Experience of enriching Tizen HTML5 application

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  - Collaboration
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  - Tizen specific functionalities
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Background introduction

One day I was inspired by Google Doc…

What is HTML5 ?

HTML5 New Features

HTML5 is the latest HTML standard. It walks hand in hand with CSS3, the latest CSS standard.

HTML5

HTML5 Elements
HTML5 Semantic
HTML5 Input types
HTML5 Graphics
HTML5 Video / Audio
HTML5 Geolocation
HTML5 Drag / Drop
HTML5 Local Storage
HTML5 Web Workers

CSS3

CSS3 Borders
CSS3 Backgrounds
CSS3 Gradients
CSS3 Fonts
CSS3 2D Transforms
CSS3 3D Transforms
CSS3 Transitions
CSS3 Animations
CSS3 Columns
CSS3 User Interface

www.w3schools.com/html/html5_intro.asp

Why I choose HTML5 ?

Benefits

- **Zero installation & timely upgrade**

  It makes app more accessible and feasible and updates can be performed in background and affect immediately
- **Offline cache**

  Allow app to work even when not connected to internet.
- **Graphics & audio & video**

  Strengthen app with rich cool features in standard way, without plugin.
- **Cross-platform & cross-browser**

  Write once, run everywhere!
- **Hybrid application on mobile**

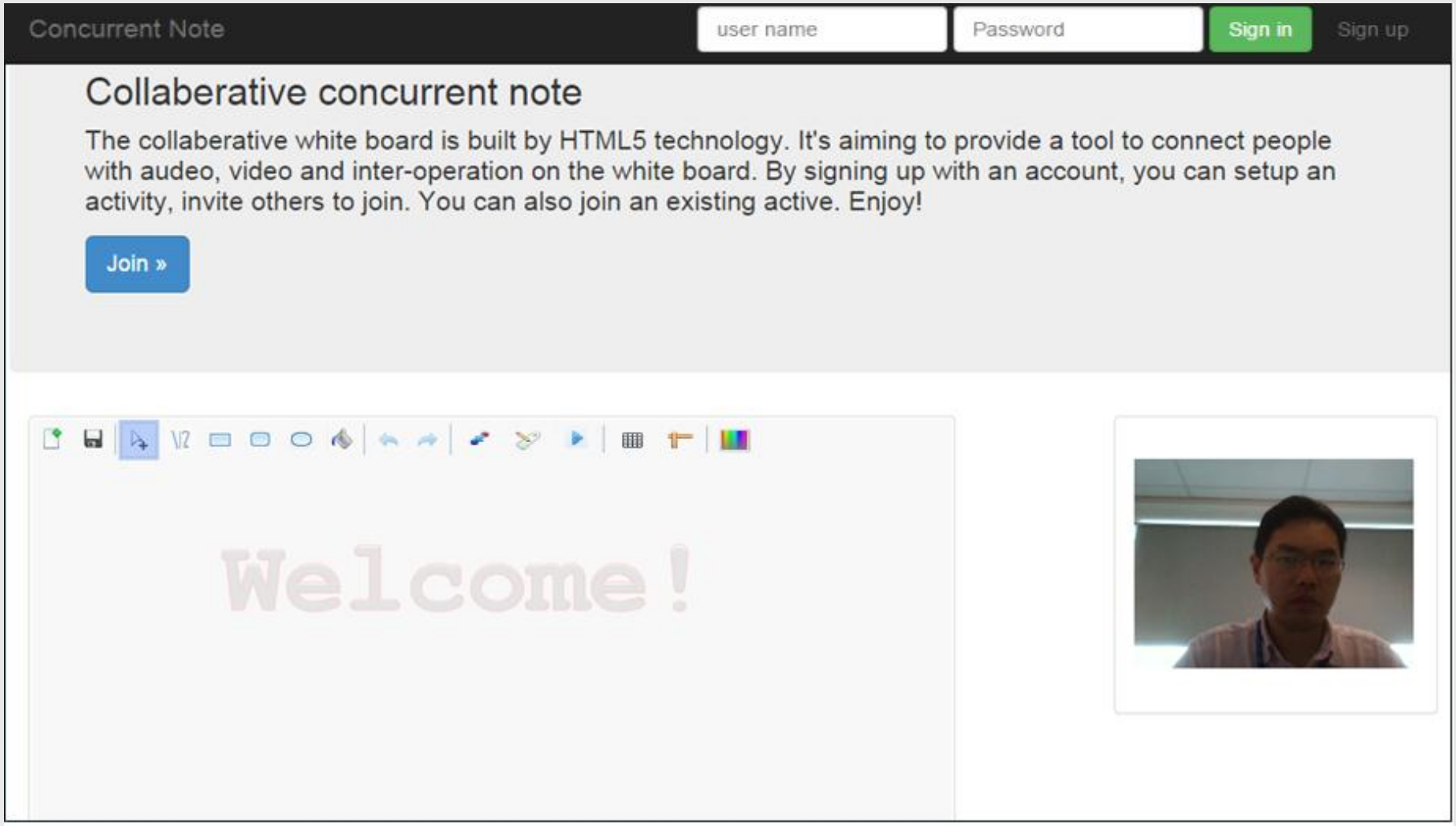
  Win-win when combine HTML5 with mobile development.
- **Websocket**

  Allow client to have full-duplex communication with server.

Concurrent Note

A quick glance…

It’s running on Tizen 3.0, with Crosswalk runtime



What business it can be applied for…

- **Network meeting**

  Allow attendees to share the same document and video based communication.

- **Online education**

  It’s good for teacher to interact with students for specific course.

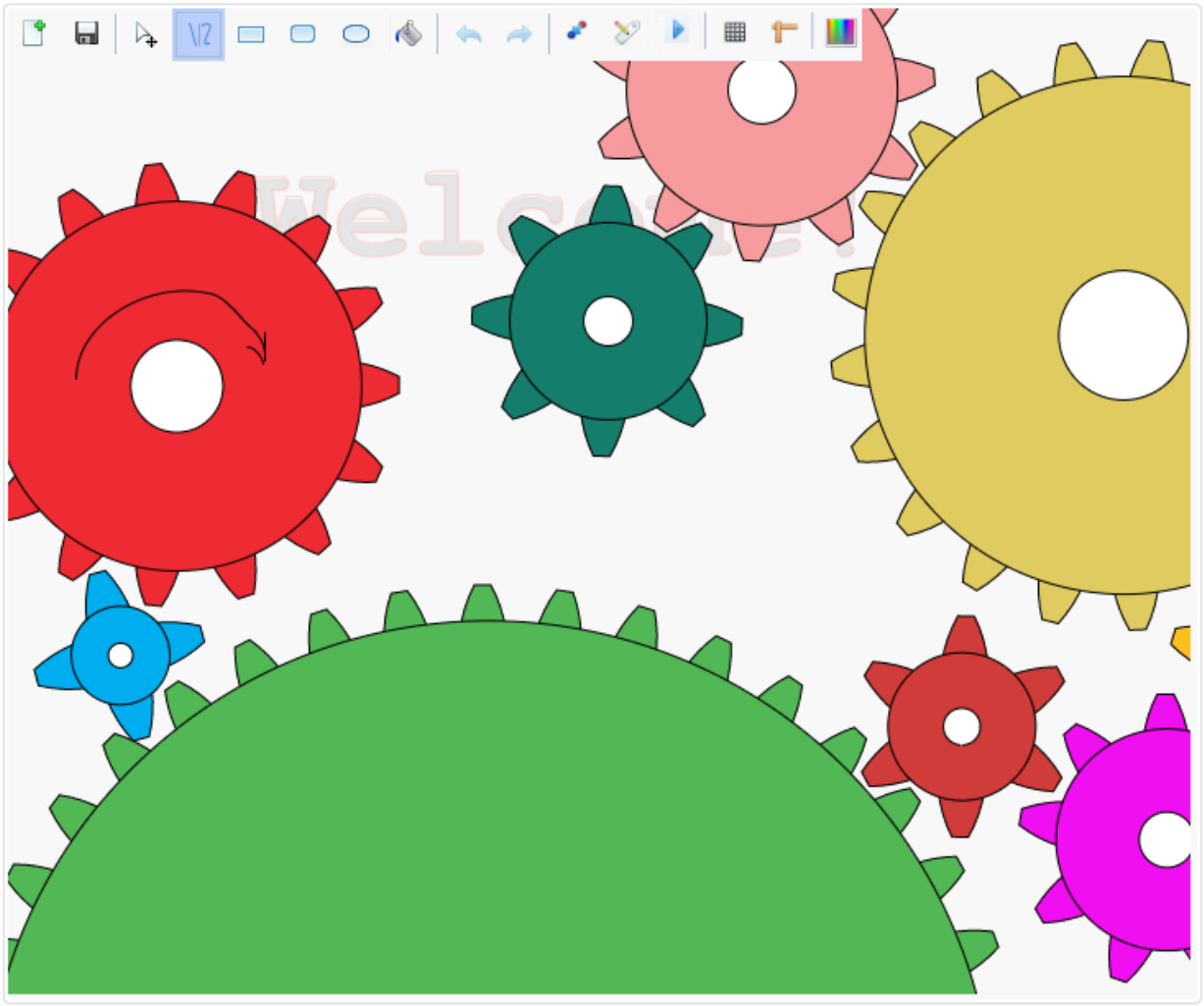
- **Collaborative work**

  Allow workmates / engineers to finish same job collaboratively.

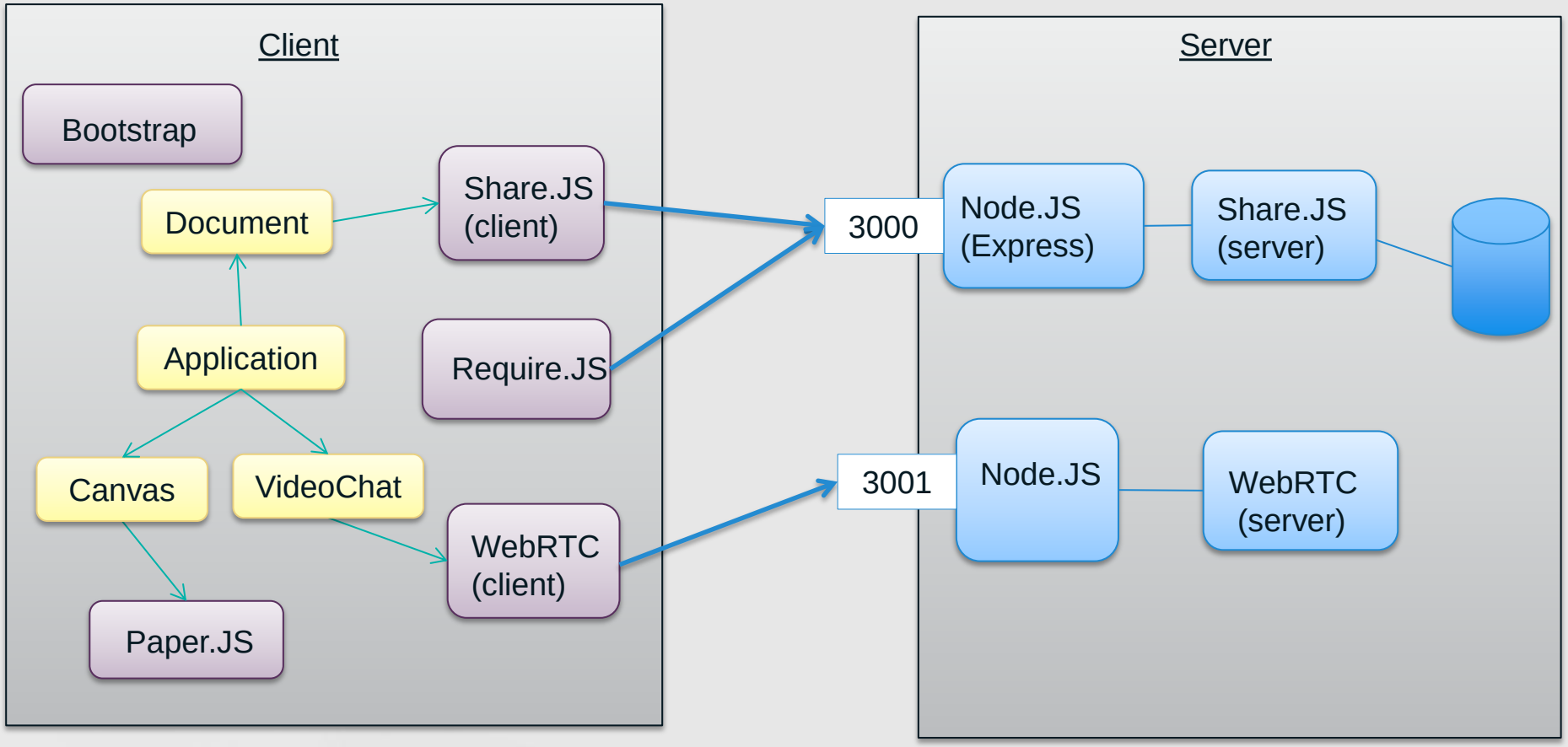
- **Customization for Tizen**

  Maximize Tizen capabilities by customizing the application.

My amazing story…



System diagram



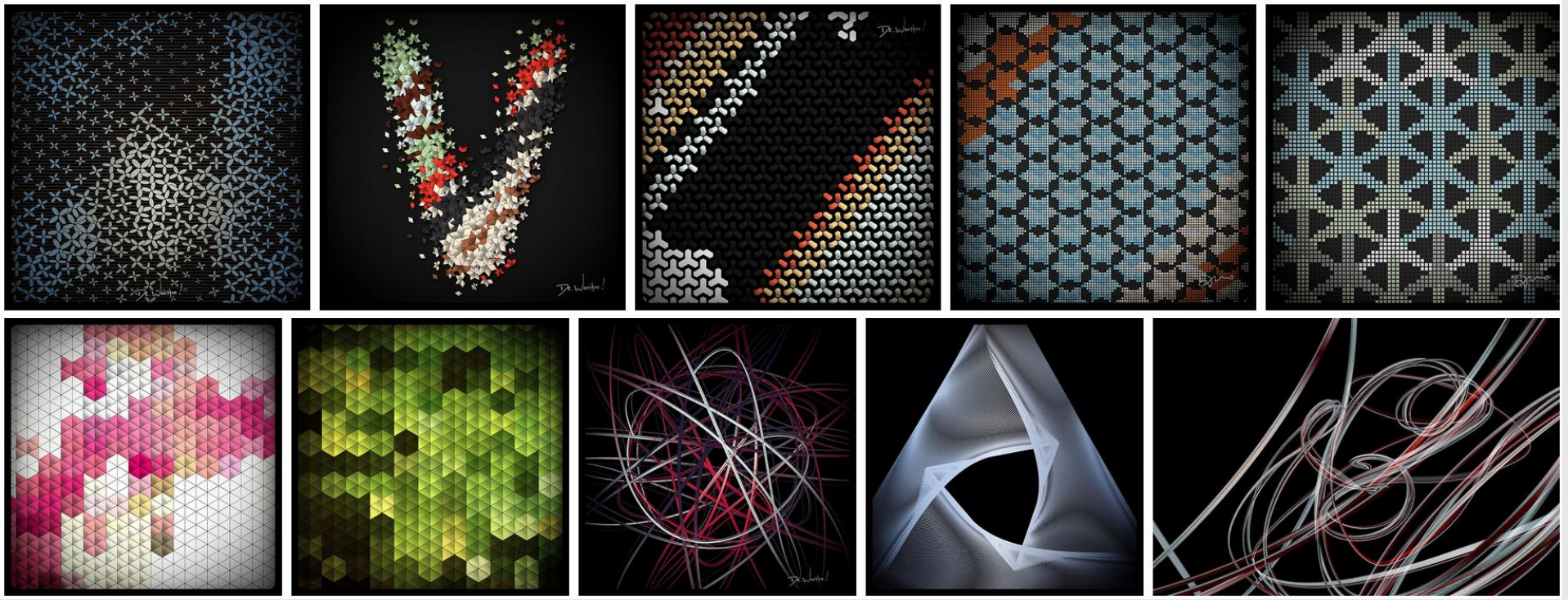
Open source

https://github.com/yejingfu/whiteboard

Technologies behind app

HTML5 Canvas vs. PaperJS…

Amazing art images by PaperJS

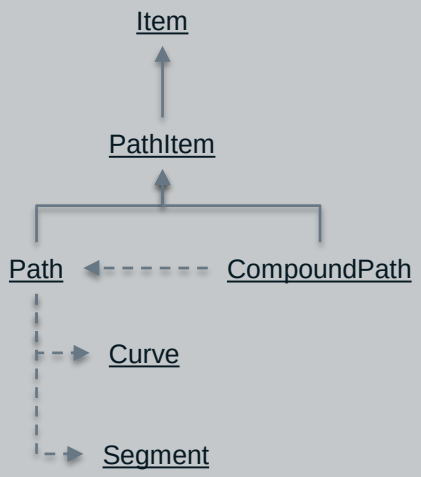


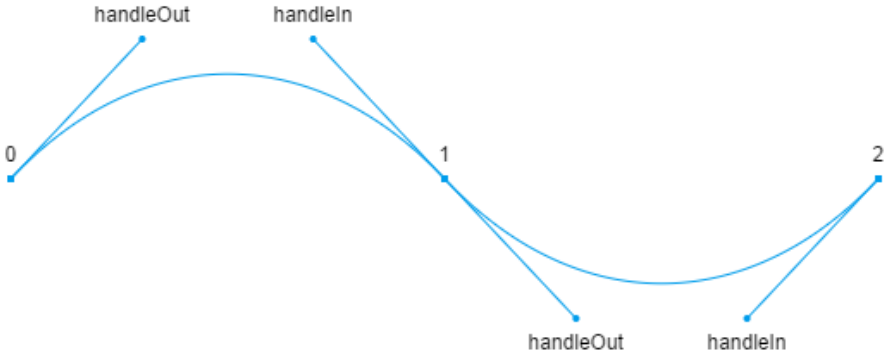
Object-Oriented programming API

```
// Basic Types
Point(x, y)
Size(width, height)
Rectangle(point, size)
Matrix(a, c, b, d, tx, ty)
```

$$\begin{bmatrix} x \\ y \\ 1 \end{bmatrix} = \begin{bmatrix} a & b & tx \\ c & d & ty \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ 1 \end{bmatrix} = \begin{bmatrix} a * x + b * y + tx \\ c * x + d * y + ty \\ 1 \end{bmatrix}$$

(Affine transformation)





(path = curves + segments)

Enhance 2D drawing by PaperJS…

- **Drawing:**
  - Primitives: line, curves, rectangle, ellipse, etc.
  - Fill with solid color or gradient color
- **Editing:**
  - Scale, rotate, snap, duplication, etc.
  - Transaction
- **Animation**

Collaboration by HTML5

It’s fun to play together.

…but how collaboration is working?

Do you know OT, the back hero?

Operational Transformation (OT) is a class of algorithms that do multi-site real-time concurrency. OT is particularly suitable for implementing collaboration features such as group editing in the Web context.

It has been adopted in Apache Wave and Google Docs.

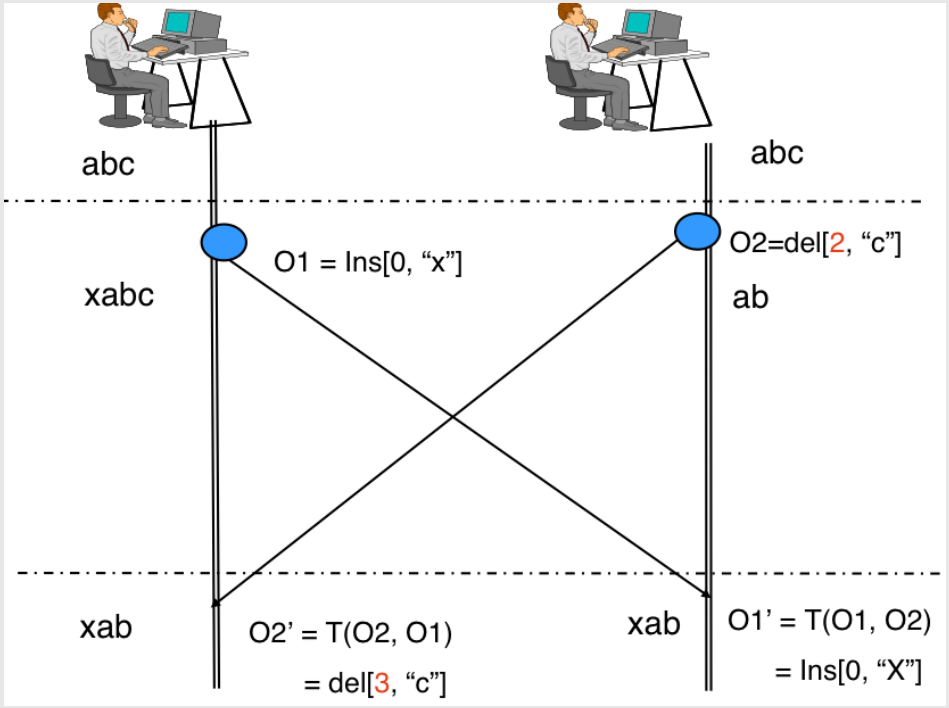
Collaborative systems using OT typically adopt a replicated architecture for the storage of shared documents to ensure good responsiveness in high latency environments, such as the Internet. The shared documents are replicated at the local storage of each collaborating site, so editing operations can be performed at local sites immediately and then propagated to remote sites. Remote editing operations arriving at a local site are typically transformed and then executed. The transformation ensures that application-dependent consistency criteria are achieved across all sites. The lock-free, nonblocking property of OT makes the local response time not sensitive to networking latencies

How is OT working?

O1 = Insert[0, "x"] // insert character "x" at position "0“
O2 = Delete[2, "c"] // delete the character "c" at position "2“

⇩

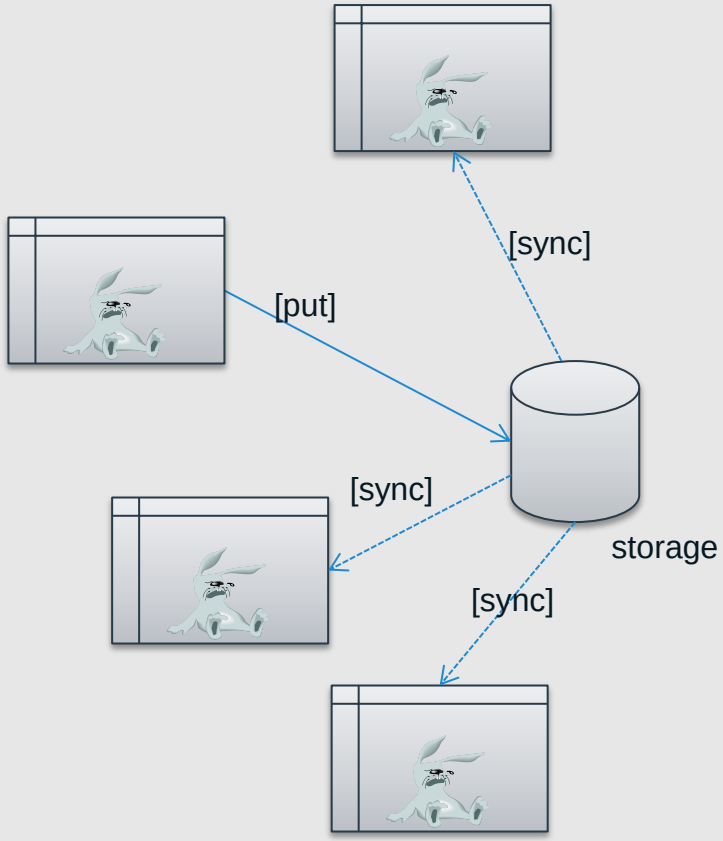
O1` = T(O1, O2) = Insert[0, "x"] // insert character "x" at position "0“
O2` = T(O2, O1) = Delete[3, "c"] // delete character "c" at position “3“



The import thing is the eventual consistency can be achieved by OT.

ShareJS implements OT

ShareJS generates operation for each edit. Operations are like git commit to document. If multiple users submit operations simultaneously, the server is responsible to transform the operations and apply to each client. Transformation is a bit like git rebase operation. The algorithm is very careful to make sure every client ends up with the same document, no matter what order the operations are actually applied in.



ShareJS has functions defined for either plan text or JSON objects.

Real-time communication by HTML5

Are you using Skype or QQ?

A revolution is happening now…

WebRTC is leading the revolution

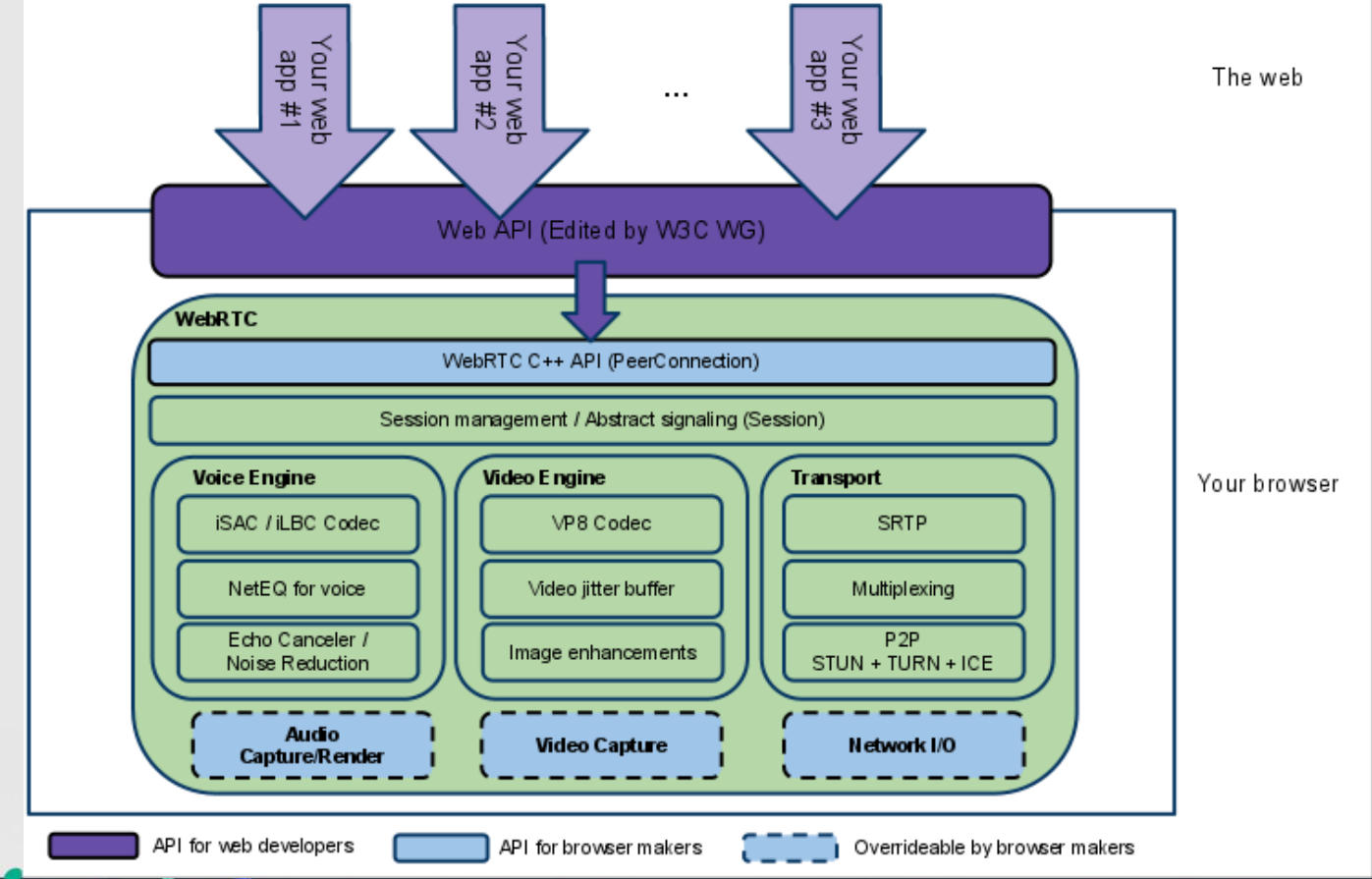
WebRTC is free, open project that enables web browsers with Real-Time Communication(RTC) capabilities via simple JavaScript APIs (without plugins). The WebRTC components have been optimized to best serve this purpose. WebRTC W3C standards are under drafting.

- **Installation is not needed**
- **Peer to peer communication**
- **Plugin killer**

www.webrtc.org/demo

WebRTC Framework

- Voice Engine
- Video Engine
- Transport



WebRTC API

- **getMediaStream / getUserMedia:**

  get access to data streams, such as from the user's camera and microphone
- **RTCPeerConnection**

  audio or video calling, with facilities for encryption and bandwidth management
- **RTCDataChannel**

  peer-to-peer communication of generic data

HTML5 is strengthening Tizen…

Tizen fully supports HTML5

No code change is required to run HTML5 application on Tizen.

You can choose Tizen SDK to develop HTML5 application in easy way.

An additional configuration defines specific Tizen functionalities:

```
// config.xml
<widget …>
    <tizen:application id="Yejingfu.ConcurrentNote" package="Yejingfu" required_version="2.1"/>
    <content src="index.html"/>
    <icon src="icon.png"/>
    <name>Concurrent Note</name>
    <tizen:privilege name="http://tizen.org/privilege/tizen"/>
    <tizen:privilege name="http://tizen.org/privilege/filesystem.read"/>
    <tizen:privilege name="http://tizen.org/privilege/filesystem.write"/>
    <tizen:privilege name="http://tizen.org/privilege/wifi.read"/>
    <tizen:privilege name="http://tizen.org/privilege/notification" />
    <tizen:setting screen-orientation="portrait" encription="enable" install-location="auto"/>
</widget>
```

Improve by Tizen capability

- **Touch**

  Touch capability make it easier to draw free-style curves on 2D canvas. The user interface becomes more friendly.

- **File system**

  By using Tizen API to access local file system, the application can save / load the ShareJS document to local device. Besides it enable users to record the video chatting to local device as well.

- **Security manager**

  Tizen provides resource encryption to protect the application from hacking.

- **Notification**

  The Notification API provides a way to notify current user of events that happen in the application. Currently the application can notify when more users join this session. More cool notifications will be added in the future.

- **Location-based service**

  Informing peer’s geographic location.

Summary

Two things make HTML5 rock

- **New technologies**

  They are unified under an official standard specification.

  They are making the Internet cleaner, leaner, faster and more visually appealing.

- **Mobile development**

  More and more developers chose HTML5 for building mobile apps. Both mobile and desktop are expanding support for HTML5.

  HTML5 would be key to business apps for company.

If you want to learn more HTML5 very cool features and demonstrations, please visit:
http://www.html5rocks.com

HTML5 consolidate Tizen

HTML5 provides easier way to develop applications for Tizen.

It would attract developers with shorter development cycles and lower costs by avoiding experiences of native code.

HTML5 would be the first alternative to develop app for Tizen.

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Q & A

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