

From Idea to MVP - Real World Projects

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VSS Vorlesung

Zurich, 13.05.2020

Axelra's Ventures



Moflix is a technology provider for telecom enterprises, that radically simplify the distribution and management of telco products.

Public Market Launch		109	
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Start	10.7.19	Go-Live	9.12.19
Calendar days	152	Working days	109
Teamsize	6 + 20	Links	moflixgroup.com , swype.ch



livealytics provides a complete analytics solution for measuring and benchmarking the performance of sales and live marketing promotion activities, trade shows and retail spaces.

Beta Go-Live		66	
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Start	28.05.2019	Go-Live	30.08.2019
Calendar days	94	Working days	66
Teamsize	5 + 2	Links	Livealytics.com



SIBEX is a Digital Asset Trading Tool for OTC professionals. By running on full nodes, it helps to eliminate the counterparty risk and discover totally new arbitrage opportunities.

Alpha Go-Live		72	
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Start	27.05.2019	Go-Live	08.09.2019
Calendar days	102	Working days	72
Teamsize	7 + 3	Links	sibex.io



FQX enables organisations to create, accept and transfer promissory notes electronically. FQX operates the eNI™ system, an internationally distributed electronic registry system that records rights and beneficial ownership interests in electronic negotiable instruments (eNI™) and allows efficient and secure transfers.

Alpha Go-Live		WIP	
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Start	19.12.2019	Go-Live	June 2020
Calendar days		Working days	66
Teamsize	7 + 5	Links	fqx.ch

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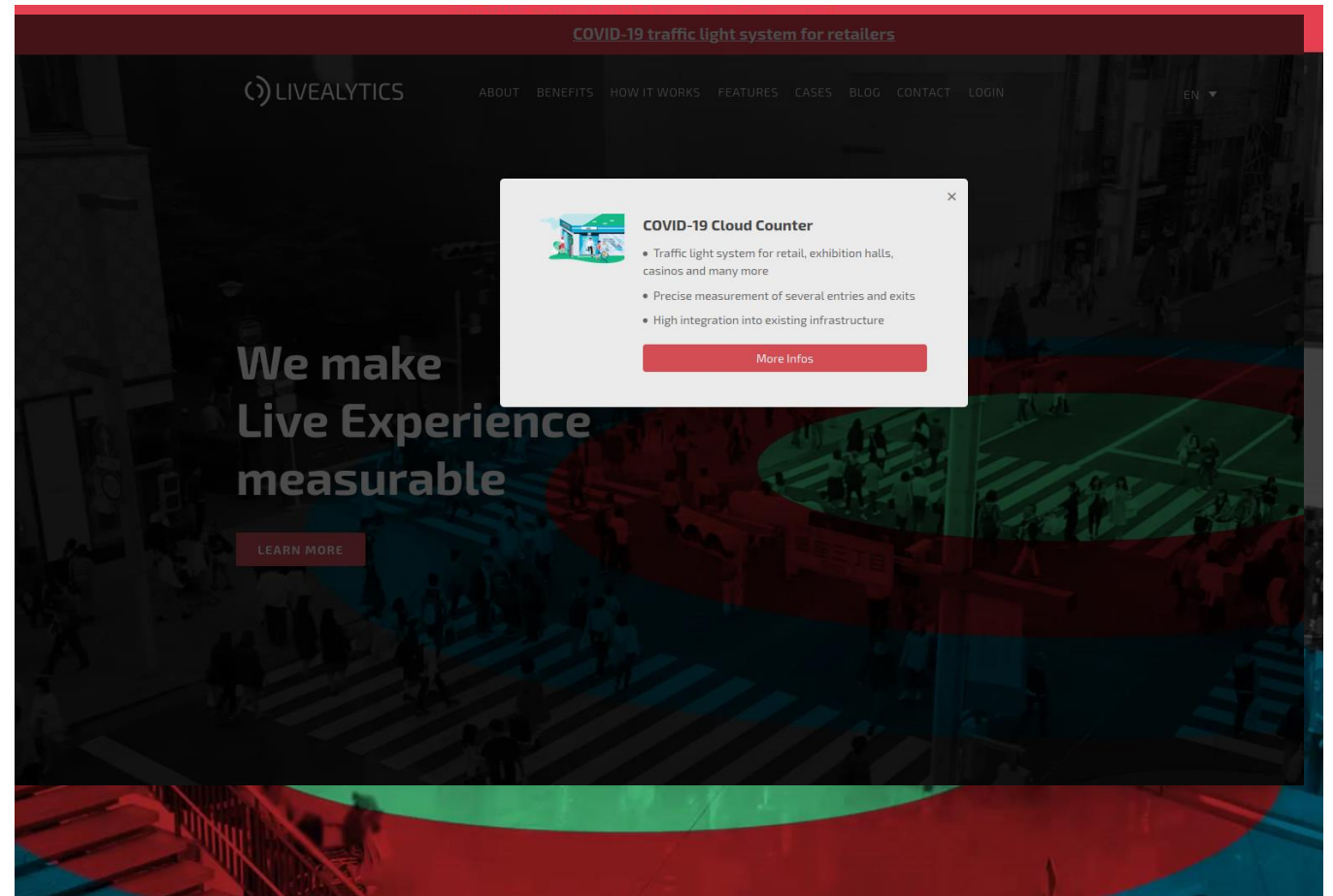
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- Measurements and statistics for events and fairs
 - COVID-19



Can you deliver in 1
week?

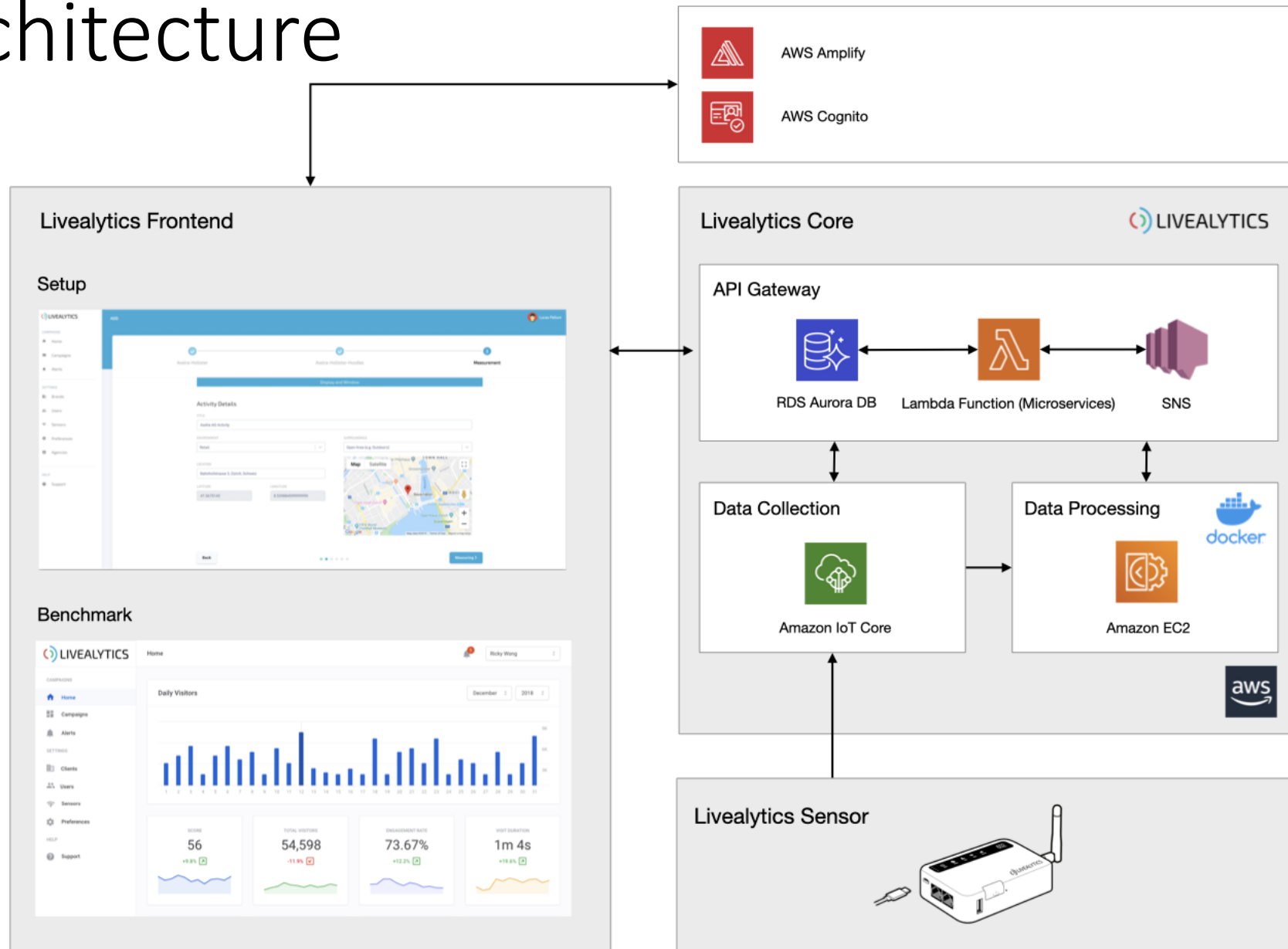
Hmm...

Task: Integrate XOVIS devices

Standard sensors		Sensors with extended coverage area						
PC2 PC2R PC2S PC2R-0	PC3 PC3-0	PC2-UL PC2R-UL PC2S-UL PC2R-UL-0	PC2-L PC2R-L PC2S-L PC2R-L-0	PC3-L PC3-L-0	PC3-M1 PC3-M1-0	PC3-M2 PC3-M2-0	PC3-H PC3-H-0	PC3-UH PC3-UH-0
								
2.20 m - 6.00 m	6.00 m - 14.00 m	2.20 m - 3.50 m	2.20 m - 6.00 m	6.00 m - 9.00 m	9.00 m - 12.00 m	11.00 m - 14.00 m	14.00 m - 16.00 m	16.00 m - 20.00 m

- Tracking for airport queues [[xovis](#)], but als retail stores
- Mounted on the ceiling, e.g., at the entrance
- Accuracy ~98%

Architecture



XOVIS Sensor Integration

- Real-time counter

- Polling - latency
- [WebSocket!](#) ([well-supported](#))

- [WebSocket](#)

- Full duplex communication with TCP
- [Text or binary](#)
- Ports 80/443, compatible with HTTP, uses upgrade header to change from HTTP to WebSocket
- HTTP request/reply
 - WebSocket does not need request
- wss://localhost...

```
let connection = new WebSocket('wss://localhost:8080/api');  
connection.binaryType = "arraybuffer";
```

```
GET ws://localhost:8080/ws HTTP/1.1  
Host: server.example.com  
Upgrade: websocket  
Connection: Upgrade  
Sec-WebSocket-Key: tvdBI26pvLeIgFiDC3H5Sg==  
Sec-WebSocket-Version: 13  
Origin: http://localhost:8080
```

```
HTTP/1.1 101 Switching Protocols  
Upgrade: websocket  
Connection: Upgrade  
Sec-WebSocket-Accept: Myz76wyg5WStKRkpSCKhTt/tWAM=
```


WebSockets

■ Reverse Proxy?

- [Nginx](#) / [Apache](#)
- Proxy need to set header again, otherwise lost
- Connection timeout

■ Go implementation

- Basic: x/net
- Advanced:
github.com/gorilla/websocket

■ Example:

```
location /chat/ {
    proxy_pass http://backend;
    proxy_http_version 1.1;
    proxy_set_header Upgrade $http_upgrade;
    proxy_set_header Connection "upgrade";
    proxy_read_timeout 60s;
}
```

```
mod_proxy_wstunnel:
```

```
ProxyPass "/ws2/" "ws://echo.websocket.org/"
ProxyPass "/wss2/" "wss://echo.websocket.org/"
ProxyWebSocketIdleTimeout 60
```

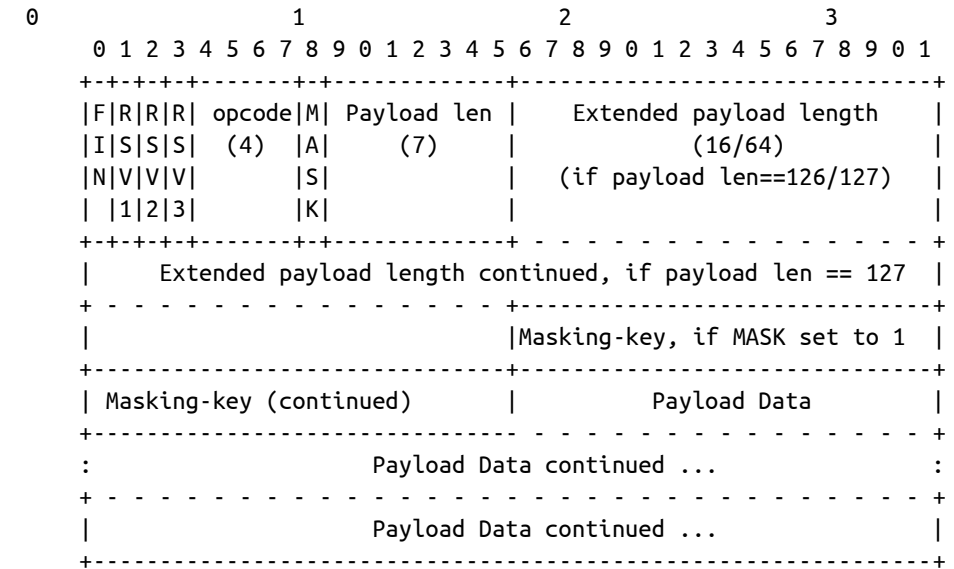
```
var connection = new WebSocket('ws://localhost:8080/ws');
connection.onopen = function () {
    connection.send('Ping');
};
let counter = 0;
connection.onmessage = function (e) {
    console.log('update: ' + counter++);
    let string = 'Markets:<br>';
    for(let s of JSON.parse(e.data)) {
        string += s.name + ', price=' + s.price_usd + '<br>';
    }
    let element = document.getElementById('text');
    element.innerHTML = string;
};

func ws(w http.ResponseWriter, r *http.Request, _
httprouter.Params) {
    conn, _ := upgrader.Upgrade(w, r, nil)
    messageType, _, _ := conn.NextReader()
    for {
        res, _ :=
http.Get("https://api.coinmarketcap.com/v1/ticker/?limit=10")
        w, _ := conn.NextWriter(messageType)
        io.Copy(w, res.Body)
        time.Sleep(2 * time.Second)
    }
}
```

WebSockets

■ Protocol

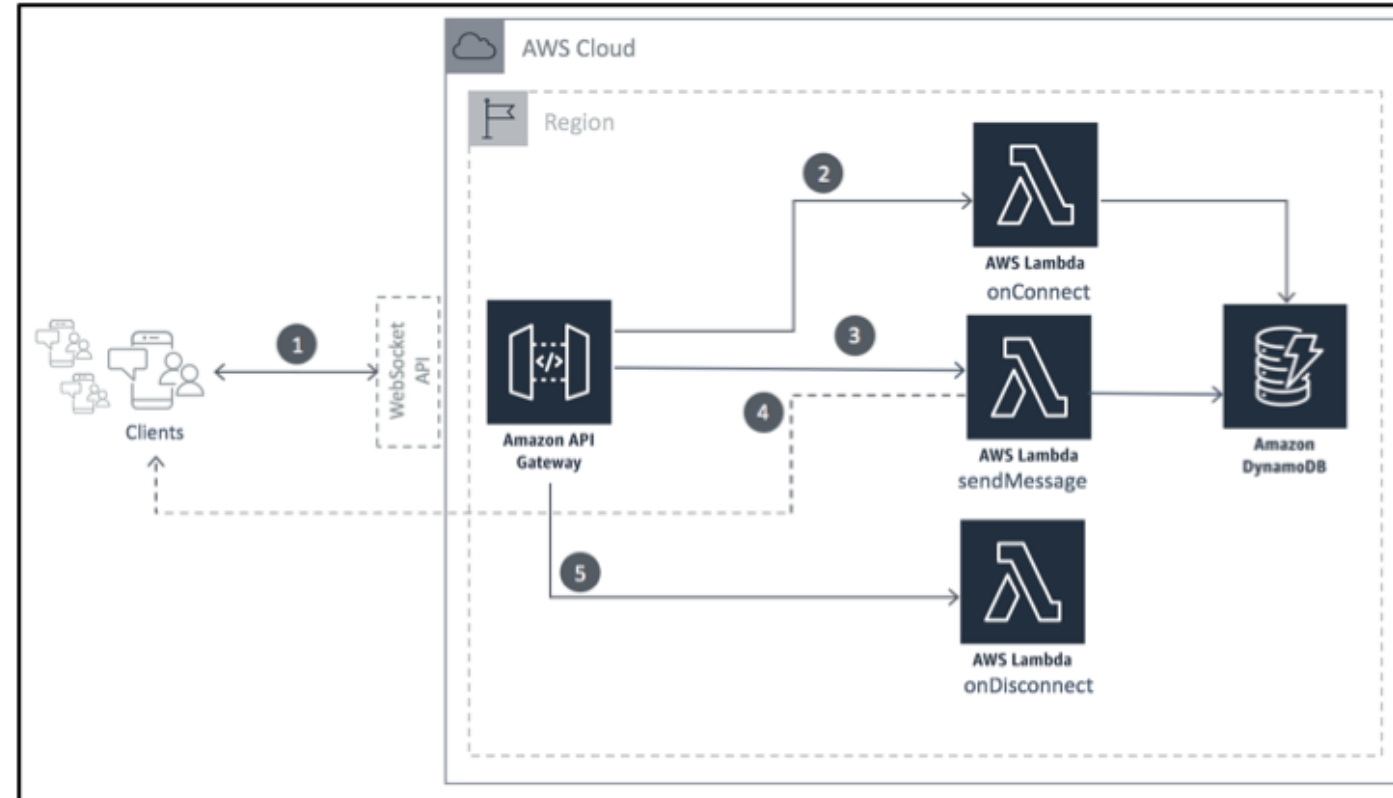
- Client Handshake Request
 - Sec-WebSocket-Key: dGhllHNhbXBsZSBub25jZQ==
 - Sec-WebSocket-Version: 13, since 2011
- Server Handshake Response
 - Sec-WebSocket-Accept: s3pPLMBiTxaQ9kYGzzhZRbK+xOo=
- If mask set, XOR “encryption”
 - “By having the browser generate a random mask for each frame, the hostile client code cannot choose the byte patterns that appear on the wire and use that to attack vulnerable network infrastructure. ([source](#))”
 - “treating WebSockets data as a cacheable HTTP request. ([source](#))”
 - prevent proxy cache poisoning attacks
- wss://
 - “but until certificates are free, this would make any web standard requiring SSL/TLS a “rich man's” standard rather than an internet wide solution.”



- FIN – last message
- Opcode
 - 0: continue, 1: text, 2: binary

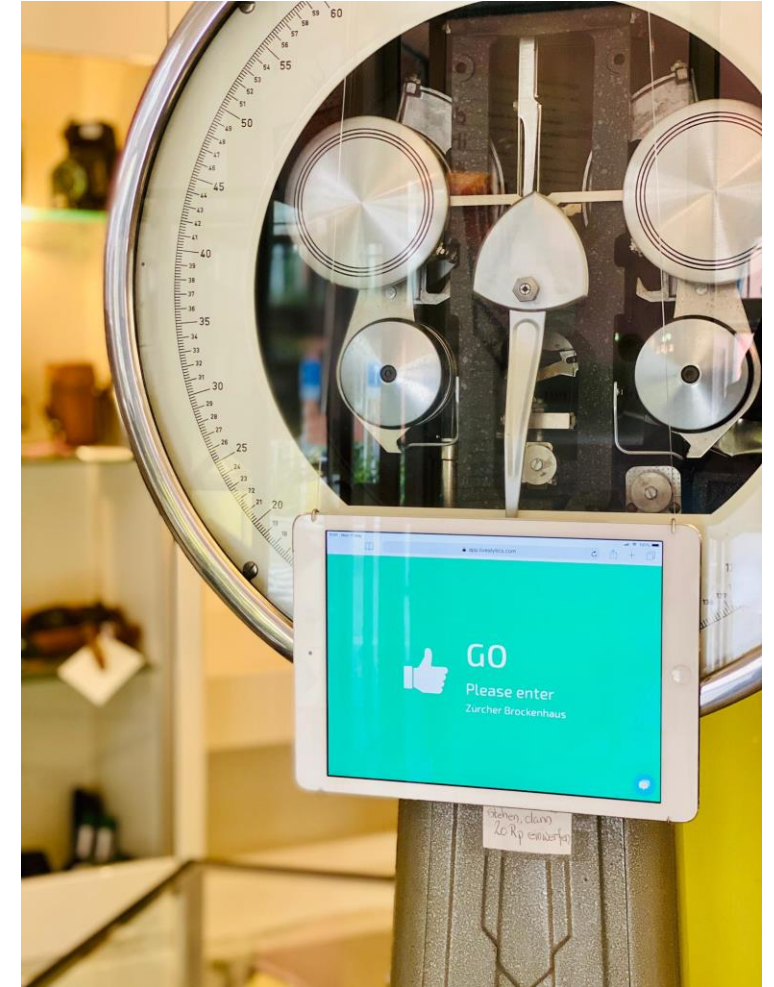
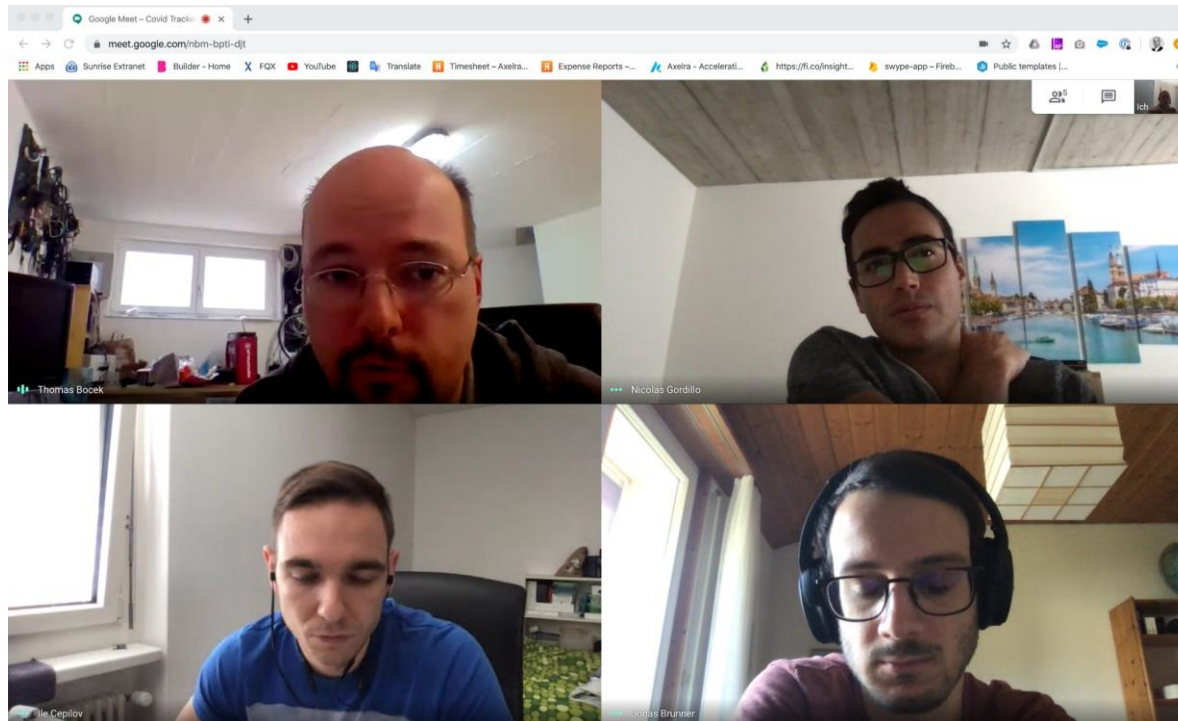
AWS Websockets

- 18.12.2018: [Announcing WebSocket APIs in Amazon API Gateway](#)
- Sample App on [github](#)
 - ~200 lines configuration
 - ~70 line of code
- Recent student project
 - ~800 lines of code
 - ~700 lines of yml



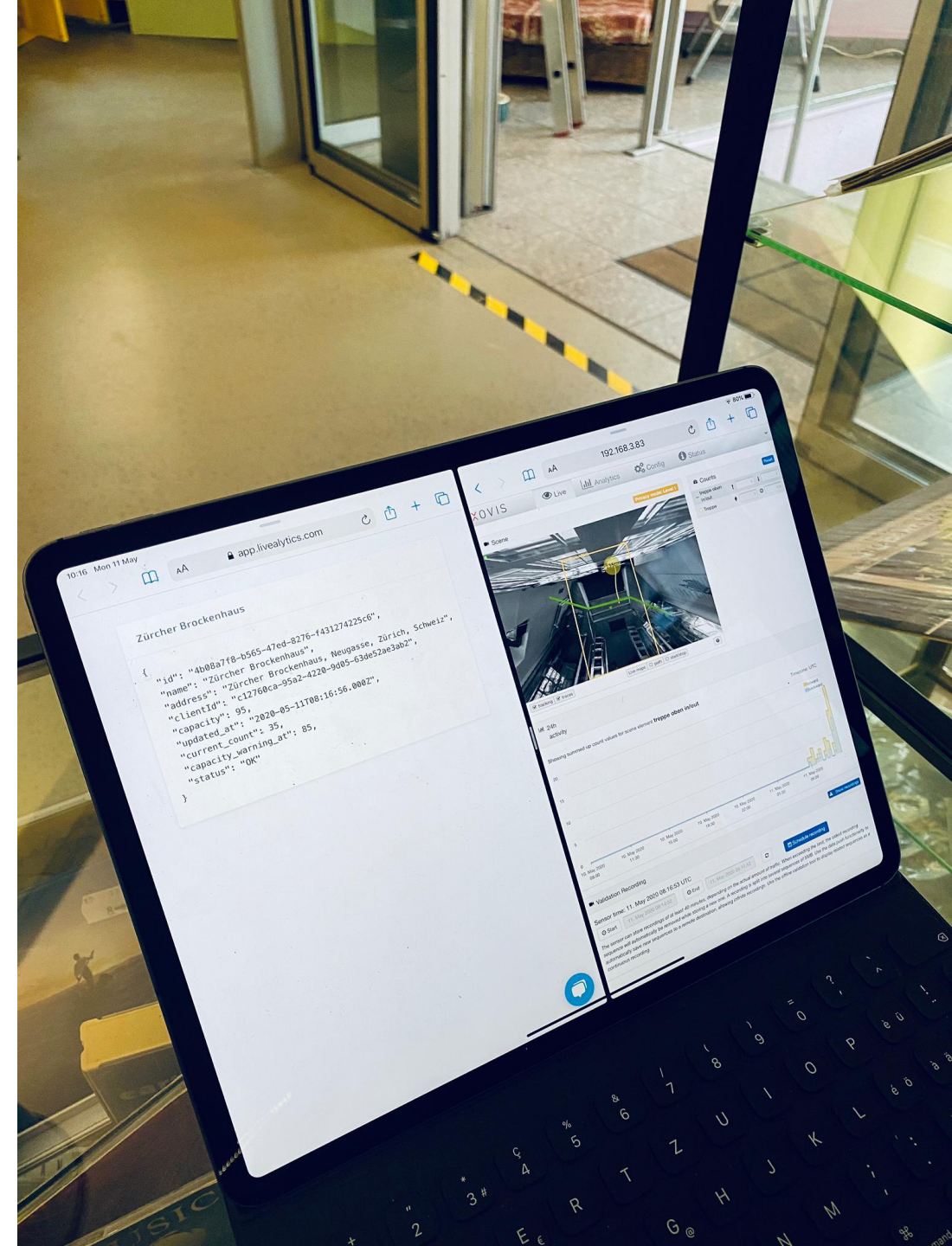
Deployment

- Remote Team – Liveanalytics / Axerla
- Installation at Brockenhaus Zurich
 - Testvideo / Sensorvideo



Take Away Message

- Distributed systems add complexity
- Startups need to be agile (as Livealytics just showed)
- It can be done in 1 week 😊 ([demo](#))
 - Also thanks to the great support of Simon from Livealytics



Questions?



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