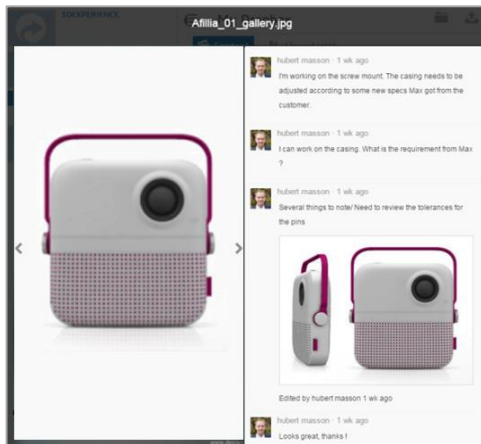
Embed any content with
URI in the comment

React
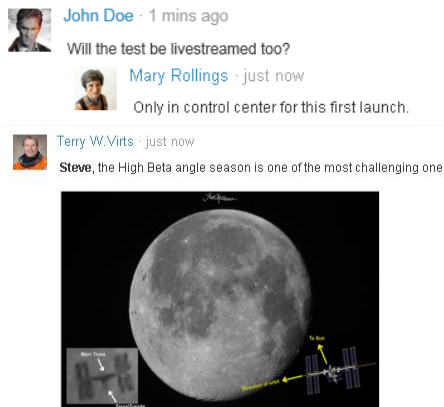
- Positive action
- Unlike to cancel previous like
- Counter for number of likes

People who like this:

- User list (picture, first and last name)

*Available in **3D**Drive and **3D**Swym in R2017x. Other apps to leverage 3DComments in subsequent releases.*

3DNotification delivering email and live alerts

Deliver notifications from platform as well as apps.
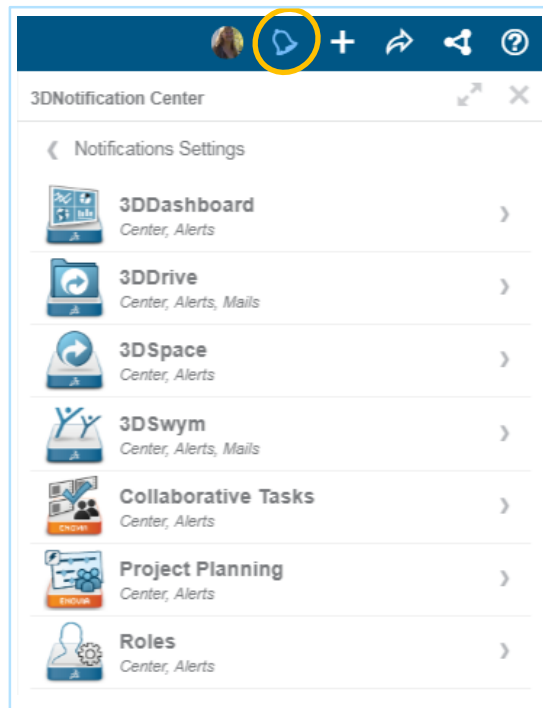
Email and live alerts!
Popup for 5 seconds and click for action
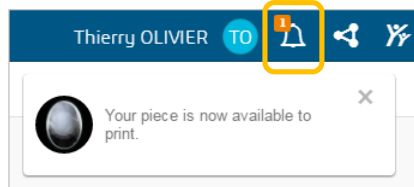
Email – option in Settings
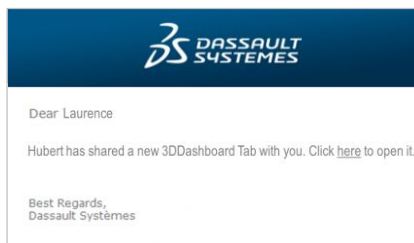
Notifications may include message, pictures, links, buttons
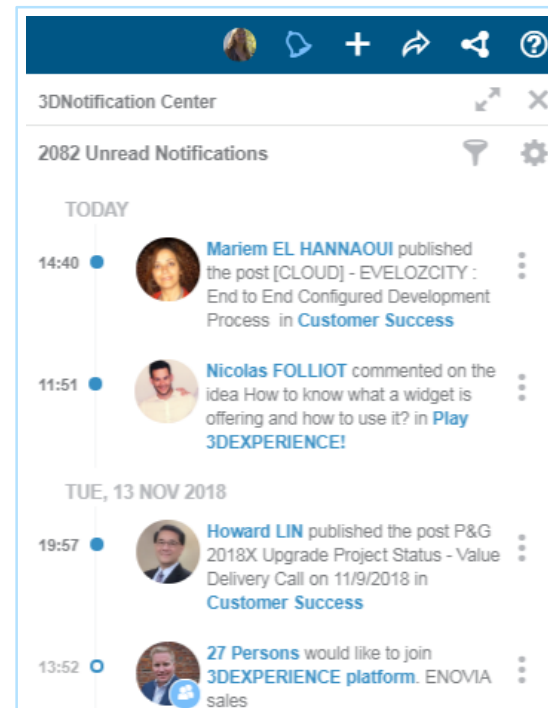
③ Search, navigate and discover content

▶ Discover in one click any data stored in the **3D**EXPERIENCE platform simply by typing key words in the search field

▶ Use 6WTags to refine your navigation

3DSearch

6WTags
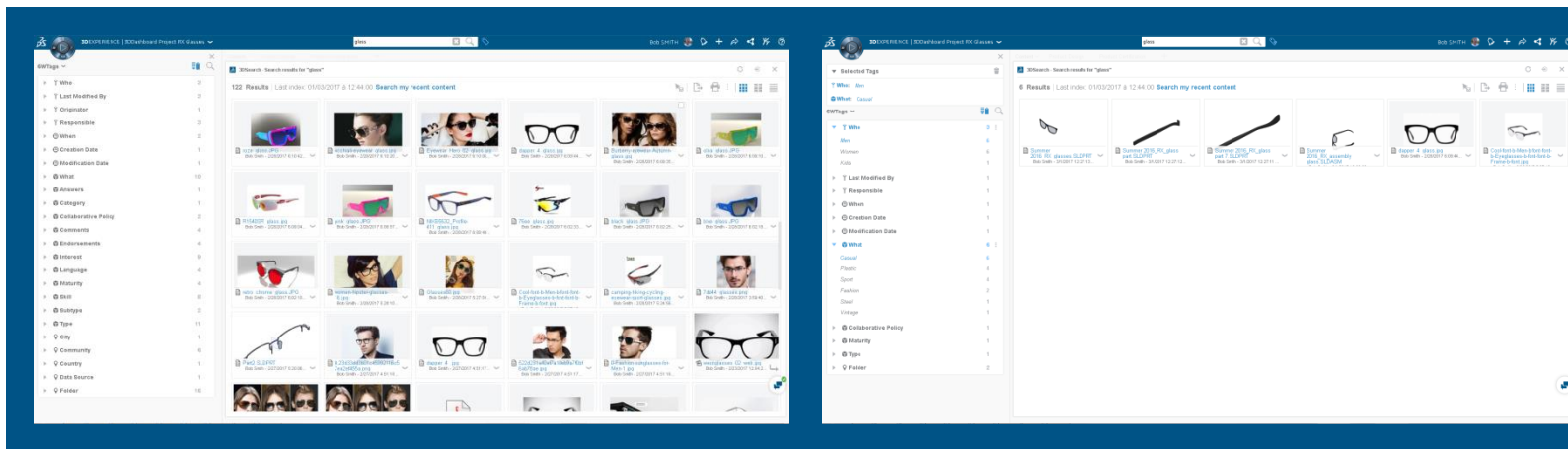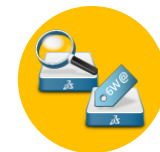
3DSearch to search across the enterprise

Unique filtering to find what you need faster.

Search across all apps
Search for both meta-data as well as unstructured data in files, posts etc.

6WTags
Content in collaborative spaces and communities is tagged automatically when saved using one or more tags describing the content in terms of "Who, What, When, Why, Where, and How".

Users can also add their own tags and use them to filter the search results.

In-context Analytics
for quick analysis of search content.
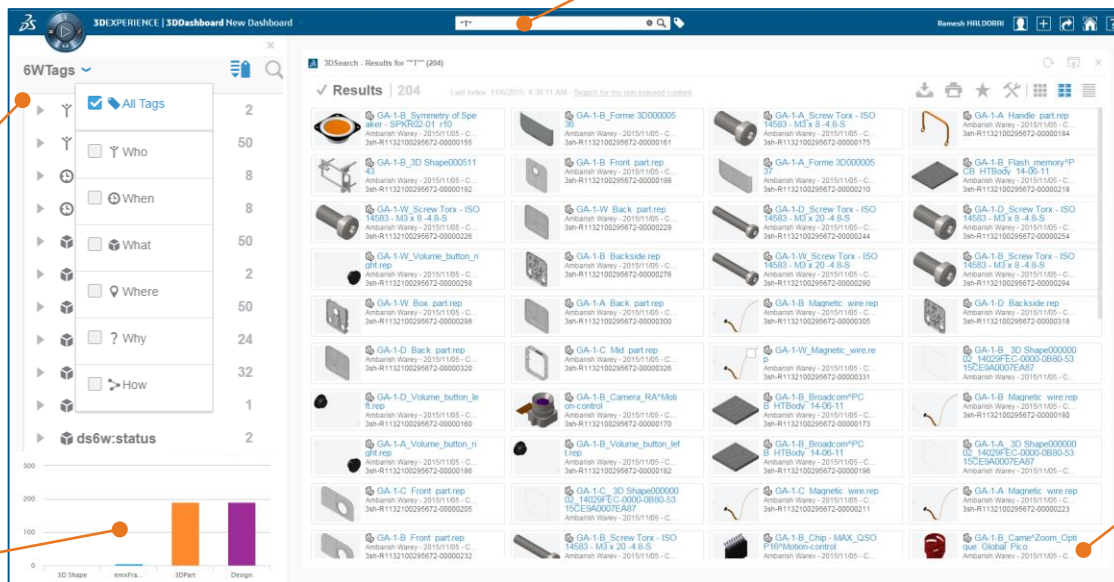
Launch and open 3DPlay directly from the search results.

3DPassport: **3D**EXPERIENCE ID
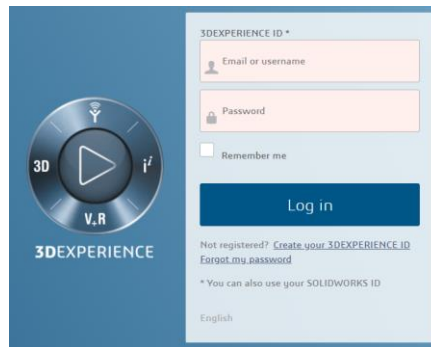
User id is now called
3DEXPERIENCE ID

New tab **Security** in **My Profile**
Change password, 2-Factor Authentication…

Notification by email in case of account update

3DPassport: Passport Control Center *On Premise*

Manage Authentication Options in a Dashboard

▷ Security: 2-Factor Authentication, Password Management, HTTP Throttling, Lockout

▷ Integration: Repository, SAML, oAuth Proxy

▷ Configuration: General, Advanced, Trust store

Overall **3D**EXPERIENCE Portfolio and Architecture

Industry Solution Experiences (ISE)

Industry Process Experiences (IPE)

3DEXPERIENCE | 3DDashboard Business Operations

Identity   Stores   Customers   Collections   Social Media Listening

3DEXPERIENCE Open

Governance & Lifecycle-centric Roles

Design & Engineering-centric Roles

Manufacturing & Production-centric Roles

Simulation-centric Roles

3D Design Experience for Professionals Roles

Collaborative Innovation

Platform Contributors

3DDashboar   3DSwym   3DSpace   3DPlay   3DPassport   3DSearch   3DComme   3DMessaging   3DCompass

Infrastructure
(Compute, Network, Storage)

Industry Portfolio

Unified User Experience

Packaging Roles

Platform Services

Out of the Box Platform Capabilities

3DEXPERIENCE Platform n-Tier Web Architecture (Logical View)

Presentation

Webtop Clients
Ex.: ENOVIA Apps, 3DDashboard, 3DSwym, Next GEN Apps

Native Clients
Ex.: CATIA, DELMIA and SIMULIA Apps, CATIA V5, SolidWorks, xCAD,...

Clients

HTTPS / WSS

Reverse-Proxy

Full Web Protocol
Modular & Reusable
Stateless
Scalable
High Availability (Active-Active)
Secure
Single Source of Truth

Logic and Openness

WWW

3DComment

3DNotification

Web Application Server
TomEE+
Java Virtual Machine

3DSpace

License Server (DSLS)

3DDashboard

3DPassport

3DSwym

3DSearch

Data

3DSwym Video Convertor

3DSwym Index

3D Index Server (*)

3DSpace Index

Database Server Metadata Repository

File Server(s) (FCS) Long Fields Repository

(*) : Optional for Thumbnails generation in r2019x GA

3DEXPERIENCE Platform: 3-Tier Web Architecture

Architecture for Growth and Availability

Presentation

Load balancing : (Fail-Over)
Ability to dispatch load on different Application servers or File servers.

Fail-over :
In case of failure of an application server transaction is dispatched on another application server.

Logic and Access

Active/Active

Fail-Over

One Server

3DNotification

3DPassport   **3DDashboard**   **3DSearch**   **3DComments**   **3DSwym**   **3DSpace**

Active/Active

Licensing Servers (DSLS) (3 servers)

Data

Active-Active

(*) optional

Fail-Over

Active-Active

Active/Active

Active/Active

3DSwym Index Server

3DIndex Server (*)
Thumbnail Buildtime

3DSpace Index Server

Database Server: *Metadata Repository*

File Collaborative Server(s) (FCS) *Representation and Content Repository*

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3DEXPERIENCE Architecture
On-Premises Deployment Example

Failover

HTTPS

Reverse proxy / Load balancer

LB   LB   Failover   LB   LB   LB   LB   Failover Cluster

3DPassport

3DDashboard

3DNotification

3DComment

3DSwym Front end

3DSearch

3DSpace + 6WTags+ 3DCompass Front end

License Control

3DSwym Index

3DSwym Media Processor

3DSpace Store

3DSpace Index

3D Index Server (only build 2D/3D thumbnails)

3DSwym Store (NFS)

Database (Oracle DB, MS SQL Server)

Legend :

Machine

Connexion (http, https, nfs, ...)

Database Connexion (SQL, MQL)

NFS share

LB   Load Balanced

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3DEXPERIENCE Architecture
On-Premises Deployment Example

[Compact Production]
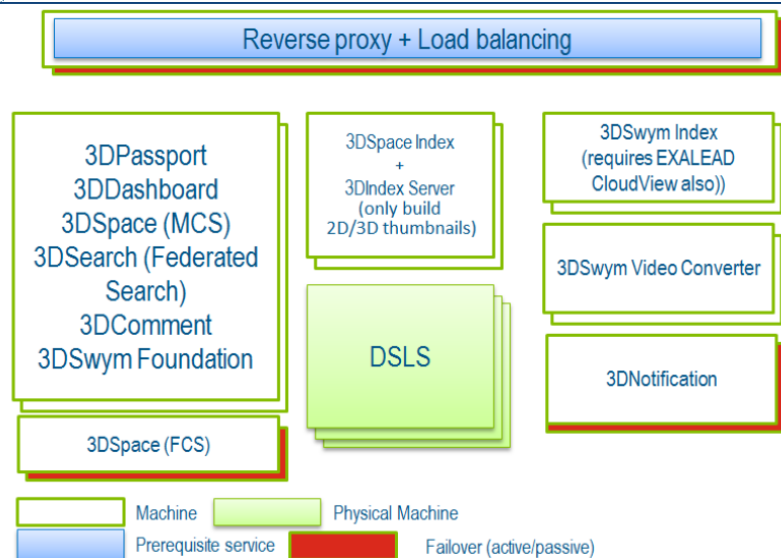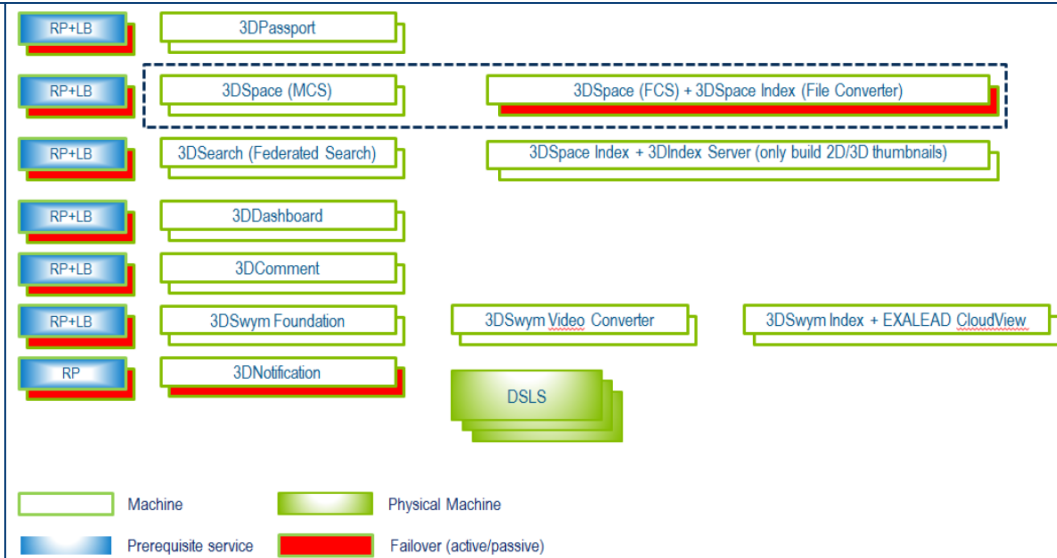
[Separated Production]

왜 HTTPS 인가?

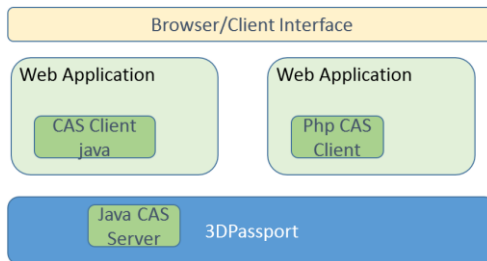## 3DPassport

Single sign-on for All 3DEXPERIENCE Platform

Based on CAS Specification
(http://en.wikipedia.org/wiki/Central_Authentic ation_Service)

Compliant with any LDAP v3 directory

SAML 2. 0 based integration

2-Phase Authentication Option

Browser/Client Interface

Web Application
- CAS Client java

Web Application
- Php CAS Client

Java CAS Server — 3DPassport

🔗 **System Security Considerations**

🔗 **Secure Transport (https)**

All communication with the CAS server MUST occur over a secure channel (i.e. TLSv1). There are two primary justifications for this requirement:

1. The authentication process requires transmission of security credentials.
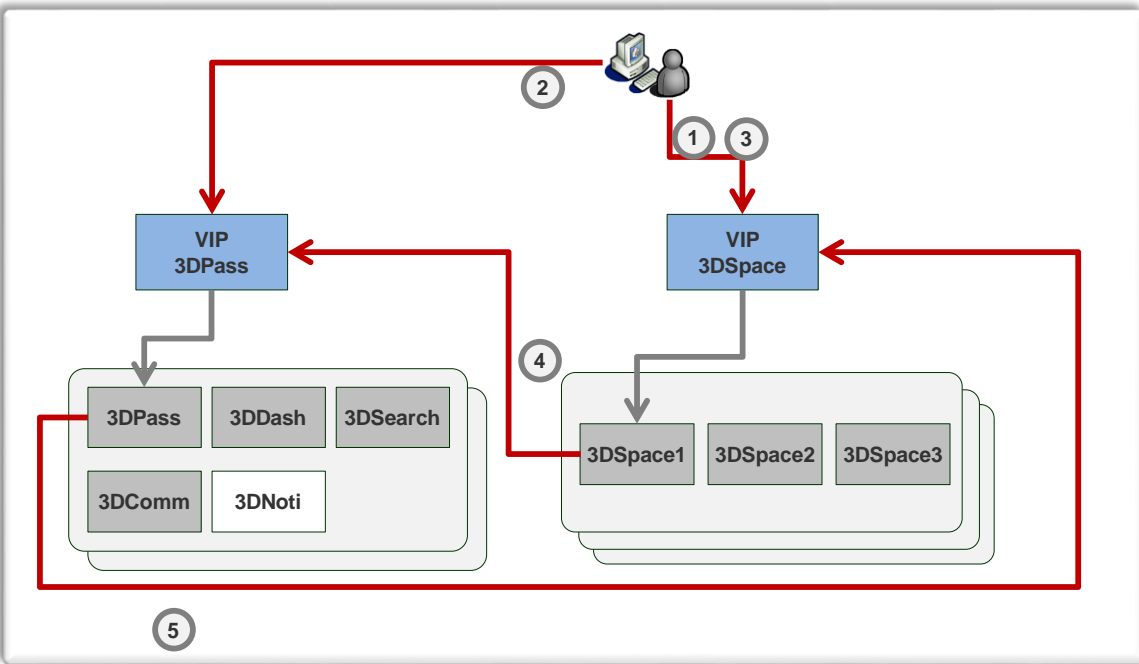2. The CAS ticket-granting ticket is a bearer token.

Since the disclosure of either data would allow impersonation attacks, it's vitally important to secure the communication channel between CAS clients and the CAS server.

Practically, it means that all CAS urls must use HTTPS, but it **also** means that all connections from the CAS server to the application must be done using HTTPS:

- when the generated service ticket is sent back to the application on the "service" url
- when a proxy callback url is called.

https://apereo.github.io/cas/4.2.x/planning/Security-Guide.html

Load Balancing 과 Cookie 기반 Session Affinity

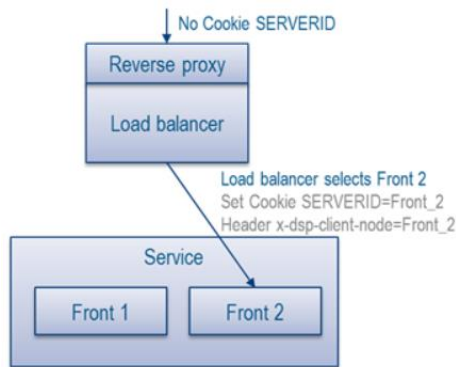| 번호	설명
1	사용자가 HTTPS로 Service 요청 Login 안되어 있으므로 3DPassport로 redirect
2	3DPassport로 Login 요청 3DPassport는 Service Ticket 발행
3	발생된 Service Ticket(ST)과 함께 재 요청
4	요청 받은 서버는 3DPassport에게 Service Ticket Validation 요청 (**proxyValidate**)
5	3DPassport는 확인 후 해당 SP에 Callback 처리 (**proxyCallBack**) ➔ **사용자가 3DSpace1로 접속 했으므로, 이 ProxyCallback도 3DSpace1에 요청 해야 됨** ➔ **IP 기반 Load balancing 으로 구현 안됨** ➔ **Cookie 기반 LB로 구현 가능** ➔ **Cookie 이름 SERVERID**

Virtual Host (RB+LB)　　Web Application Server(TomEE)　　HTTPS
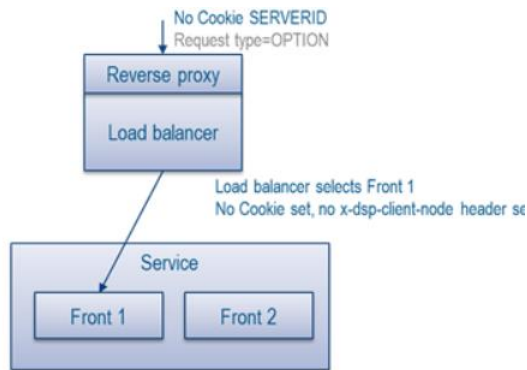
Physical / Virtual Machine　　HTTP

https://apereo.github.io/cas/4.2.x/protocol/CAS-Protocol.html#proxy-web-flow-diagram

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Load Balancing 과 Cookie 기반 Session Affinity

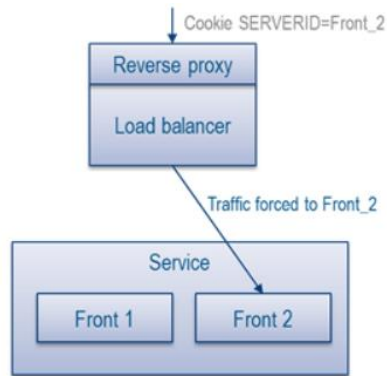**[Standard First Request]**

No Cookie SERVERID

Reverse proxy

Load balancer

Load balancer selects Front 2
Set Cookie SERVERID=Front_2
Header x-dsp-client-node=Front_2

Service

Front 1   Front 2

[Option Request]

No Cookie SERVERID
Request type=OPTION

Reverse proxy

Load balancer

Load balancer selects Front 1
No Cookie set, no x-dsp-client-node header se

Service

Front 1   Front 2

[Standard Other Request]

Cookie SERVERID=Front_2

Reverse proxy

Load balancer

Traffic forced to Front_2

Service

Front 1   Front 2

- Session affinity is performed through cookie injection
- For calls deprived of Cookies:
  - For **OPTION** call: do not set any Cookie (just set **CORS** headers and return 200, see reverse proxy configuration for content)
  - For all other calls: Set the cookie with the Node ID, and set the **x-dsp-client-node** header with the same Node ID
- Health-checking through HTTP calls..

Load Balancing 과 Cookie 기반 Session Affinity

1) Client sends a request to 3DSPACE in HTTPS that is converted to HTTP via the RP and forwarded to LB
2) LB sets a header **x-dsp-client-node** with the selected node ID (ex: 3DSPACE_1)) and forwards the request to one of available 3DSPACE nodes (round robin)
3) 3DSpace CAS client retrieves the node ID from **x-dsp-client-node** header of the request and sets the same value in the **serverId** param in the query string of the service URL param provided in the query string of the redirection URL to 3DPassport. The 3DSpace service url is reconstructed based on the **X-Forwarded** headers provided by the RP (or LB acting as RP in some cases):
The following headers **MUST** be provided:
  - **X-Forwarded-Host** (usually provided by the reverse proxy. Ex: mod_proxy in Apache httpd set this header automatically)
  - **X-Forwarded-Port** (ex: 443. This is usually set at the LB level)
  - **X-Forwarded-Proto** (ex: https: This usually set at the LB level)

Service URL = x-forwarded-proto://x-forwarded-host:x-forwarded-port/?serverId=NODE_ID

4) LB sets the **SERVERID** cookie (3DSPACE_1) in the response sent to the client
5-6) Client is redirected to 3DPassport, the user authenticates and is redirected back to 3DSpace with a service ticket.
The client sends the request to 3dspace with the SERVER_ID cookie
7) LB reads the **SERVERID** cookie and route the request to the 3DSPACE_1 frontend
8) CAS client gets the ticket from the request and validate it against 3DPassport by providing the 3DSpace proxy callback URL that also carries a **serverId** param:

Callback URL = x-forwarded-proto://x-forwarded-host:x-forwarded-port/proxyCallback?serverId=NODE_ID

9) 3DPassport sends callbacks (proxy/logout) to 3DSPace URL with **serverId** in the query string and additionally a **SERVERID** in the Cookie header (16x and later only).
The LB can then route the request to the correct 3DSpace node based on the **serverId** param or **SERVERID** cookie
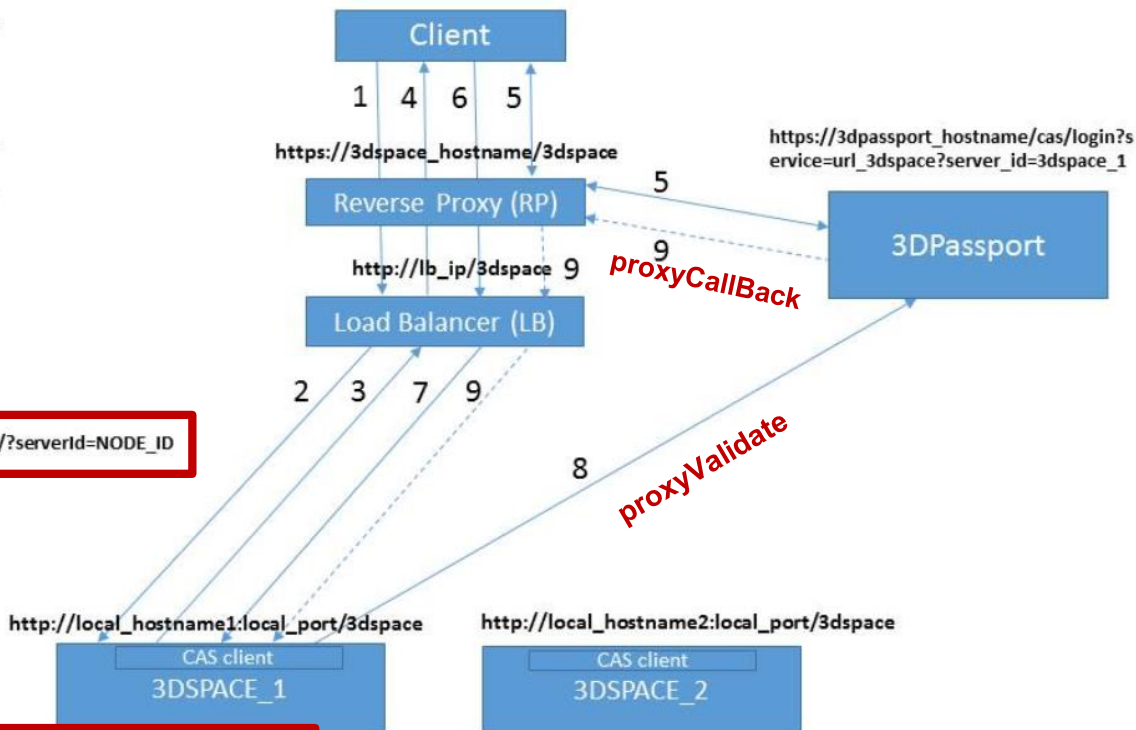
왜 Service별 FQDN이 필요 한가?

Session affinity cookie names

```xml
<bean id="serverIdCookieParamNames" class="java.util.HashMap">
    <constructor-arg>
        <map>
            <entry
                key="3dspaceserverid"
                value="3DSPACESERVERID" />
            <entry
                key="3dsdashserverid"
                value="3DDASHBOARDSERVERID" />
            <entry
                key="3dsearchserverid"
                value="3DSEARCHSERVERID" />
            <entry
                key="3dswymserverid"
                value="3DSWYMSERVERID" />
            <entry
                key="3dcommentserverid"
                value="3DCOMMENTSERVERID" />
            <entry
                key="${cas.lb.stickysession.serverid.param.name:serverId}"
                value="${cas.lb.stickysession.cookie.serverid.name:SERVERID}" />
        </map>
    </constructor-arg>
</bean>
```

Note: If the **same FQDN** (Full Qualified Domain Name) is used for all services, then **one cookie name must be used per service** to facilitate load balancing implementation, therefore we **recommend one FQDN per service**.