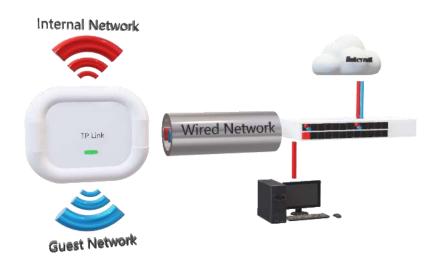
SECURITY THREATS AND CHALLENGES IN CLOUD COMPUTING

By A. Alshammari, S. Alhaidari, A. Alharbi, M. Zohdy

WHAT IS CLOUD COMPUTING









ADVANTAGES OF CLOUD COMPUTING

- Reduces maintenance, management costs
- Can be used from anywhere
- No installation



DISADVANTAGES OF CLOUD COMPUTING

- Proprietary interfaces, data formats and technologies
- Susceptible to security threats



DEPLOYMENT MODELS

- Public Cloud
- Private Cloud
- Hybrid Cloud



SERVICE MODELS

- Infrastructure as a Service
- Platform as a Service
- Software as a Service





I. XML SIGNATURE WRAPPING ATTACK

 SOAP (Simple Object Access Protocol) requests and responses <?xml version="1.0"?> <soap:Envelope xmlns:soap="http://www.w3.org/2001/12/soap-envelope"</pre> soap:encodingStyle=http://www.w3.org/2001/12/soap-encoding> <soap:Header> </soap:Header> <soap:Body> <soap:Fault> </soap:Fault> </soap:Body>

</soap:Envelope>



SIGNATUR

```
<Signature>
  <SignedInfo>
     <CanonicalizationMethod />
      <SignatureMethod />
     <Reference>
        <Transforms>
        <DigestionMethod>
        <DigestValue>
     </Reference>
  </SignedInfo>
  <SignatureValue />
  <KeyInfo/>
  <Object />
</Signature>
```

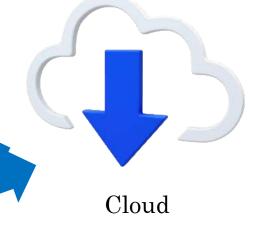
XML SIGNATURE WRAPPING ATTACKS

Simple Ancestry Context Attack Optional Element Context Attack

Sibling Value Context Attack Sibling Order Context Attack



SIMPLE ANCESTRY CONTEXT ATTACK



SSL / TLS

Client



SSL / TLS



Middle Tier (Proxy Server/Firewall)



THE ATTACK

```
<soap:Envelope ...>
  <soap:Header>
     <wsse:Security>
        <ds:Signature>
        <ds:SignedInfo>
             <ds:Reference URI="#CMPE">
             </ds:Reference>
        </ds:SignedInfo>
     </wsse:Security>
  </soap:Header>
  <soap:Body wsu:Id="CMPE">
     <getQuote Symbol="IBM"
  </soap:Body>
</soap:Envelope>
```

```
<soap:Envelope ...>
  <soap:Header>
     <wsse:Security>
        <ds:Signature>
        <ds:SignedInfo>
            <ds:Reference URI="#CMPE">
            </ds:Reference>
        </ds:SignedInfo>
     </wsse:Security>
  </soap:Header>
  <soap:Body wsu:Id="newCMPE">
     <getQuote Symbol="MBI"
  </soap:Body>
</soap:Envelope>
```

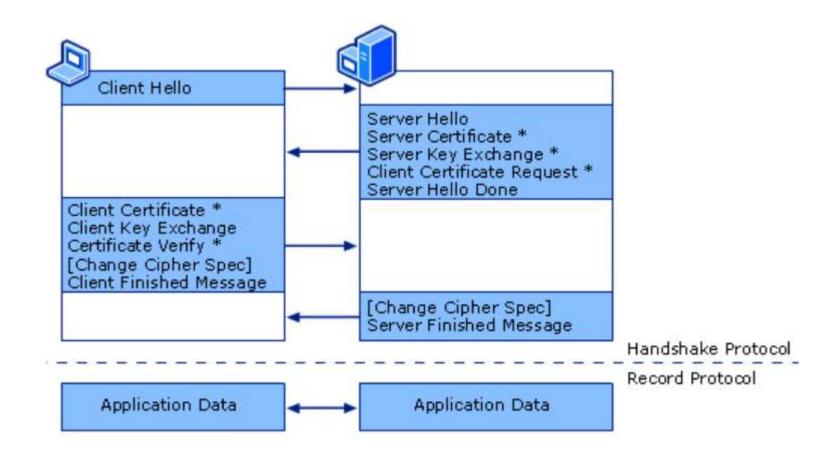
SOLUTION TO XML SIGNATURE WRAPPING

ATTACK REST (Representational State Transfer)

Encryption to many data formats

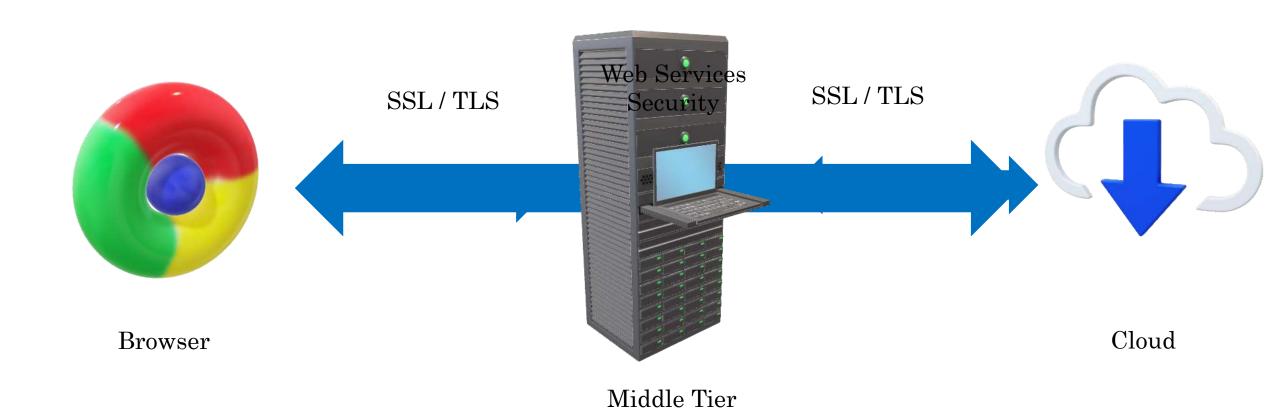


II. BROWSER SECURITY



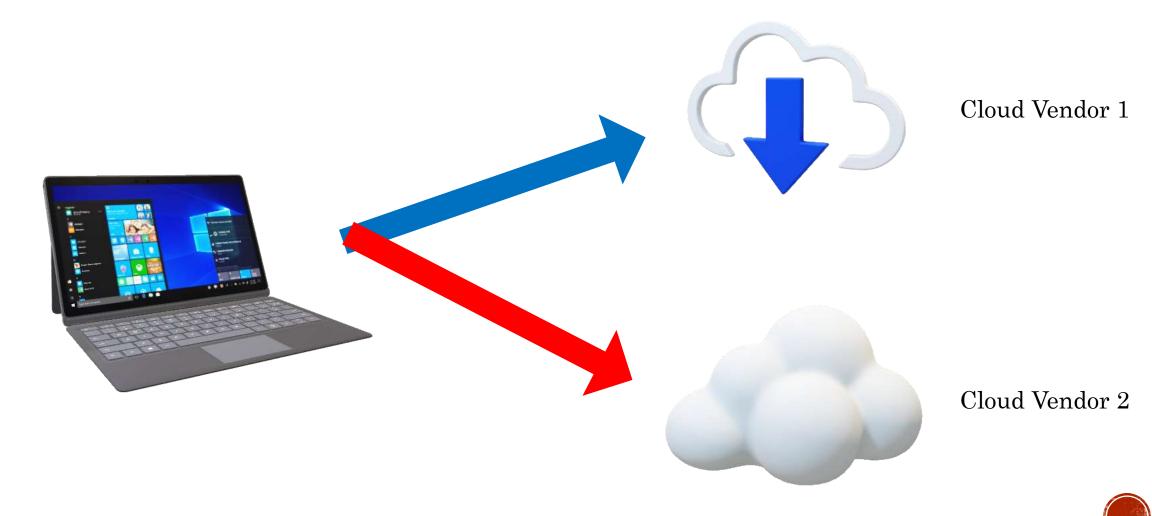


SOLUTION TO BROWSER SECURITY



(Proxy Server/Firewall)

III. VENDOR LOCK-IN



SOLUTION TO VENDOR LOCK-IN

- Software Adaptation
- Model Driven Architecture
- Refactoring



THANK YOU



