APIS IT d.o.o.

Fiscalization – technical aspects

Project overview

- April 2012. – Project inception

- 14.6.2012. – Conceptual design

- 26.7.2012. – Proposal of Fiscalization Law

- 2.8.2012. – Solution presentation

- 1.10.2012. – Certificates (FINA)

- 12.10.2012. – Publicly available testing environment

- 1.1.2013. – Production

Contemporary solutions
Hw and sw certified systems

- Time delay enables manipulation with receipts at end user side (cash registers)

- Impossible to track single receipt issued to customer (citizen) in central system

Croatian solution
On line system

- **Online** working mode without any time delays which reduces possibility of tampering with receipts

- **Unique Receipt ID number** is issued by the central system in real time and guarantees that the receipt is clearly identified, confirms that the receipt is received and enables citizens and tax administration employees to check issued receipts

Contemporary solutions
Hw and sw certified systems

- Oligopoly - unfair market competition between producers of cash registers devices

- High cost for end users (cash registers) – usually around 400-500€

- High cost of solution for government (hw, sw, certification process)

Croatian solution
On line system

- **Open market** for development of end user solutions (cash registers) according to publicly issued technical standard

- **Low cost** for end users (cash registers) – as low as 10€ per month, no fiscal memory or any specific hardware

- **Low CAPEX and OPEX**

Contemporary solutions
Hw and sw certified systems

- Ineffective use of collected data

- No interaction with citizens

- Lack of flexibility

Croatian solution
On line system

- **Web and mobile applications** for tax administration, **risk analysis** through use of **BI system**

- **Web applications** for citizens and lottery games for purpose of raising awareness on subject

- Collection of **new type** of data can be easily done in production system without regard on a size of message

Contemporary solutions
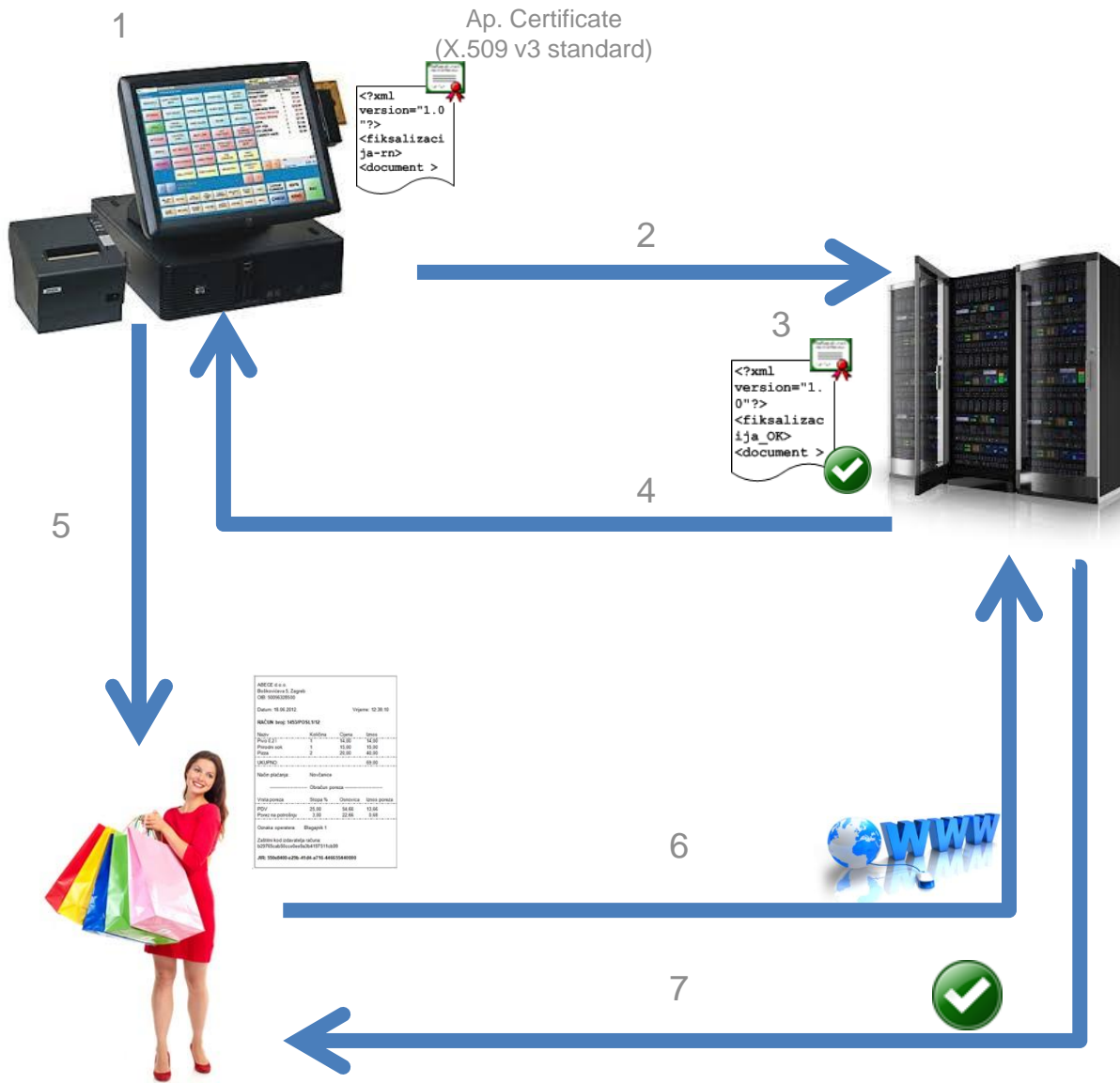## Hw and sw certified systems

- Complexity

- Non standard solutions

Croatian solution
On line system

- End user device has to be able to generate and sign XML messages and send them to central system

- Standardized solution (XML, digital certificates) wich enables interoperability with other governement systems

1

Ap. Certificate
(X.509 v3 standard)

```
<?xml
version="1.0
"?>
<fiksalizaci
ja-rn>
<document >
```

2

3

```
<?xml
version="1.
0"?>
<fiksalizac
ija_OK>
<document >
```

4

5

6

7

1. - Generating and digital signing of XML messages

2. - Delivery in real time using Internet

3. – Checking messages certificates Generating JIR and time recording Creating and signing reply message

4. - Message containing the JIR is sent back

5. - The receipt is printed out on the cash register and physically delivered to the citizen

6. - Using web application or SMS the citizen verifies whether the receipt delivery

7. - Respons to the citizen's query (positive or negative)

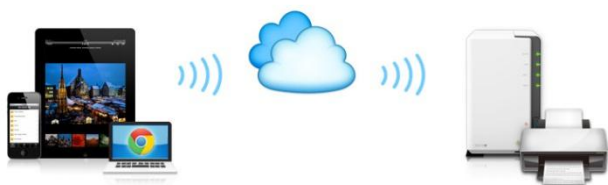# Prerequisites for end users (cash registers)

- Digital certificate

- Cash register device with internet access

- Must support the creation of XML and electronic signature

- Registered office space
  - Declared electronically in the same way as the billing (first message in the system)

End user devices (cash registers)

Upgrade of existing cash registers

Cloud based solutions from 10€ per month the cash register, printer, internet connection, card acceptance and application

Android app using Google cloud print 77€ (annual license)

End user devices (cash registers)

Enterprise users – centralized solutions - one communication point to central system

Free program code - freeware

Functional modules

- **Central system** (for legally liable entities) – receiving messages
- **Client applications** (for tax administration employees)
- **Public applications for Web and SMS control of receipts** (for citizens)
- **Risk analysis** through use of BI system
- **PKI infrastructure**

Architecture

Multiple tier architecture
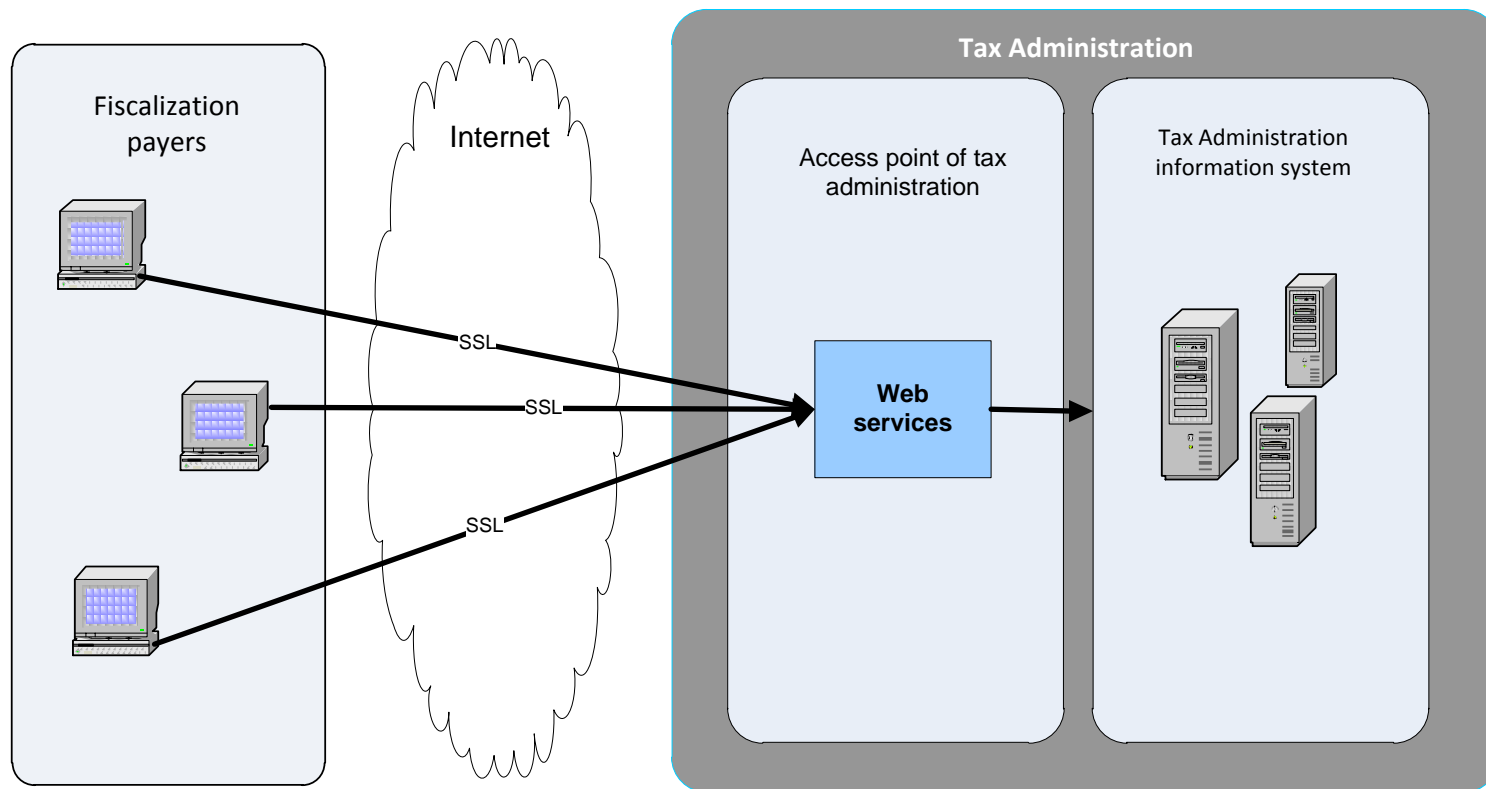
Security

- Digital certificates are used to ensure authentication of user and protection of data integrity
  - SSL certificate for web server for central system (1-way SSL)
    - secure connections from a web server to a browser. Typically, SSL is used to secure credit card transactions, data transfer and logins. It binds together a domain name, server name or hostname and an organizational identity (i.e. company name) and location
  - Application certificate - app. certificate (X.509 v3 standard) for end user devices
- Penetration testing done by third party
- Robust solution that can cope with DDOS

What & Why - XML

Core standard adopted by World Wide Web Consortium (W3C)

- Simplicity
  - set of rules helps make documents more readable to both humans and machines
- Extensibility
  - allows developers to create their own DTD's (Document Type Definition)
  - extended with several additional standards that add styles, linking, and referencing ability to the core XML set of capabilities
- Interoperability
  - parsers that interpret them can be built at relatively low cost in any of a number of languages
- Openness
  - W3C – publicly published
- Experience
  - SGML community

Non functional requirements

Maximum peak load - **1.000** messages per second

System can receive more then **10.000.000** messages a day

Processing time is up to **2** seconds

Availability **7 X 24**

Recovery Point Objective = **0**

Recovery Time Objective = **0**
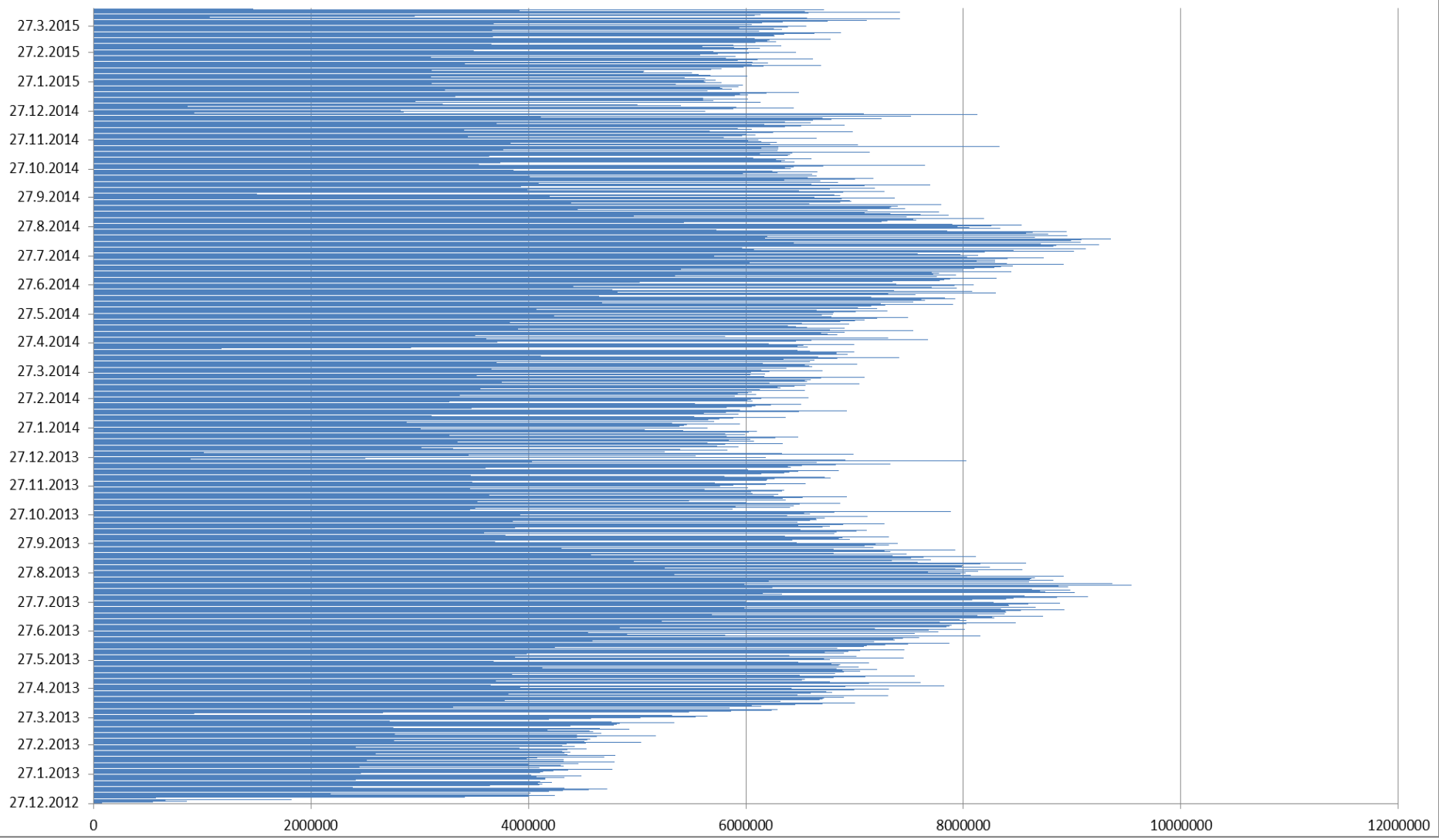
Seasonal charater

Fiscalization in numbers

- More then **5 billions*** of messages received
- Max. number of messages per day – **9.500.000**

- Number of users – around **100.000**
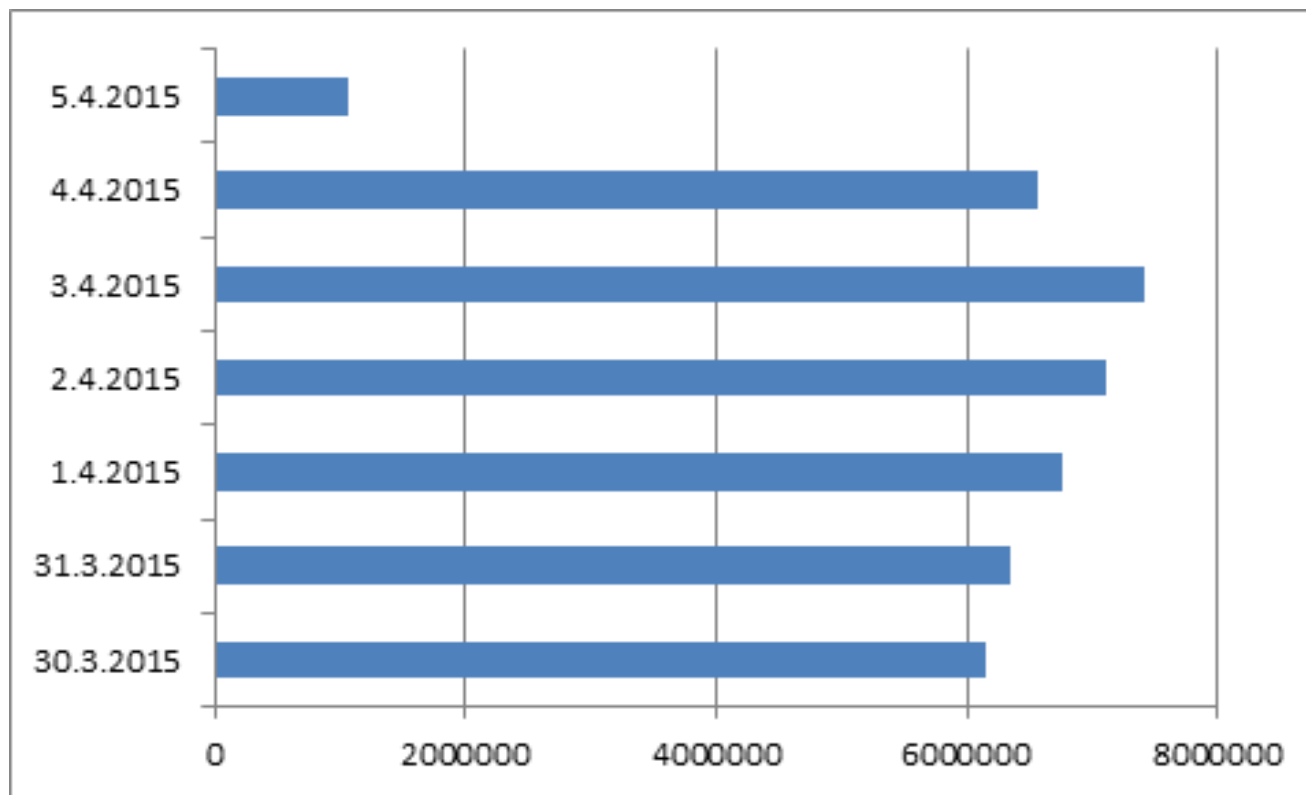- Number of clients – around **200.000**

*on 14th of March 2015

AGENCIJA ZA PODRŠKU INFORMACIJSKIM SUSTAVIMA I INFORMACIJSKIM TEHNOLOGIJAMA

Number of messages (27.12.2012 – 14.4.2015)

Number of messages (30.3.2015 - 5.4.2015)

Fiscalization in numbers

- Max. msg. peak per sec.- **960**
- Average response time – **310 msec**
- Less then **2%** of messages processed above **500 msec**

- System downtime - **0 sec**
- Number of security breaches **0**

Web application for citizens

http://www.provjeri-racun.hr/provjeraracuna

SMS application for citizens

- Use of mobile gateway provider

- JIR or ZKI

- 3 types of reply
  - Receipt is found
  - Receipt is not found
  - Receipt was checked multiple times. Please contact Tax administration.

General characteristic

- **Openness** of the system ensures that there is no need for certification and that fiscalization subjects can choose solution for themselves
- **Cost-effectiveness** of the system means low level of expenses for users and state administration
- **Flexibility** of the system ensures that changes in message content and size can be easily implemented
- **Simplicity** of the system enables systems based on different platforms to exchange data using XML messages
- **Robustness** of the system guarantees coping with peak loads of a 1000 messages per second and 10 mil. messages a day
- **Scalability** of the system guarantees quick adjustment to the increased loads of the system