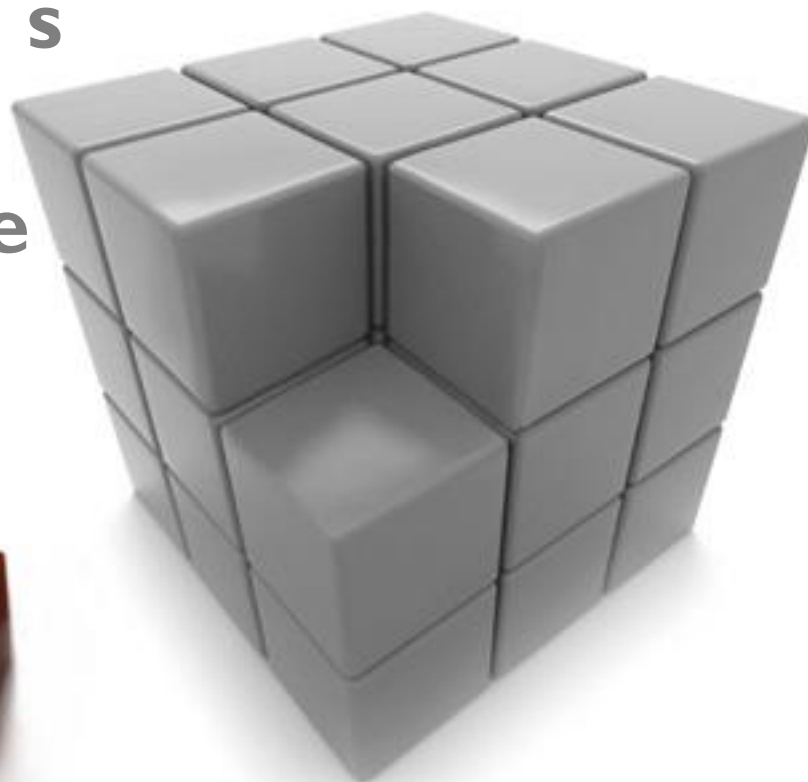




Sustav za integraciju s FINA-inim e-Račun servisom za poslovne korisnike

Boris Komunjer

listopad 2016.



O IN2

- ❑ tvrtka IN2 osnovana je 1992.
- ❑ vodeći isporučitelj IT usluga u Hrvatskoj
- ❑ 200+ klijenata, dugoročno partnerstvo s klijentima
- ❑ 300+ završenih projekata
- ❑ 500+ djelatnika



O IN2



- ❑ IN2 grupu čini 12 tvrtki i 1 predstavništvo
- ❑ projekti u SEE regiji i šire (Albanija, Bugarska, Rumunjska)
- ❑ kontinuirani poslovni rast

Hrvatska
IN2 Zagreb
IN2, ured Pula
IN2, ured Osijek
IGEA
INsig2
INbet2
INsite2
IN2data

Bosna i Hercegovina
IN2 Sarajevo
megaIN2

Kosovo
IN2, podružnica Priština

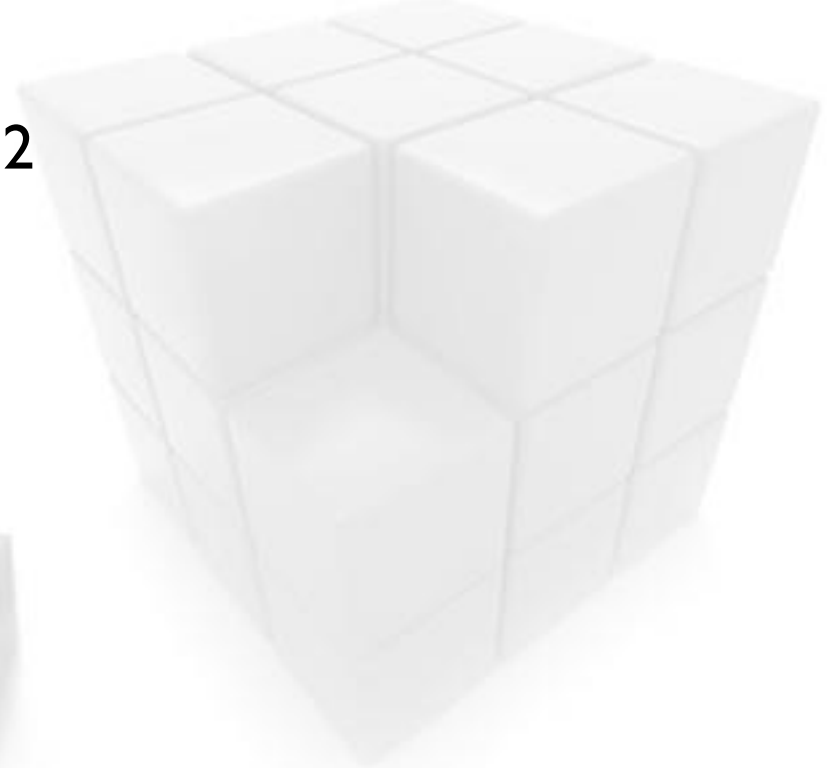
Srbija
IN2 Beograd
IN2 Dynamics

Slovenija
IN2 Koper

Makedonija
IN2 Skopje

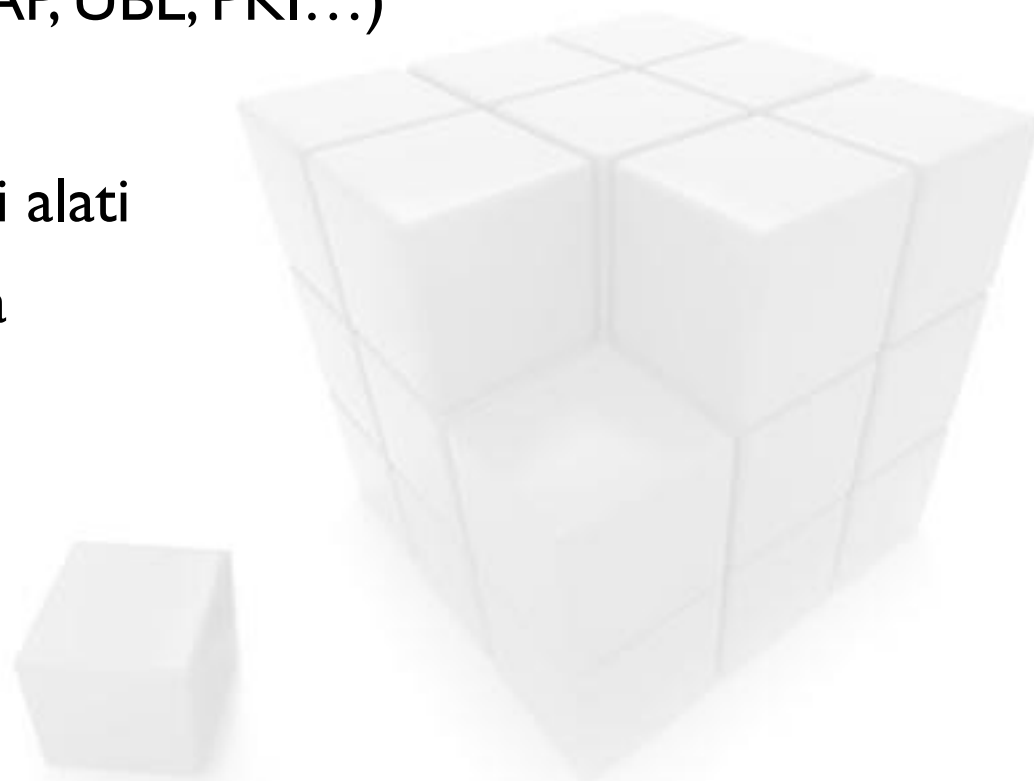
O predavaču

- ❑ Boris Komunjer
 - boris.komunjer@in2.eu
- ❑ Diplomirao na FER-u, smjer Elektroničko i računalno inženjerstvo
- ❑ Od svibnja 2015. zaposlen u IN2
- ❑ Rad s Oracle bazom podataka
- ❑ Razvoj nadogradnji u EBS-u
- ❑ Razvoj aplikacija u Javi
- ❑ Razvoj aplikacija u APEX-u



Sadržaj prezentacije

- ❑ Elektronički račun
- ❑ FINA e-Račun
- ❑ Osnovni pojmovi (SOAP, UBL, PKI...)
- ❑ Web servisi
- ❑ Korištene tehnologije i alati
- ❑ Implementacija sustava



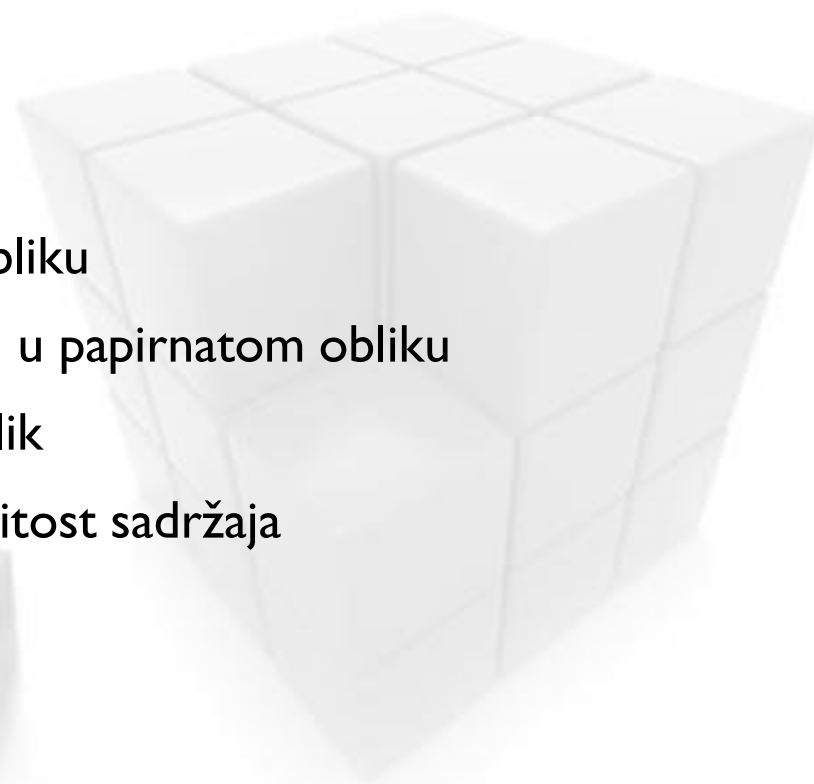
Elektronički račun

❑ Što je elektronički račun?

- [Ministarstvo gospodarstva](#)
- [Porezna uprava – izdavanje](#)
- [Porezna uprava – ispostavljanje](#)

❑ Ukratko

- Izdan i poslan u elektroničkom obliku
- Sadrži sve informacije kao i račun u papirnatom obliku
- Strukturirani i nestrukturirani oblik
- Vjerodostojnost podrijetla, cjelovitost sadržaja
- Izbor tehnologije je slobodan

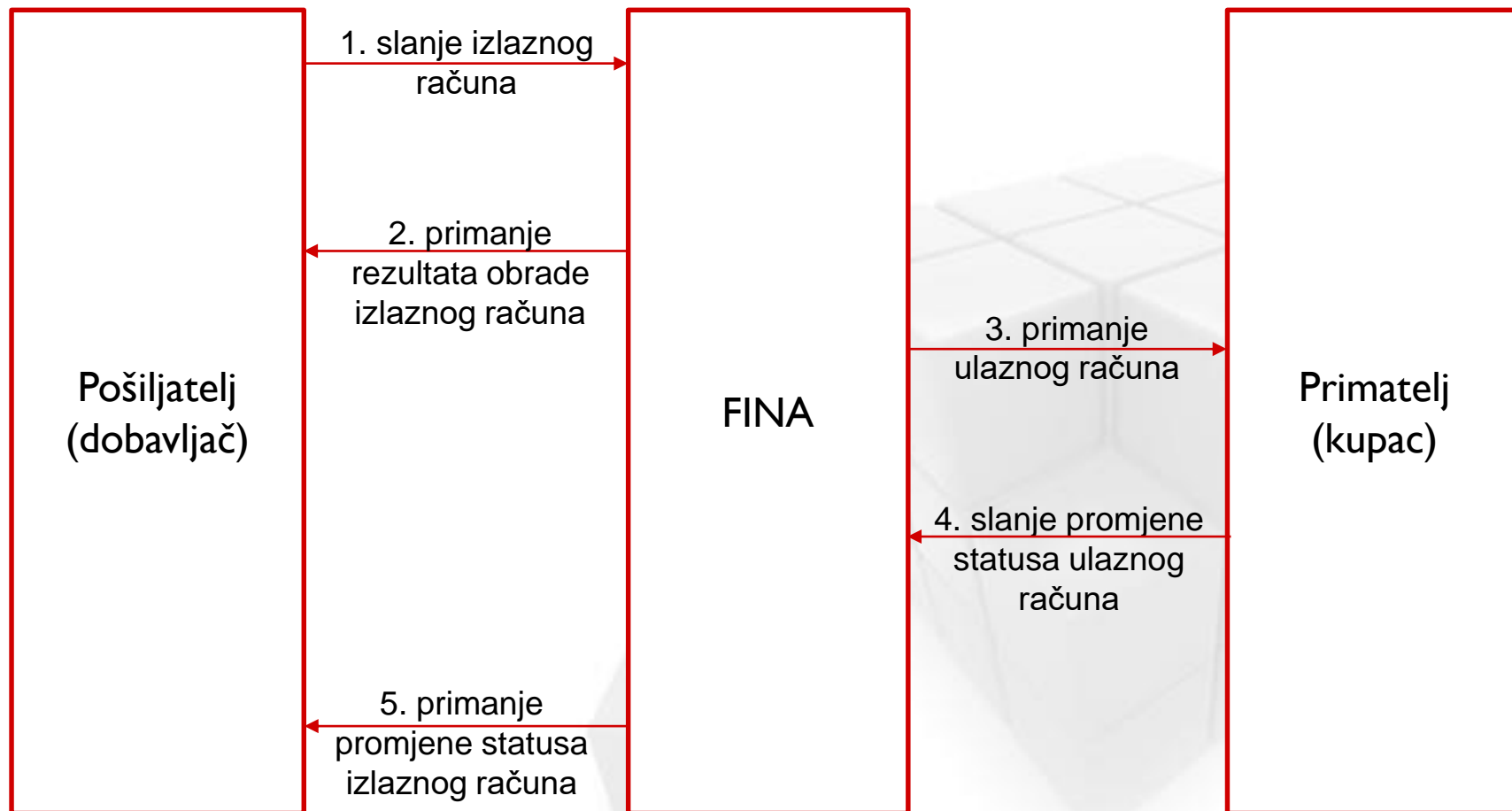


FINA e-Račun

- ❑ Servis za razmjenu računa između dobavljača i kupaca
- ❑ Izdavanje
- ❑ Zaprimanje
- ❑ Arhiviranje
- ❑ Potrebna registracija
- ❑ Potrebni certifikati
- ❑ Slanje i primanje računa od svih registriranih korisnika
- ❑ Napomena: Postoje i drugi sustavi za razmjenu e-računa



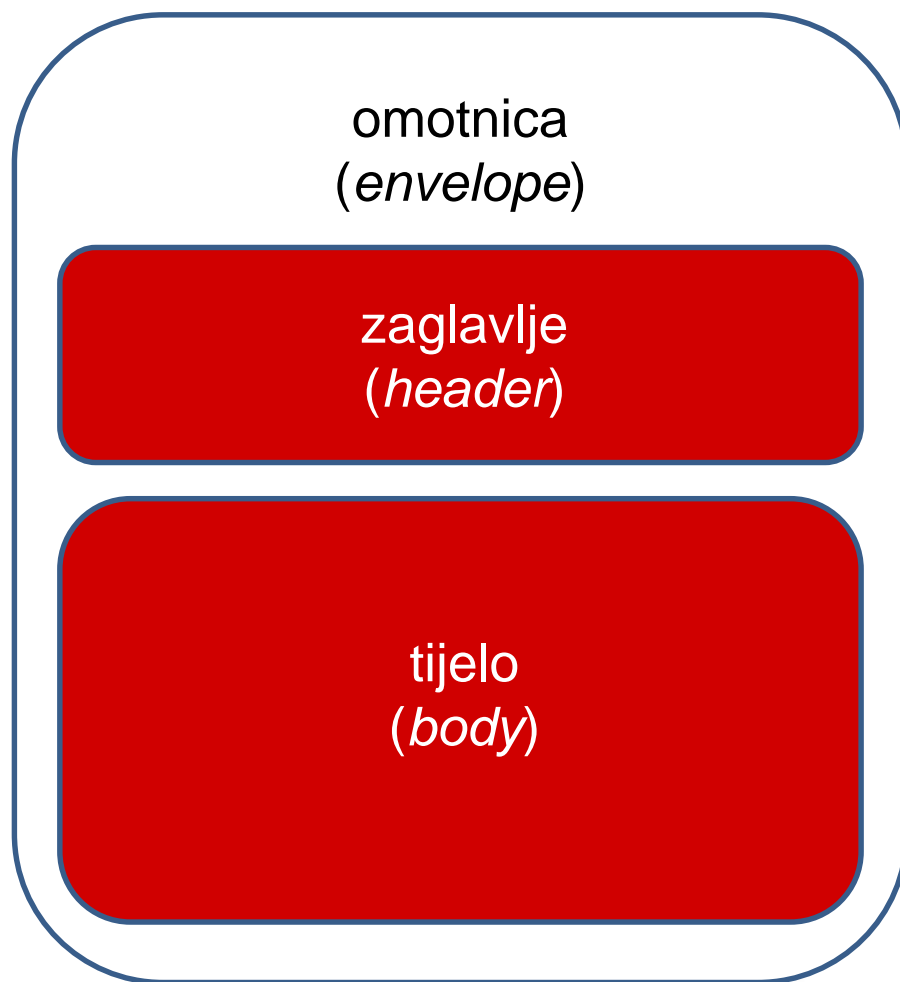
FINA e-Račun



SOAP (*Simple Object Access Protocol*)

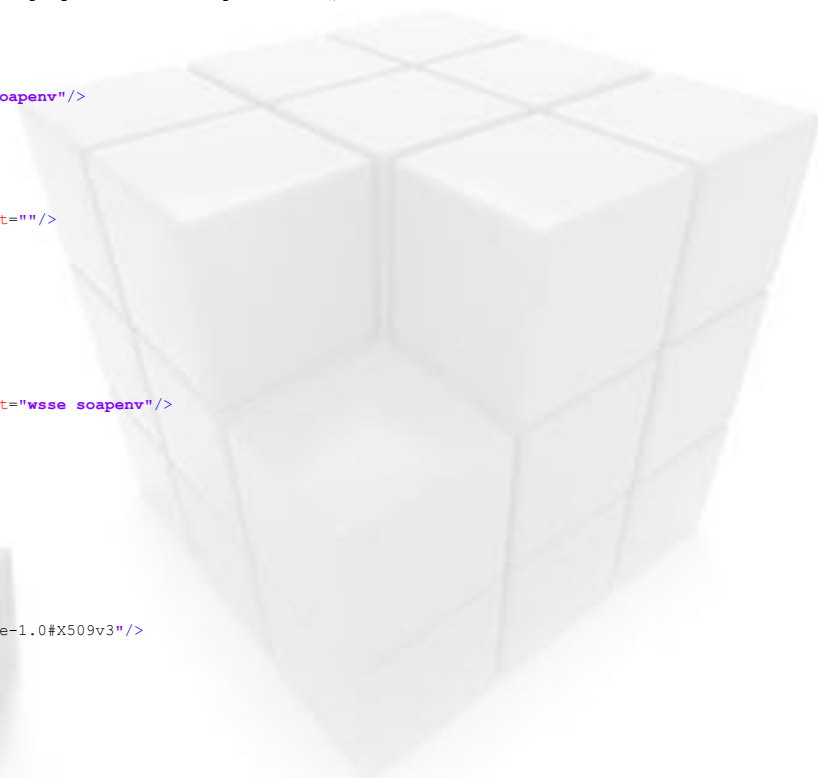
- ❑ Razmjena strukturiranih podataka
- ❑ XML format
- ❑ Web servisi
- ❑ Proširiv (različite ekstenzije, npr. WS-security)
- ❑ Neutralan (radi preko svakog protokola) najčešće HTTP(S)
- ❑ Neovisan (neovisan o modelu programiranja)

SOAP - struktura



SOAP primjer - zaglavlje

```
<soapenv:Envelope xmlns:soapenv=http://schemas.xmlsoap.org/soap/envelope/ xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <soapenv:Header>
    <wsse:Security xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd"
      xmlns:wssu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd"
      soapenv:mustUnderstand="1">
      <wsu:Timestamp wsu:Id="TS-6451">
        <wsu:Created>2016-08-18T11:19:49.062Z</wsu:Created>
        <wsu:Expires>2016-08-18T11:24:49.062Z</wsu:Expires>
      </wsu:Timestamp>
      <wsse:BinarySecurityToken EncodingType="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0#Base64Binary"
        ValueType="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509v3"
        wsu:Id="X509-4FCDC43AA4EE19B18F14715191890629676">MIIEUzCCAzqAwIBAg...gTzq/AR0tuls4hPhkXtCg3UIhtrubF+Q==
      </wsse:BinarySecurityToken>
      <ds:Signature xmlns:ds="http://www.w3.org/2000/09/xmldsig#" Id="SIG-6452">
        <ds:SignedInfo>
          <ds:CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#">
            <ec:InclusiveNamespaces xmlns:ec="http://www.w3.org/2001/10/xml-exc-c14n#" PrefixList="soapenv"/>
          </ds:CanonicalizationMethod>
          <ds:SignatureMethod Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1"/>
          <ds:Reference URI="#Id--880112207">
            <ds:Transforms>
              <ds:Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#">
                <ec:InclusiveNamespaces xmlns:ec="http://www.w3.org/2001/10/xml-exc-c14n#" PrefixList=""/>
              </ds:Transform>
            </ds:Transforms>
            <ds:DigestMethod Algorithm="http://www.w3.org/2001/04/xmenc#sha256"/>
            <ds:DigestValue>engQycRv9Nhdu3ikDePiA4CAiKO47bawYRSMarsFyHo=</ds:DigestValue>
          </ds:Reference>
          <ds:Reference URI="#TS-6451">
            <ds:Transforms>
              <ds:Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#">
                <ec:InclusiveNamespaces xmlns:ec="http://www.w3.org/2001/10/xml-exc-c14n#" PrefixList="wsse soapenv"/>
              </ds:Transform>
            </ds:Transforms>
            <ds:DigestMethod Algorithm="http://www.w3.org/2001/04/xmenc#sha256"/>
            <ds:DigestValue>pyFRLNIA081SUVLASHw9+ntg8Y9QXJ5SUIgYx6Q83GQ=</ds:DigestValue>
          </ds:Reference>
        </ds:SignedInfo>
        <ds:SignatureValue>Hbfr68w+...6oSksX5tREWdR2qA=</ds:SignatureValue>
        <ds:KeyInfo Id="KI-4FCDC43AA4EE19B18F14715191890629677">
          <wsse:SecurityTokenReference wsu:Id="STR-4FCDC43AA4EE19B18F14715191890629678">
            <wsse:Reference URI="#X509-4FCDC43AA4EE19B18F14715191890629676"
              ValueType="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509v3"/>
          </wsse:SecurityTokenReference>
        </ds:KeyInfo>
      </ds:Signature>
    </wsse:Security>
  </soapenv:Header>
```



SOAP primjer - tijelo

```

<soapenv:Body xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd"
  wsu:Id="Id--880112207">
  <ns:GetB2BIncomingInvoiceAckMsg xmlns:ns="http://fina.hr/eracun/b2b/sync/GetB2BIncomingInvoice/v0.1">
    <iwsc:MessageAck xmlns:iwsc="http://fina.hr/eracun/b2b/invoicewebsevicecomponents/v0.1">
      <iwsc:MessageID>005130ed-8fa9-4a66-a439-57d42efb853b</iwsc:MessageID>
      <iwsc:MessageAckID>b9fbf5c3-3cd9-4dfc-89cd-3e3131b19892</iwsc:MessageAckID>
      <iwsc:MessageType>1104</iwsc:MessageType>
      <iwsc:AckStatus>ACCEPTED</iwsc:AckStatus>
      <iwsc:AckStatusCode>100</iwsc:AckStatusCode>
    </iwsc:MessageAck>
  <ns:B2BIncomingInvoice>
    <doctype:DocumentType xmlns:doctype="http://fina.hr/eracun/b2b/invoicewebsevicecomponents/v0.1">
      <doctype:DocumentTypeCode>380</doctype:DocumentTypeCode>
      <doctype:DocumentTypeText>Invoice</doctype:DocumentTypeText>
    </doctype:DocumentType>
    <sts:InvoiceStatus xmlns:sts="http://fina.hr/eracun/b2b/invoicewebsevicecomponents/v0.1">
      <sts:StatusCode>0</sts:StatusCode>
      <sts:StatusText>Nenaplaćen</sts:StatusText>
    </sts:InvoiceStatus>
    <ns:BuyerID>318</ns:BuyerID>
    <ns:InvoiceID>33376</ns:InvoiceID>
    <ns:IncomingInvoiceEnvelope>
      <ns:InvoiceEnvelope>PD94bWwgdmVyc2lvbj0iMS4wIiB1...1jZUxpbnUKPjwvSW52b21jZQo+</ns:InvoiceEnvelope>
      <ns:PdfDocument>JVBERi0xLjcnJeLjz9MNCjY0IDAgb2JqD...mRvYmoKc3RhcncR4cmVmCjIwMzgzMgo1JUVPRgo=</ns:PdfDocument>
    </ns:IncomingInvoiceEnvelope>
  </ns:B2BIncomingInvoice>
</ns:GetB2BIncomingInvoiceAckMsg>
</soapenv:Body>

</soapenv:Envelope>

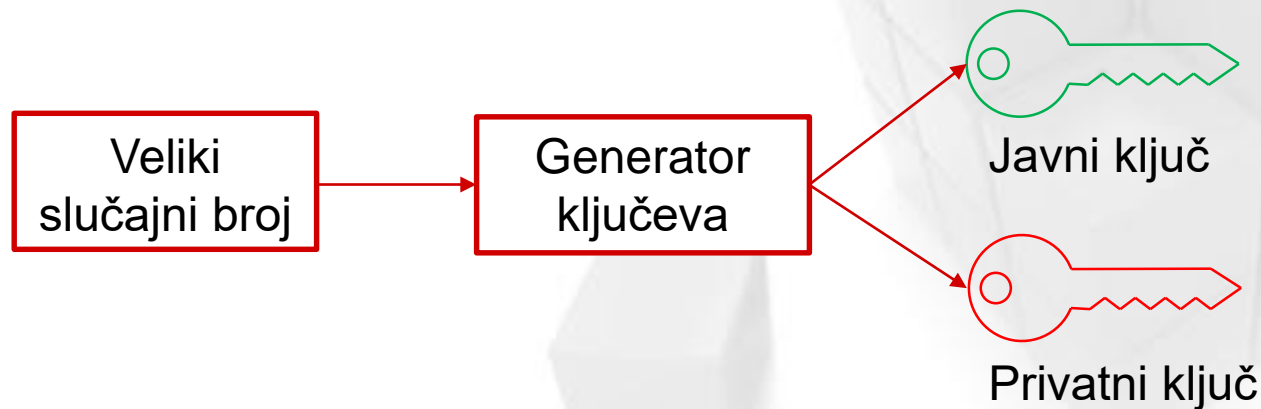
```

UBL (*Universal Business Language*)

- ❑ Kolekcija standardnih poslovnih dokumenata (preko 60)
 - Računi, narudžbe, natječaji, katalogi, priloženi dokumenti...
- ❑ Digitalizacija komercijalnih i logističkih procesa
 - Naručivanje, prijevoz, upravljanje teretom...
- ❑ Mogućnost ekstenzija
 - Digitalni potpis
 - Dodatne informacije o izdavatelju računa (u ovom primjeru)
 - Memorandumi
- ❑ Različite prilagodbe; FINA ima svoju za potrebe e-Računa
- ❑ [UBL 2.1 specifikacija](#)

PKI (*Public Key Infrastructure*)

- ❑ Kriptografija javnog ključa (*Public Key Cryptography*)
 - Koristi parove ključeva (javni i privatni ključ čine par)
 - Podatci kriptirani jednim se mogu jedino dekriptirati drugim
 - Privatni ključ se ne može odrediti iz javnoga
 - TEMELJ MODERNE RAČUNALNE SIGURNOSTI



PKI (*Public Key Infrastructure*)

- ❑ Dvije najpoznatije upotrebe:
 - Digitalni potpisi
 - Poznati pošiljatelj
 - Sadržaj nije izmijenjen u transportu
 - Pošiljatelj ne može zaniijekati slanje sadržaja
 - Kriptiranje komunikacije
 - Osigurava povjerljivost
 - TLS (*Transport Layer Security*, bivši SSL)
- ❑ Digitalni certifikati
- ❑ *Certification Authorities (CA)*



Digitalni potpis

❑ Potpis SOAP poruke

- Potpisuje se tijelo i vremenski pečat (*timestamp*)
- Potpis se nalazi u zaglavlju poruke

❑ Potpis UBL dokumenta

- Potpisuje se cijeli dokument
- Potpis se ugrađuje u dokument kao UBL ekstenzija

❑ [Java XML Digital Signature API](#)

- javax.xml.crypto
- javax.xml.crypto.dsig
- javax.xml.crypto.dsig.keyinfo
- javax.xml.crypto.dsig.spec
- javax.xml.crypto.dom
- javax.xml.crypto.dsig.dom



Digitalni potpis primjer - SOAP

```

<ds:Signature xmlns:ds="http://www.w3.org/2000/09/xmldsig#" Id="SIG-6452">
  <ds:SignedInfo>
    <ds:CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#">
      <ec:InclusiveNamespaces xmlns:ec="http://www.w3.org/2001/10/xml-exc-c14n#" PrefixList="soapenv"/>
    </ds:CanonicalizationMethod>
    <ds:SignatureMethod Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1"/>
    <ds:Reference URI="#Id--880112207">
      <ds:Transforms>
        <ds:Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#">
          <ec:InclusiveNamespaces xmlns:ec="http://www.w3.org/2001/10/xml-exc-c14n#" PrefixList=""/>
        </ds:Transform>
      </ds:Transforms>
      <ds:DigestMethod Algorithm="http://www.w3.org/2001/04/xmlenc#sha256"/>
      <ds:DigestValue>engQycRv9NhdU3ikDePiA4CAiKO47bawYRSMarsFyHo=</ds:DigestValue>
    </ds:Reference>
    <ds:Reference URI="#TS-6451">
      <ds:Transforms>
        <ds:Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#">
          <ec:InclusiveNamespaces xmlns:ec="http://www.w3.org/2001/10/xml-exc-c14n#" PrefixList="wsse soapenv"/>
        </ds:Transform>
      </ds:Transforms>
      <ds:DigestMethod Algorithm="http://www.w3.org/2001/04/xmlenc#sha256"/>
      <ds:DigestValue>pyFRLN1A081SUVLASHw9+ntg8Y9QXJ5SUIgYx6Q83GQ=</ds:DigestValue>
    </ds:Reference>
  </ds:SignedInfo>
  <ds:SignatureValue>Hbfr68w+...6oSKsX5tREWdR2qA=</ds:SignatureValue>
  <ds:KeyInfo Id="KI-4FCDC43AA4EE19B18F14715191890629677">
    <wsse:SecurityTokenReference wsu:Id="STR-4FCDC43AA4EE19B18F14715191890629678">
      <wsse:Reference URI="#X509-4FCDC43AA4EE19B18F14715191890629676"
        ValueType="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509v3"/>
    </wsse:SecurityTokenReference>
  </ds:KeyInfo>
</ds:Signature>

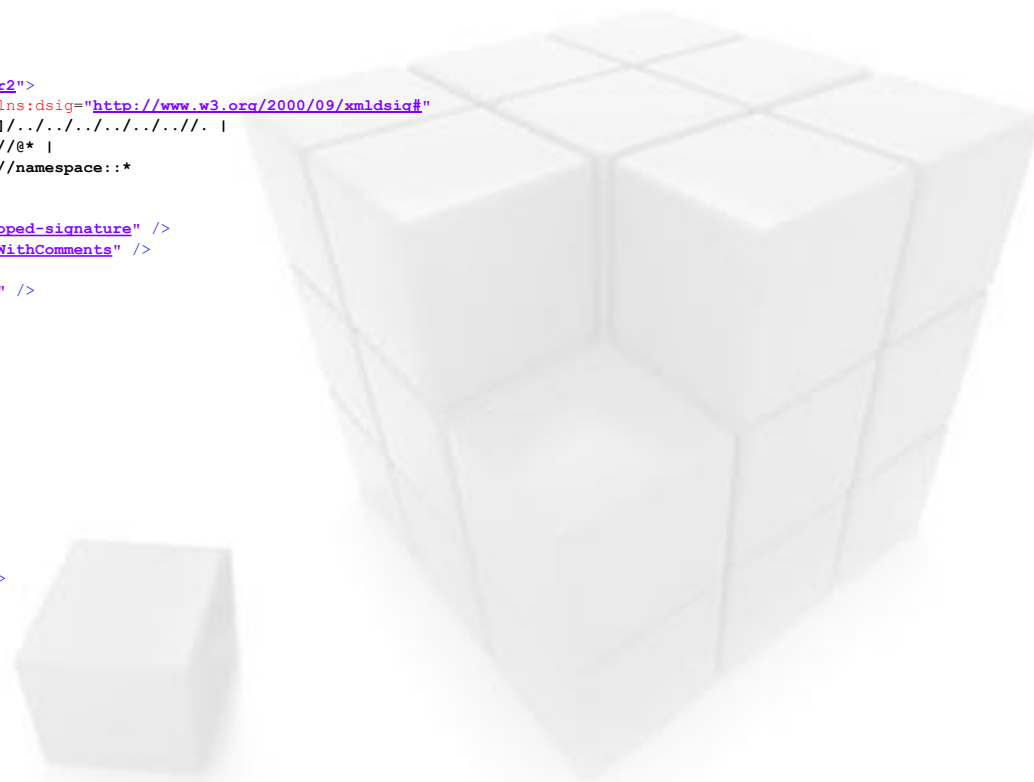
```

Digitalni potpis primjer - UBL

```

<ext:UBLExtension>
  <ext:ExtensionContent>
    <sig:UBLDocumentSignatures>
      <sac:SignatureInformation>
        <Signature xmlns="http://www.w3.org/2000/09/xmldsig#" Id="data_signature">
          <SignedInfo>
            <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#WithComments" />
            <SignatureMethod Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1" />
            <Reference URI="#id17d6b01a-4f35-11e6-9a39-ac8112b353c9", Type="http://www.w3.org/2000/09/xmldsig#SignatureProperties">
              <Transforms>
                <Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#WithComments" />
              </Transforms>
            <DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1" />
            <DigestValue>/hHwSy0JSDg8jS8Fbq+gWdk2hQ4=</DigestValue>
          </Reference>
          <Reference URI="">
            <Transforms>
              <Transform Algorithm="http://www.w3.org/2002/06/xmldsig-filter2">
                <XPath xmlns="http://www.w3.org/2002/06/xmldsig-filter2" xmlns:dsig="http://www.w3.org/2000/09/xmldsig#"
                  Filter="intersect">here()/ancestor::dsig:Signature[1]/../../../../../../../../ |
                  here()/ancestor::dsig:Signature[1]/../../../../../../../../@* |
                  here()/ancestor::dsig:Signature[1]/../../../../../../../../namespace::*
                </XPath>
              </Transform>
              <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature" />
              <Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#WithComments" />
            </Transforms>
            <DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1" />
            <DigestValue>IdFtaDeJiMGboqjz4SBUA/aI0bU=</DigestValue>
          </Reference>
        </SignedInfo>
        <SignatureValue>GsoQBp7x...OFerIwyA=</SignatureValue>
      <KeyInfo>
        <X509Data>
          <X509Certificate>MIIG0TCCBLm...gz8ssI</X509Certificate>
          <X509Certificate>MIIG9zCCBN+...5wLFO=</X509Certificate>
        </X509Data>
      </KeyInfo>
    <Object>
      <SignatureProperties Id="id17d6b01a-4f35-11e6-9a39-ac8112b353c9">
        <SignatureProperty Target="data_signature">
          <PROP_Sig xmlns="http://ns.adobe.com/pdf/2006" type="cabinet">
            <M type="text">D:20160721132013+02'00'</M>
            <Name type="text">BORIS KOMUNJER</Name>
          </PROP_Sig>
        </SignatureProperty>
      </SignatureProperties>
    </Object>
  </sig:UBLDocumentSignatures>
</ext:ExtensionContent>
</ext:UBLExtension>

```



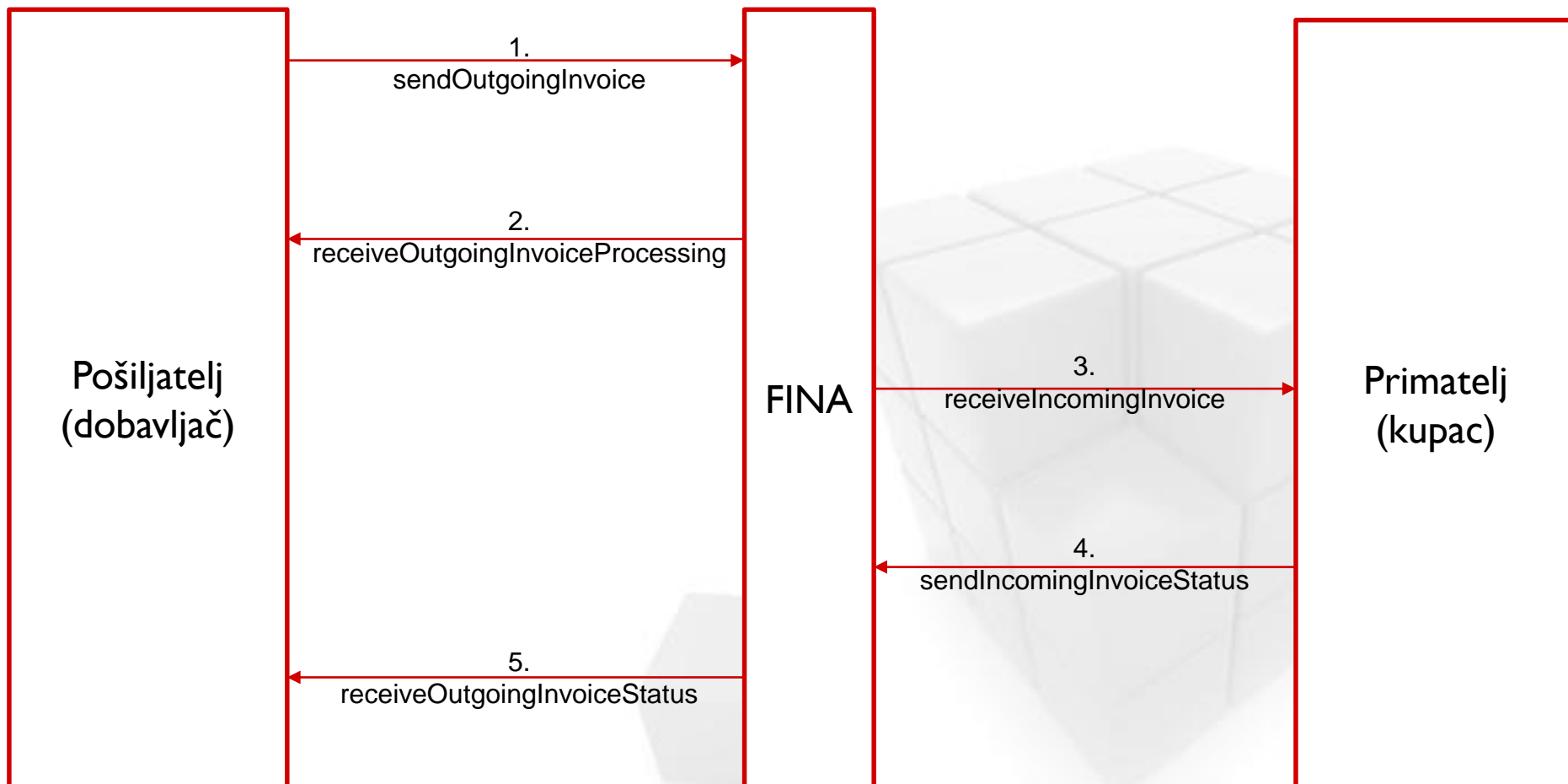
FINA web servisi

- ❑ SOAP protokol
- ❑ Zahtjev (*request*)
- ❑ Odgovor (*response*)
- ❑ Potreban potpis UBL dokumenta i SOAP poruke
- ❑ HTTPS komunikacija
- ❑ Asinkroni – pošiljatelj/primatelj moraju implementirati web servise; potreban aplikacijski i serverski certifikat
- ❑ Sinkroni – pošiljatelj/primatelj samo pozivaju FINA-ine web servise; potreban aplikacijski certifikat

FINA web servisi - asinkroni

Ime metode	Tko implementira	Tko poziva
sendOutgoingInvoice	FINA	Pošiljatelj
receiveOutgoingInvoiceProcessing	Pošiljatelj	FINA
receiveIncomingInvoice	Primatelj	FINA
sendIncomingInvoiceStatus	FINA	Primatelj
receiveOutgoingInvoiceStatus	Pošiljatelj	FINA

FINA web servisi - asinkroni

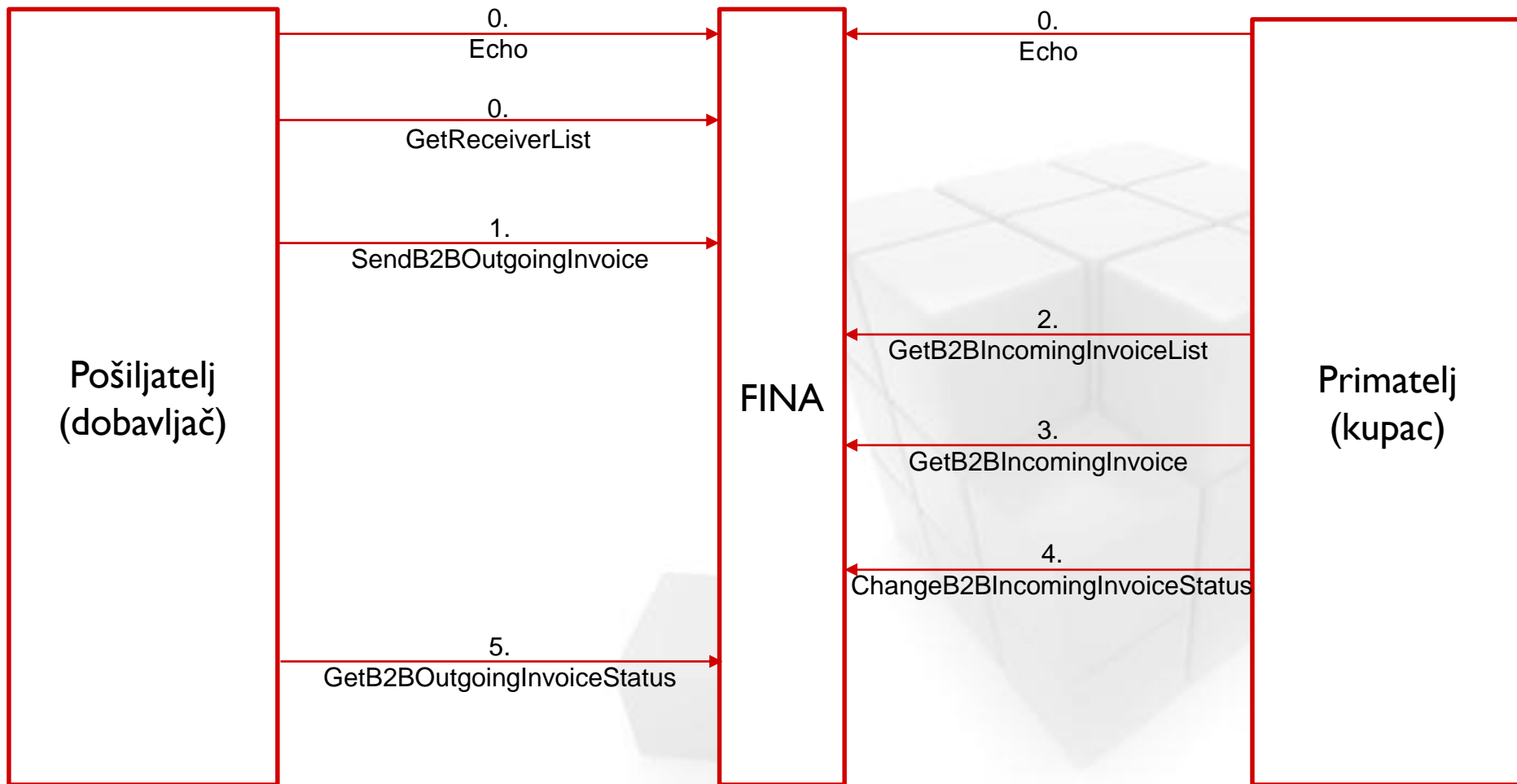


FINA web servisi - sinkroni

Ime metode	Tko implementira	Tko poziva
Echo	FINA	Pošiljatelj/ Primatelj
SendB2BOutgoingInvoice	FINA	Pošiljatelj
GetB2BIncomingInvoiceList	FINA	Primatelj
GetB2BIncomingInvoice	FINA	Primatelj
GetB2BOutgoingInvoiceStatus	FINA	Pošiljatelj
ChangeB2BIncomingInvoiceStatus	FINA	Primatelj
GetReceiverList	FINA	Pošiljatelj

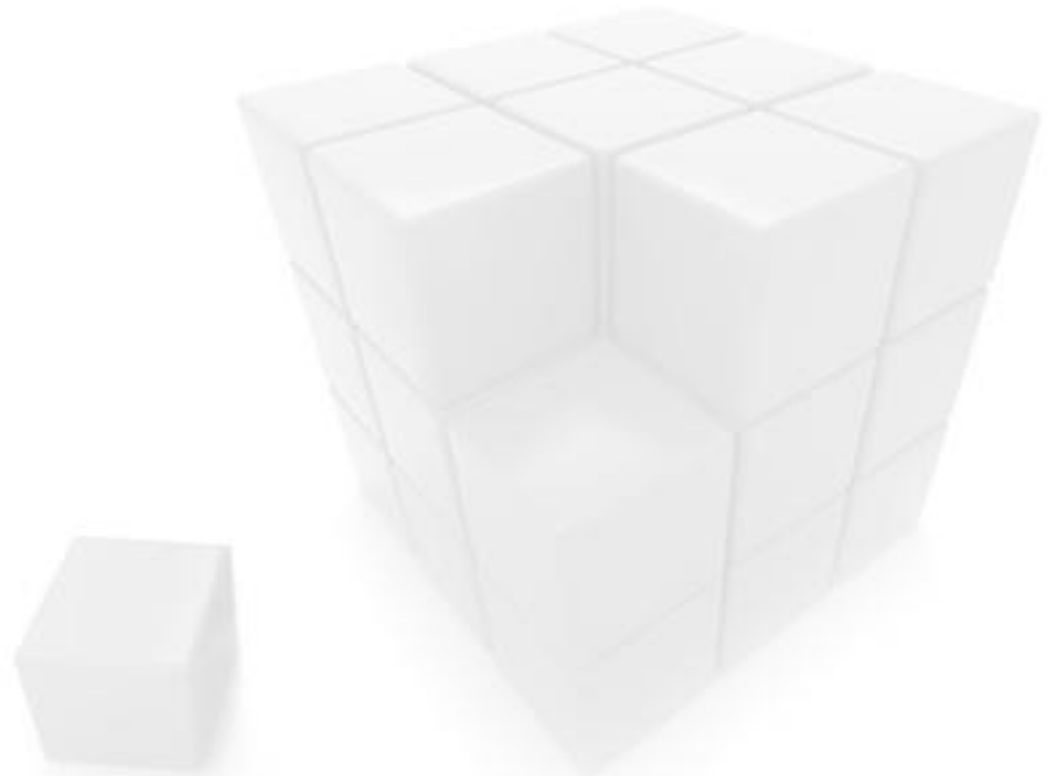
FINA web servisi - sinkroni

4.
sendIncomingInvoiceStatus



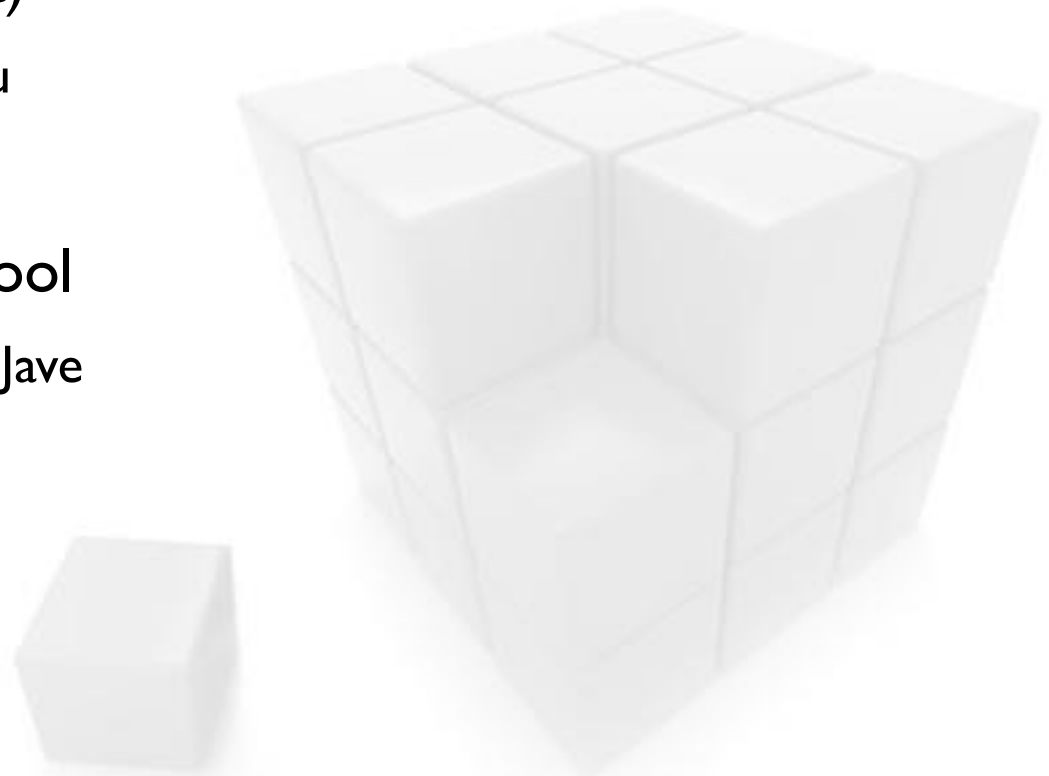
Alati i tehnologije

- Java
- Eclipse
- Maven
- SVN
- Tomcat



Java

- ❑ Java 8 (1.8.0_91, 64-bit)
 - Klijentska aplikacija
- ❑ Java 6 (1.6.0_45, 64-bit)
 - Web servisi u Tomcat-u
- ❑ [Apache Log4j](#)
- ❑ wsimport, wsgen, keytool
 - Dolaze s distribucijom Jave



Java – wsimport i wsgen

- ❑ *Contract First* pristup
- ❑ WSDL (*Web Service Definition Language*) – „contract”
- ❑ XML strukture u Java objekte – *binding*
- ❑ Primjer poziva:

```
wsimport.exe -keep .\B2BFinaInvoiceWebService.wsdl
```
- ❑ Lokalna kopija ili URL (samo za HTTP)
- ❑ Postoji i *Contract Last* pristup – prvo implementacija pa onda WSDL – wsgen
- ❑ Više o [wsimport](#) i [wsgen](#)

Java - keytool

- ❑ Java keystore
- ❑ Generiranje parova privatnih i javnih ključeva
- ❑ Import/export certifikata
- ❑ Ključevi/certifikati su spremljeni u keystore pod aliasima
 - Svaki ima svoju lozinku



Java – keytool – generiranje ključeva

□ Primjer:

```
keytool -genkeypair -alias TestAlias -keyalg RSA -keystore
server.keystore -keypass TestPass -storepass TestPass
```

What is your first and last name?

[Unknown]: Boris Komunjer

What is the name of your organizational unit?

[Unknown]: SSPR

What is the name of your organization?

[Unknown]: IN2

What is the name of your City or Locality?

[Unknown]: Zagreb

What is the name of your State or Province?

[Unknown]: Croatia

What is the two-letter country code for this unit?

[Unknown]: HR

Is CN=Boris Komunjer, OU=SSPR, O=IN2, L=Zagreb, ST=Croatia, C=HR
correct?

[no]: yes

Java – keytool – export/import certifikata

□ Primjer:

```
keytool -exportcert -alias TestAlias -keystore server.keystore -  
storepass TestPass -file Test.cer
```

```
keytool -importcert -alias TestAlias -file Test.cer -keypass  
TestPass -keystore server.truststore -storepass Ter.truststore -  
storepass TestPass  
Trust this certificate? [no]: yes
```

Java – podešavanje keystoreova

❑ Primjer:

```
String keyStore = System.getProperty("javax.net.ssl.keyStore");  
System.out.println("Current keystore: "+keyStore);  
System.setProperty("javax.net.ssl.keyStore", "PATH_TO_KEYSTORE");  
System.setProperty("javax.net.ssl.keyStorePassword", "KEYSTORE_PASSWORD");  
keyStore = System.getProperty("javax.net.ssl.keyStore");  
System.out.println("New keystore: "+keyStore);
```

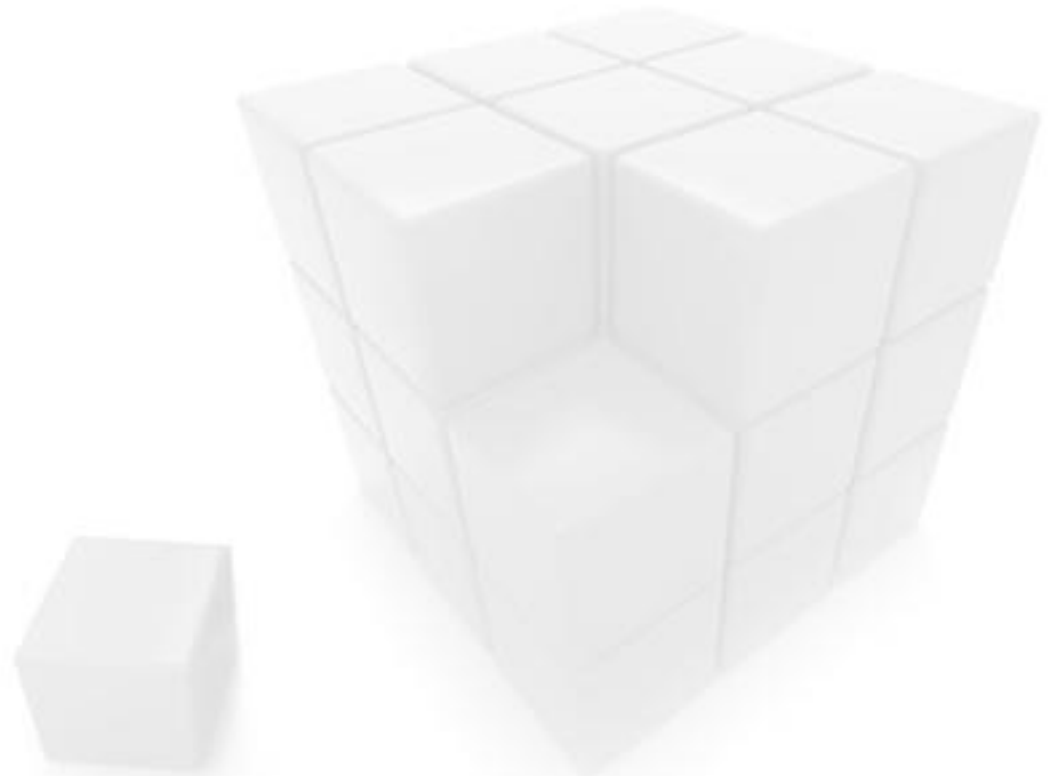
```
String trustStore = System.getProperty("javax.net.ssl.trustStore");  
System.out.println("Current truststore: "+trustStore);  
System.setProperty("javax.net.ssl.trustStore", "PATH_TO_TRUSTSTORE");  
System.setProperty("javax.net.ssl.trustStorePassword", "TRUSTSTORE_PASSWORD");  
trustStore = System.getProperty("javax.net.ssl.trustStore");  
System.out.println("New truststore: "+trustStore);
```

❑ Alias i keystore – ista lozinka!

❑ Samo jedan alias u keystore!

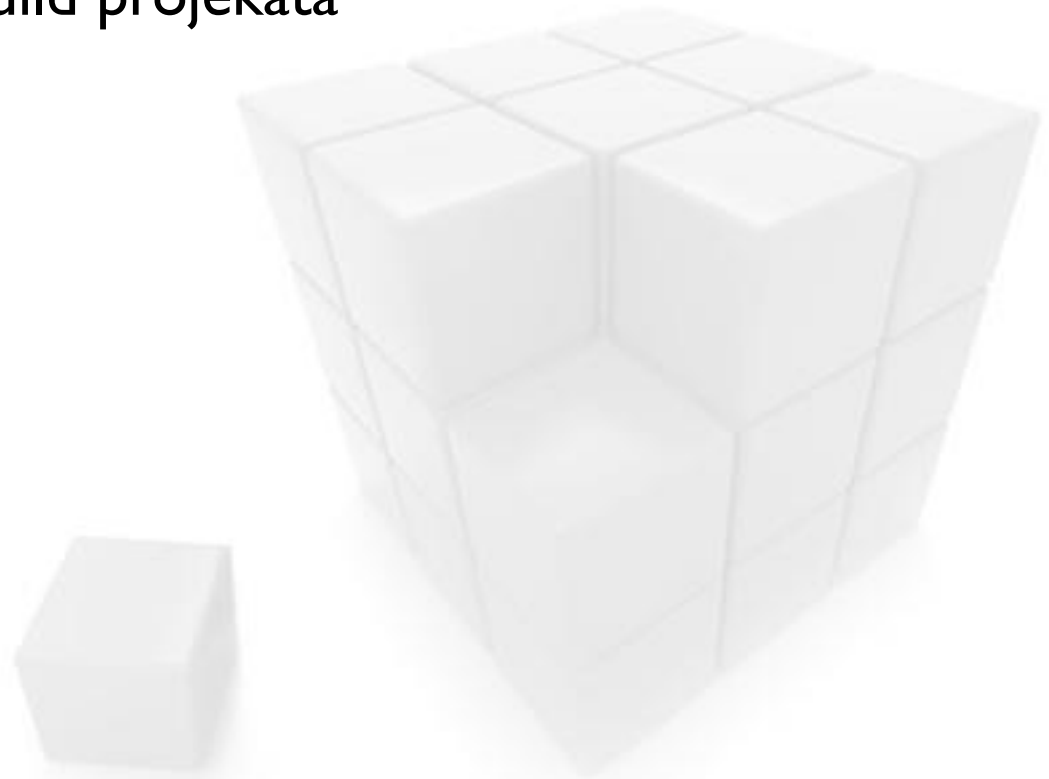
Eclipse

- ❑ Enterprise Edition
- ❑ Mars
- ❑ Neon
- ❑ Plugin za Maven
- ❑ Plugin za SVN



Maven

- ❑ Alat za izgradnju i održavanje projekata zasnovanih na Javi
- ❑ POM (*Project Object Model*)
- ❑ Unificirani sistem za build projekata
- ❑ Kompajliranje koda
- ❑ Rješavanje zavisnosti
- ❑ Unit testovi
- ❑ „Nasljednik” Ant-a
- ❑ Java 8 – Maven 3.3.3
- ❑ Java 6 – Maven 3.2.5



Tomcat

- ❑ Tomcat 7
 - Koristi Java 6
- ❑ Potrebno skinuti JAX-WS library
 - [JAX-WS RI 2.2.0](#)
 - Staviti sadržaj zip datoteke u lib direktorij Tomcata
- ❑ Dvostruka autentifikacija pri korištenju HTTPS protokola
 - Putanja do keystore i truststore
 - Keystore – sadrži identitet servera
 - Truststore – lista certifikata kojima se vjeruje

Tomcat – primjer HTTPS konfiguracije

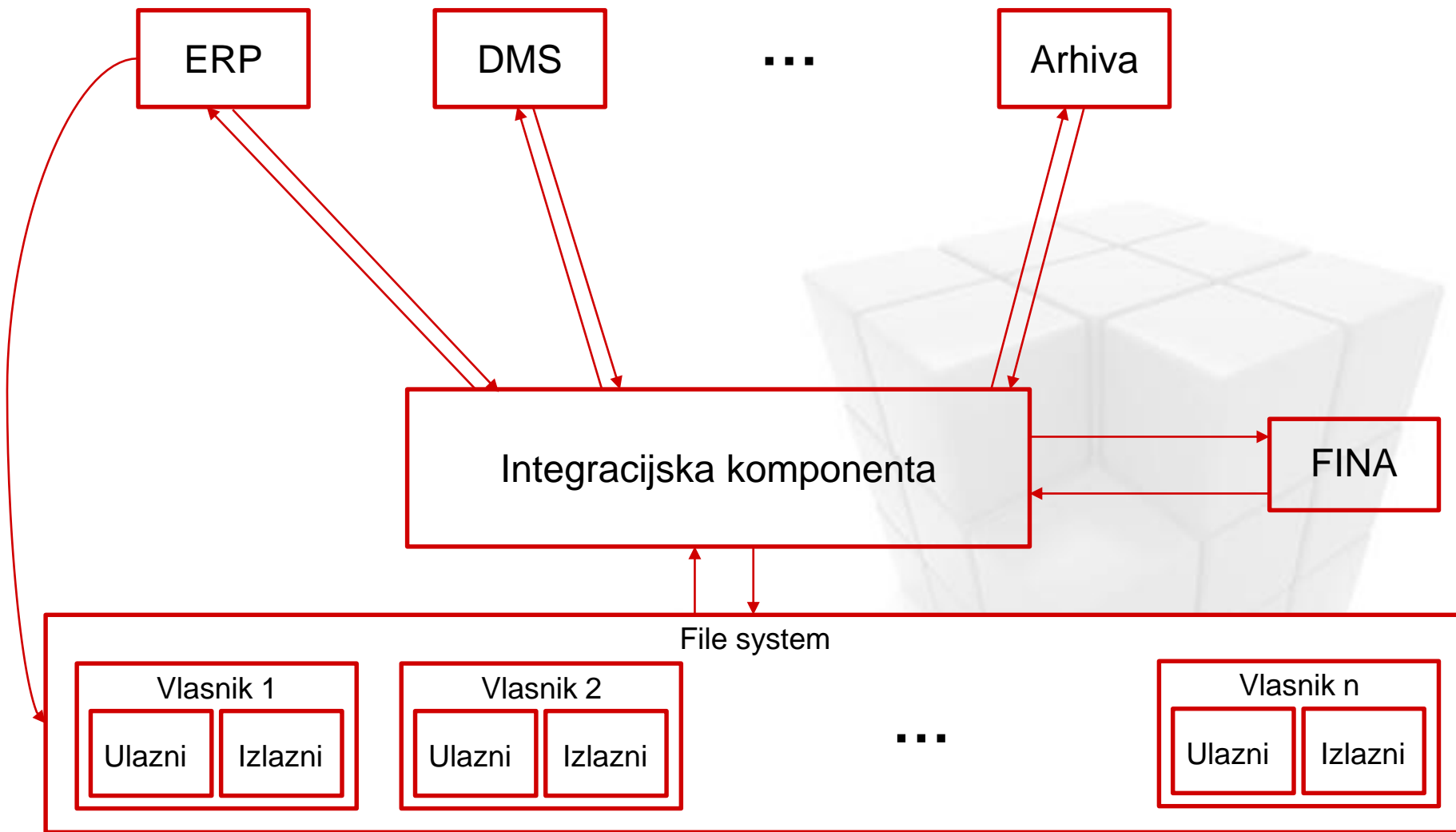
```
<Connector port="8443"  
  protocol="org.apache.coyote.http11.Http11NioProtocol"  
  maxThreads="150"  
  SSLEnabled="true"  
  scheme="https"  
  secure="true"  
  clientAuth="true"  
  sslProtocol="TLS"  
  keystoreFile="conf/server.keystore"  
  keystorePass="TestPass"  
  keyAlias="TestAlias"  
  truststoreFile="conf/server.truststore"  
  truststorePass="TestPass"/>
```



Implementacija sustava

- ❑ Sinkroni web servisi
 - Lakša implementacija
 - Potreban samo aplikacijski certifikat
- ❑ Integracijska komponenta
 - Escheduler.jar
- ❑ Multi Tenant
 - Više firmi (vlasnika, odnosno primatelja/pošiljatelja)
 - Više poslovnih jedinica po firmi
- ❑ Integracija s drugim sustavima preko jednostavnog web servisa
 - Definiran u sklopu integracijske komponente
 - Nisu tehnološki ovisni o sustavu na koji se komponenta spaja

Implementacija sustava



Konfiguracija

- ❑ Putem .properties datoteka
- ❑ Svaki vlasnik ima svoj .properties file
 - Laka i detljana konfiguracija
 - Putanje do izlaznog i ulaznog foldera
 - Putanje do konfiguracijskih datoteka za obradu izlaznih i ulaznih računa
 - Definiranje koraka obrade
 - Definiranje postavki spajanja na FINA-u (proxy, port, id pošiljatelja...)

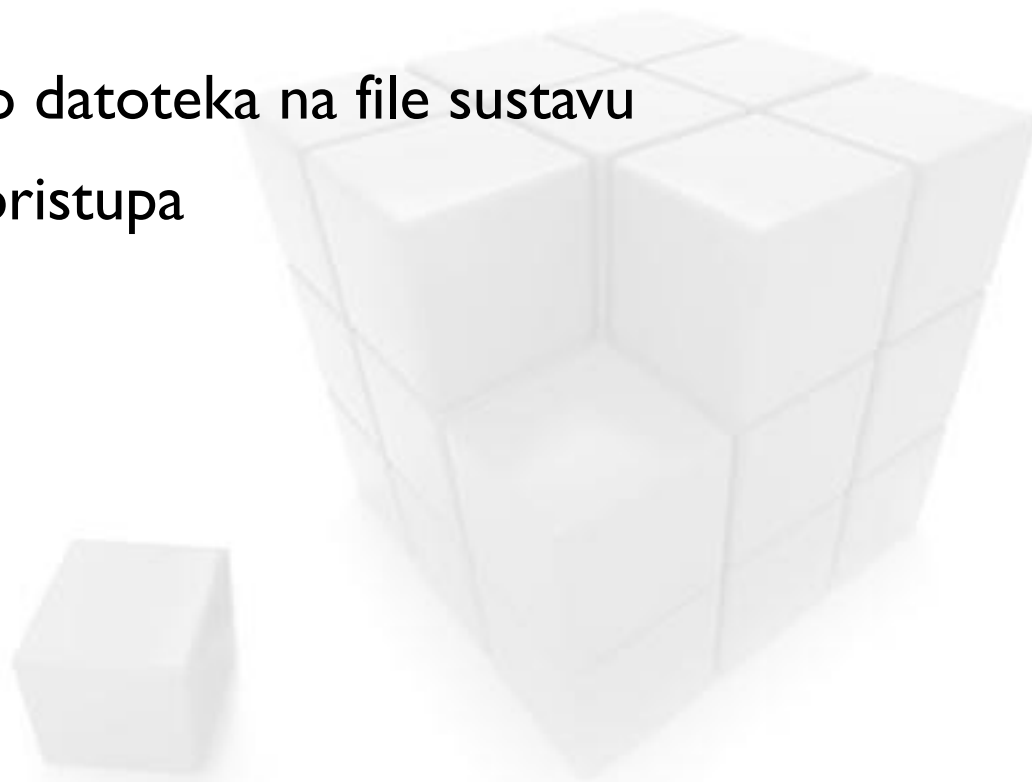
Raspored pokretanja

- ❑ Periodičko pokretanje
- ❑ Svakih 30 minuta
- ❑ Windows – Task Scheduler
- ❑ Linux – cron
- ❑ Kod pokretanja potrebno je specificirati ulazni parametar
 - 1 – obrada ulaznih i izlaznih računa
 - 2 – obrada ulaznih računa
 - 3 – obrada izlaznih računa
- ❑ Primjer:

```
/home/ebill/jdk1.8.0_92/bin/java -cp escheduler.jar hr.in2.eracun.escheduler.main.EScheduler 1  
java -cp escheduler.jar hr.in2.eracun.escheduler.main.EScheduler 1
```

Web pregled

- ❑ Jednostavna web aplikacija na Tomcatu
- ❑ PHP
- ❑ PHP JavaBridge
- ❑ Podešava se putanja do datoteka na file sustavu
- ❑ Jednostavna kontrola pristupa



Web pregled - primjer

Pregled obrade E-Računa



Ulazni računi

Obrađeni ulazni računi

Izlazni računi

Obrađeni izlazni računi

Pregled ulazni/izlazni log

E-Računi

Popis računa

Računi	
33132	33132.pdf 33132.ser 33132.xml 33132_response_log.xml incomingProcessConfig.properties log.log
33133	33133.pdf 33133.ser 33133.xml 33133_response_log.xml incomingProcessConfig.properties log.log
33136	33136.pdf 33136.ser 33136.xml 33136_response_log.xml incomingProcessConfig.properties log.log

Pitanja?





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