



Creating A Single Global Electronic Market

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# **ebXML Technical Architecture Risk Assessment v1.0**

**ebXML Security Team**  
May 10, 2001

## 21 **1 Status of this Document**

22

23 There are three categories of ebXML deliverables:

- 24 ○ *Technical Specifications* conform to the ebXML Requirements document.
- 25 ○ *Technical Reports* are either guidelines or catalogues.
- 26 ○ *White Papers* constitute a snapshot of on-going work within a Project Team.

27

28 This Technical Report has been approved by the ebXML Technical Architecture Security  
29 Team and has been accepted by the ebXML Plenary.

30 This document contains information to guide in the interpretation or implementation of  
31 ebXML.

32 Distribution of this document is unlimited.

33 Note: Implementers should consult the ebXML web site for current status and revisions  
34 to all specifications (<http://www.ebxml.org>).

35 ***This version:***

36 [www.ebxml.org/specs/secRISK.pdf](http://www.ebxml.org/specs/secRISK.pdf)

37 ***Latest version:***

38 [www.ebxml.org/specs/secRISK.pdf](http://www.ebxml.org/specs/secRISK.pdf)

## 39 **2 ebXML Participants**

40 The authors would like to acknowledge the support of the Security Team who contributed  
41 ideas to this document by the group's discussion email list, on conference calls and  
42 during the face-to-face meetings.

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65 **3 Table of Contents**

66

67 1 Status of this Document ..... 2

68 2 ebXML Participants ..... 3

69 3 Table of Contents ..... 4

70 4 Executive Overview ..... 6

71 5 Introduction ..... 7

72 5.1 Audience ..... 7

73 5.2 Scope ..... 7

74 5.3 Related Documents ..... 7

75 6 Design Objectives ..... 8

76 6.1 Problem Description & Goals for ebXML Security ..... 8

77 7 ebXML Risks ..... 10

78 8 ebXML Security Overview ..... 13

79 9 ebXML Business Process Specification Layer ..... 16

80 10 Trading Partner Information ..... 18

81 10.1 PKI Interoperability Issues ..... 19

82 10.2 CPP/CPA Security Elements ..... 20

83 11 Registry and Repository ..... 22

84 11.1 Registry ..... 22

85 11.2 Repository ..... 22

86 12 Messaging Service Functionality ..... 23

87 12.1 SOAP-SEC extensions and Signatures in ebXML Messages ..... 23

88 12.2 Lack of Processing Rules ..... 24

89 12.3 Manifests ..... 24

90 12.4 Key Management ..... 25

91 13 Conformance ..... 26

92 13.1 Overview ..... 26

93 13.2 Conformance Requirements ..... 26

94 14 Future Requirements ..... 26

95 14.1 Multi-hop and third party security services ..... 26

96 14.2 Archiving ..... 27

97 14.3 Minimum Security ..... 27

98 14.4 Automated CPA Generation ..... 28

99 14.5 Issues for non-repudiation of receipt (NRR) ..... 28

100 14.6 Registry and Repository Authentication ..... 28

101 14.7 Messaging without a CPA ..... 29

102 15 Additional Requirements and Recommendations ..... 30

103 16 Reference ..... 31

104 17 Disclaimer ..... 32

105 18 Contact Information ..... 32

106 Appendix A. Security Assertion Markup Language (SAML) ebXML use case .... 33

107 Appendix B. Packaging Profiles ..... 34

108 Appendix C. Sample Certificate Policy Element ..... 37

109 Appendix D. Registry Sample ..... 39  
110 Copyright Statement ..... 43  
111

## 112 **4 Executive Overview**

113

114 We live in interesting times. The further we move toward opening our borders both in a  
115 social sense and a business sense, the more we expose ourselves to risk. E-Business  
116 technology, like any new technology reflects this environment, and risk is inevitable. But,  
117 while there may still be much security work to be done, we should recall the words of one  
118 keynote speaker at a recent security conference:

119

120 *The reason not to panic is that we have to accept the poor state of security and*  
121 *work to mitigate the risk of attacks rather than try to prevent attacks altogether --*  
122 *an impossible task. Technology is not the enemy of security. It's only a tool, one*  
123 *that hasn't been used very well.*

124

125 ebXML is an attempt to open borders to global business. Given the limited time frame it  
126 faced, the security team decided early on that the most productive role to take would be  
127 two-fold:

- 128 • First, work with liaisons from the different working groups to discuss and identify  
129 security issues within the working group context; and
- 130 • Second, provide an initial risk assessment of the technical architecture to identify  
131 security issues that exist across groups or totally outside the existing group  
132 structure.

133

134 This document is the result of that work. The effort has exposed some risks within  
135 ebXML, exactly as was the intent of the exercise. While it would have been nice to have  
136 found that ebXML is risk-free, we know this would be naive: all real systems have risks  
137 associated with them. The risks that have been identified are risks that exist in the broader  
138 internet business environment today and should be viewed in this context. To get to the  
139 point of having secure e-business, means you have to start somewhere<sup>1</sup>. Classic advice in  
140 the security field is to start by securing the weakest link, then address the next link, and  
141 so on. This is the first step for ebXML: knowing how things stand. A valuable next step  
142 would be to integrate the information from the risk assessment as requirements into any  
143 ongoing activities for the respective working groups.

144

145 There are well-known security technologies that can be used by implementers of the  
146 ebXML specifications to provide a base level of security between any two ebXML  
147 partners. SSL and S/MIME are the primary candidates for providing confidentiality and  
148 authentication of endpoints. XML Digital Signatures can provide data integrity on  
149 messages, and existing authentication and authorization schemes are available to registry  
150 providers to enforce access control over data kept in the repository. Aside from XML  
151 Digital Signatures, these are the same mechanisms that are found in most web based  
152 service models today.

153

154 The bulk of the risks exist in the area of:

---

<sup>1</sup> Figure 1. in [BS7799-2], step 3 undertake a risk assessment.

- 155 • Dynamic business process definition
  - 156 • Service discovery
  - 157 • Negotiation.
- 158 This can be attributed to the immaturity of the technology.

159  
160 Knowing where you are is often half the problem, and that's what this document tries to  
161 show.

## 162 **5 Introduction**

163 This document describes security issues present in the ebXML technical architecture as  
164 defined by the ebXML specifications listed in Section 5.3. It provides a high level  
165 overview of the security issues in the relationships, interactions, and basic functionality  
166 of the ebXML architectural components.

### 167 **5.1 Audience**

168 Security architects and implementers should use it as a roadmap to learn:

- 169 1. What risks are present in the ebXML architecture
- 170 2. What problems the ebXML security recommendations and profiles can help  
171 solve; and
- 172 3. Perhaps most importantly, what security issues are yet to be addressed.

### 173 **5.2 Scope**

174 The security issues raised here should be considered when reviewing the design or  
175 implementation of an ebXML application. This document alone does not provide all the  
176 details required to build a secure ebXML application. Please refer to each of the ebXML  
177 component specifications listed in Section 5.3 Related Documents and the related  
178 reference specifications listed in the References for more details.

179 One of the difficulties in integrating security into a set of specifications that are being  
180 developed in parallel is that it potentially results in additional concepts needing to be  
181 addressed in a future iteration of the architecture or one of its components. In this  
182 document components of the architecture are reviewed and recommendations to address  
183 unresolved issues from a security perspective are identified and summarized in Section  
184 15 .

185

### 186 **5.3 Related Documents**

187 This risk analysis considered the following ebXML Specifications on the following  
188 topics:

189

- 190 EbXML Collaboration Protocol Profile and Agreement Specification v0.91 [ebCPP]
- 191 EbXML Message Service Interface Specification v 0.93[ebMS]
- 192 EbXML Registry and Repository Specification v0.84[ebRS]
- 193 EbXML Technical Architecture [ebTA]
- 194 EbXML Business Process Specification Schema [ebBPSS]

## 195 **6 Design Objectives**

### 196 **6.1 Problem Description & Goals for ebXML Security**

197 Implicit in business exchanges is the notion of trust. Two entities engage in a business  
198 relationship with the expectation that each party will fulfill their part of their business  
199 agreement. Without this fundamental understanding there could be no exchange.

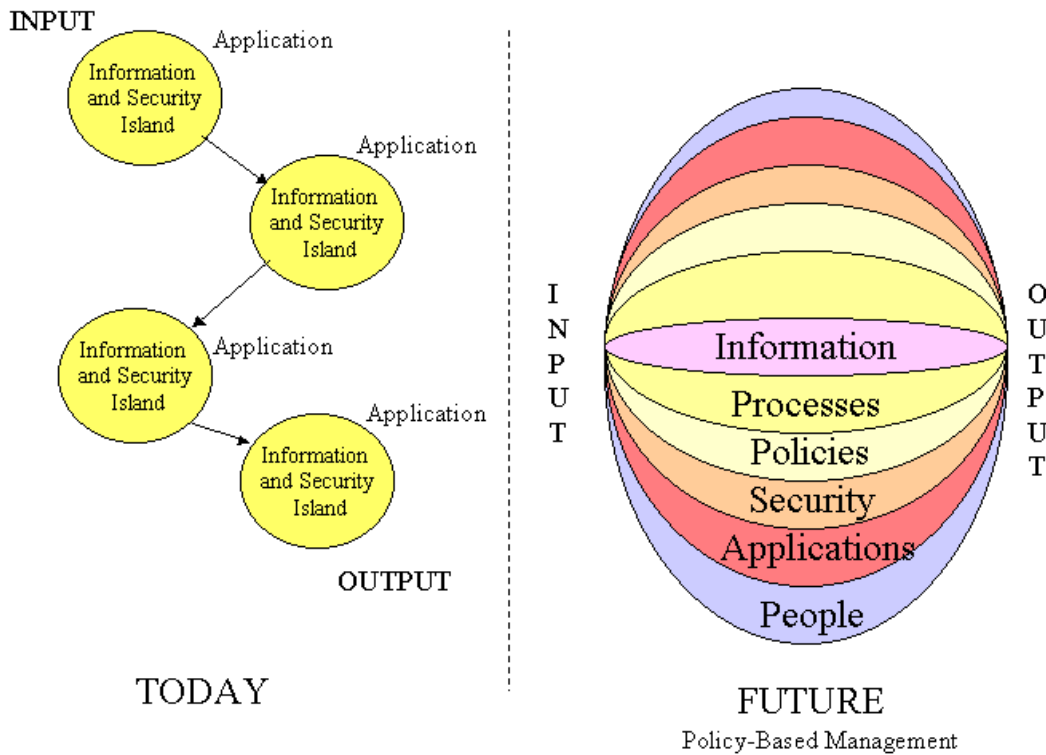
200 The companies that have implemented *Electronic Data Interchange (EDI)* agreed to  
201 implement common middleware that requires a significant investment to provide the  
202 assurance of secure transactions. Within the overall the business world, only a small  
203 percentage of companies are using EDI; consequently, *Common Business Processes* are  
204 dominated by paper transactions. Alternative standards in this area are emerging, but at  
205 this time it is not possible to provide a complete security architecture for electronic  
206 commerce based on open standards.

207 Network and system manufacturers are currently moving towards policy-based  
208 management. This is driven partly by the influence of large organizations such as ISPs  
209 and ASPs and partly by their own need to facilitate the management of large  
210 implementations of networks and systems. In providing a complete risk assessment it is  
211 important to consider this trend.

212 The left side of the picture below, Figure 1, attempts to illustrate how individual  
213 applications today are developed in isolation and the information and security for each is  
214 left within the application domain. This means that security decisions are closely tied to  
215 the application and it is difficult to grow or change the security infrastructure without  
216 requiring a rewrite of the application itself.

217





218  
 219 **Figure 1. Future for Policy-driven Security**

220 The right side of the picture illustrates a more modular approach. In a Policy-Based  
 221 Management scheme, the emphasis is on building a layered infrastructure so that the  
 222 application can specify security requirements in terms of the business need. The entities  
 223 responsible for the infrastructure and management can then make the appropriate  
 224 decisions for mapping the application requirements into the environments security  
 225 capabilities and mechanisms.

226 This document attempts to begin a conceptual layering of ebXML applications. It  
 227 translates the business need for trust captured by the *Business Process and Information*  
 228 *Meta Model* into a set of risk assertions that can be addressed using standard security  
 229 technologies. The document also identifies emerging standards that offer the potential for  
 230 additional levels of security in the future.

231 This document describes security for ebXML in two dimensions. First, there are security  
 232 technologies available that have been identified in some of the ebXML project  
 233 specifications (Business Process, Trading Partners, Registry & Repository, and Transport  
 234 Routing & Packaging). This process is similar to the isolation model. Each project is  
 235 addressing security within a narrow scope and demonstrating their individual piece of  
 236 ebXML. Second, there are security risks that need to be addressed across layers of  
 237 ebXML architectural components in any implementation of the ebXML architecture. In

238 the process of performing this risk assessment, we introduce the notion of layering  
239 security.

240 A set of security risks have been documented in the following Section 7, ebXML Risks.  
241 Implementers should use the references cited to provide a complete risk assessment of  
242 their implementation.

## 243 **7 ebXML Risks**

244 Within any organization there exist vulnerabilities or risks that must be mitigated or  
245 reduced to an acceptable level in order for the organization to perform business functions.  
246 The following list identifies key risks for ebXML:

- 247 • Unauthorized transactions and fraud – The benefit of human experience in  
248 identification of unusual or inconsistent transactions is reduced with e-  
249 transactions. This automation of transactions may present more risk to businesses  
250 by increasing the number of opportunities to change an entity's computer records  
251 and/or those of the entity's trading partners which could cause or allow fraud to  
252 be perpetrated. In the automated payment generation area, the manipulation or  
253 diversion of payments, payment generation in error or the inappropriate timing of  
254 payments (funds not in place or payment delivered too early) are an increasing  
255 risk to business.
- 256 • Loss of confidentiality – Sensitive information may be inadvertently or  
257 deliberately disclosed on the network. External parties might gain information  
258 about transactions or specific entity knowledge without the primary party's  
259 knowledge.
- 260 • Error detection (application, network/transport, platform) – Errors in processing  
261 and communications systems may result in the transmission of incorrect trading  
262 information or inaccurate reporting. Application errors can result in significant  
263 losses to trading partners and potential business losses.
- 264 • Potential loss of management and audit – There is the potential for the loss of data  
265 if proper controls are not implemented. Policies for retention of data are also an  
266 issue. EDI transaction data are normally maintained for long periods of time and  
267 without consideration of legal and audit issues the parties may not be able to  
268 provide adequate or appropriate evidence.
- 269 • Potential legal liability – the legislation for the legality of electronic transactions  
270 and records are still being created. Although legal precedence has been set for the  
271 use of digital signatures in the US and other countries, there are still a number of  
272 countries that do not have any legislation in place for dealing with electronic  
273 information. Without proven audit and control, the presentation and admissibility  
274 of electronic evidence is still immature and inconsistent between jurisdictions.

275 The major categories of security risks and some countermeasures for ebXML are briefly  
276 defined and then categorized in the matrix below.

277 A more complete view of information security management which is covered in [BS-  
 278 7799/ISO-17799] including all the aspect of risks need to be measured and controlled to  
 279 establish a security management framework.

Risk Category	Risk element	Currently Availabel Conter measure	Emerging Technology for Counter measures
Unauthorized transactions and fraud	Identification	Biometrics (physical); electronic (userid and password, token, certificate; notarized documents	SAML[SAML]
	Authentication	Userid and password; PKI; token; biometrics;	SAML
	Authorization	RBAC; delegated;	SAML
	Non-repudiation of origin	XML-DSIG; PKI; paper; policies and procedures including audit and control	
	Non-repudiation of receipt	AS1, AS2, MDN <sup>EDI</sup>  ebXML TRP persistent signed receipt plus policies and procedures	
	Secure timestamp	Notary; signed audit logs;	

280  
281

Risk Category	Risk element	Currently Availabel Conter measure	Emerging Technology for Counter measures	
Loss of Confidentiality	Application	SMIME/PGP policies and procedures including audit and control		
	Message	SMIME/PGP policies and procedures including audit and control	XML Encryption [XMLENC]	
	Transport		SSL; TLS	
			VPN	
			policies and procedures including audit and control	

282  
283  
284

<sup>EDI</sup> <http://www.ietf.org/internet-drafts/draft-ietf-ediint-as1-12.txt>,  
<http://www.ietf.org/internet-drafts/draft-ietf-ediint-as2-09.txt>

284

Risk Category		Risk element	Currently Available Counter measure	Emerging Technology for Counter measures
Error Detection	Application	Virus	Anti-virus software plus policies and procedures	
		Improper configuration	Configuration management; policies and procedures including audit and control	
		Improper use	Testing and code reviews	
	Network/ MessageLevel	Virus	Anti-virus software plus policies and procedures	
		Denial of Service		
		Intrusion detection	Intrusion detection software	
		Subversion		
		Protocol-level attacks		
	Network/ Transport Level	Improper configuration	Configuration management; policies and procedures including audit and control	
		Denial of Service	policies and procedures including audit and control	
	Platform	Virus	Anti-virus software plus policies and procedures	
		Improper configuration	policies and procedures including audit and File Access Control; Server Security; Backup and archive; CERT based safe operating practices <sup>2</sup>	

285  
286

<sup>2</sup> CERT<sup>®</sup> Coordination Center (CERT/CC), www.cert.org

Risk Category	Risk element	Currently Available Counter measure	Emerging Technology for Counter measures
Potential loss of Management and Audit	Electronic evidence	policies and procedures including audit and control; backup and archival; demonstrable secure processing	WebTrust Principles and criteria for Certificate Authorities AICPA/CICA; PKI Assessment Guidelines (PAG) ABA (two guidelines for assessing and facilitating interoperability of PKIs)
	Key management	policies and procedures including audit and control; CA	XKMS[XKMS]

287  
288

Risk Category	Risk element	Currently Available Counter measure	Emerging Technology for Counter measures
Potential Legal Liability		policies and procedures including audit and control	

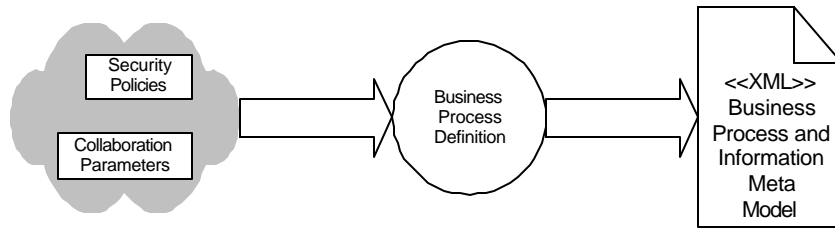
289  
290

Figure 2. Risk Matrix

291 **8 ebXML Security Overview**

292 The *Business Process* is ultimately what defines a need for security. The security process  
 293 often becomes a morass of details and technical discussion. At the root of it all is some  
 294 business requirement for security, often expressed as a desire to lessen a particular risk or  
 295 exposure. The current discussions on security revolve mostly around separate security  
 296 mechanisms such as encryption and signing. Questions arise such as: is it necessary for  
 297 confidentiality to encrypt the manifest as well as the payload? There are many such  
 298 questions, and it is difficult to determine what the business process requires based on a  
 299 simple desire to apply or not apply a particular security mechanism.

300 The pictures and text below attempt to capture the relationship between the security  
 301 elements and the ebXML Technical Architecture components: Business Process, Trading  
 302 Partners, Registry & Repository, and Transport Routing & Packaging.

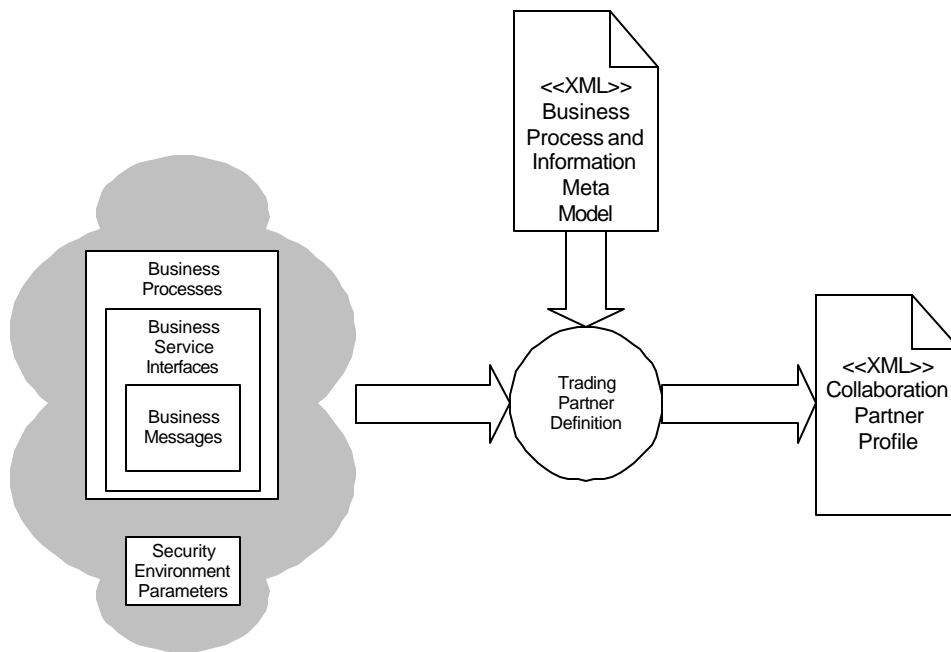


303

304

**Figure 3. BP defines security characteristics**

305 The Business Process (BP) definition phase attempts to capture security characteristics of  
 306 business process collaboration at a relatively high level (Figure3). In the current ebXML  
 307 flow, the information model is then translated into an XML representation and combined  
 308 with other environmental information.



309

310

**Figure 4. CPP is crafted from different inputs**

311 The generation of the *Collaboration Protocol Profile* (CPP) is driven by the *Business*  
 312 *Process Information Meta Model* (and contains a reference to the model in its structure)  
 313 but is not completely an automatic process. Figure 4 attempts to capture this by  
 314 identifying a step called the “trading partner definition”. For the ebXML architecture to  
 315 move towards supporting policy-based management, it will require further work in this  
 316 area to model security practices and services as well as applications. In the CPP, the  
 317 business requirement for providing secure transport becomes an XML element called  
 318 **secureTransport**, and the business requirement for security characteristics becomes  
 319 an XML attribute called **Characteristics** under the **DeliveryChannel** element  
 320 as indicated in the XML fragment below.

321

322

```
<DeliveryChannel >
    <Characteristics
```

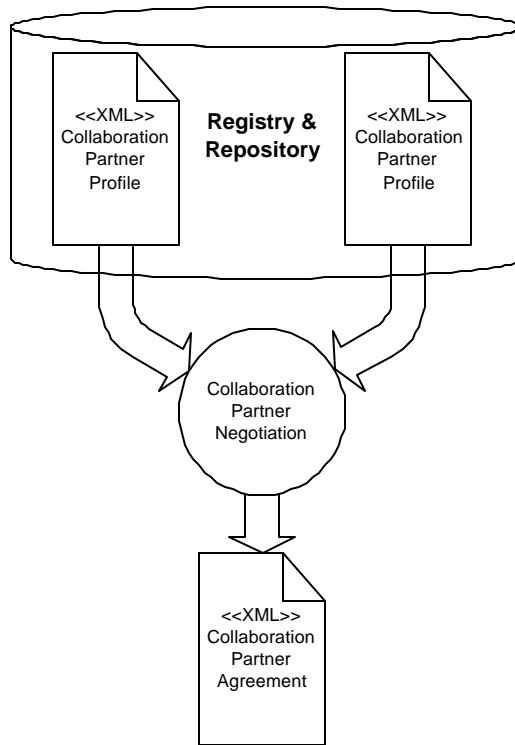
```
323         nonrepudiationOfOrigin='false'  
324         nonrepudiationOfReceipt='false'  
325         secureTransport='true'  
326         confidentiality='false'  
327         authenticated='false'  
328         authorized='false'  
329     />  
330 </DeliveryChannel>
```

331 This sub-element of a **DeliveryChannel** then indicates that certain additional elements  
332 within the CPP must be defined to provide the details on how secure transport is to be  
333 provided. Following the example, if the security attribute **secureTransport** is  
334 indicated in the CPP, then the **Transport** element of the CPP might contain details like  
335 the following fragment:

```
336 <Transport transportId="N12">  
337     <Protocol version="1.1">HTTP</Protocol>  
338     <Endpointuri=https://www.ebxmlregisterservices.org/asynch  
339     type="request"/>  
340     <TransportSecurity>  
341         <Protocol version="1.0">TLS</Protocol>  
342         <CertificateRef certId="N05"/>  
343     </TransportSecurity>  
344 </Transport>
```

345 The CPP can also define different levels at which security may be present. For example,  
346 the Document Exchange Section of the CPP might include tags for an *ebXML binding*  
347 [ebCPP]. An ebXML binding contains elements for describing reliable messaging and  
348 non-repudiation that contains a reference to a **Certificate** structure that references the  
349 key used to sign an ebXML document [XMLDSIG]<sup>3</sup>. Security can also be defined at the  
350 transport level (e.g. SSL via TLS). These patterns can be combined within the CPP  
351 document.

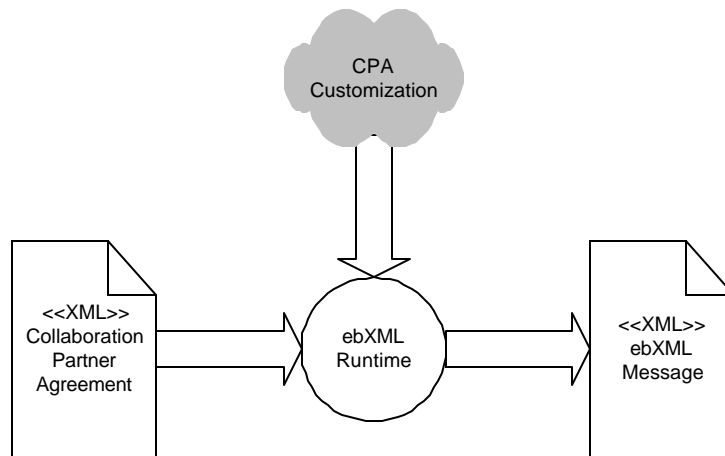
352 Once a CPP has been defined, it may be stored in the ebXML compliant Registry &  
353 Repository (See Figure 5). When business partner A wishes to collaborate with business  
354 partner B, it locates the CPP for partner B and the two parties engage in a process of  
355 negotiating an agreement based on matching complimentary items in the two profiles.  
356 The end result of this negotiation is a *Collaboration Protocol Agreement (CPA)*  
357 document. Currently this is a manual process.



358  
359

**Figure 5 Storing a CPP and generating a CPA**

360 The CPA is then used to configure the runtime for the ebXML components so that the  
361 business collaboration can execute the secure business process (Figure 6).



362  
363

**Figure 6 Configuring the runtime**

364 **9 ebXML Business Process Specification Layer**

365 The security model for ebXML relies on an assumption that the modelling of security  
366 attributes at the *Business Operational View* (see the text below) is mapped appropriately  
367 to the *Functional Service View* (expanded tags in the CPP).



368 The security model only addresses those security attributes that have been represented in  
369 XML as a result of the conversion of business process and information models into an  
370 XML representation. The current set of security characteristics that the business process  
371 [ebBPSS] has chosen to represent in XML is as follows:

```
372         nonrepudiationOfOrigin  
373         nonrepudiationOfReceipt  
374         secureTransport  
375         confidentiality  
376         authenticated  
377         authorized
```

378 Currently the *Business Process* asserts security characteristics at a very coarse level. An  
379 example of this coarse granularity is given in the paragraphs below in the description of  
380 the issues surrounding **non-repudiation**.

381 To provide end-to-end security it must be possible to assert security requirements at a  
382 finer level of granularity in the business information model. For example, there are a  
383 number of things within the business model to which security characteristics can be  
384 applied; documents, delivery channels, or business processes as a whole.

385 This cannot be done with the current level of detail. The coarser the granularity of the  
386 security characteristics, the simpler but more limited the options are. In the beginning of  
387 any such effort, it is natural to start with the simple, coarse-grained security  
388 characteristics. However, eventually the business process will require finer granularity to  
389 the security characteristics despite the challenging nature of such added detail.

390 For example, it is difficult with the current set of security characteristics to indicate  
391 whether **non-repudiation** is handled by the application or by the message service layer.  
392 It is also difficult to see how this is represented by the CPP. To assert that non-  
393 repudiation of receipt is addressed means that some pieces of the message header and  
394 payload are being asserted as evidence. In addition, a hash has been generated over this  
395 information and evidence that the receiver is able to verify that same hash value is  
396 returned in the acknowledgement of receipt to the sender. The sender then needs to  
397 archive this information as evidence.

398 Currently each party defining a BP must choose to apply or not apply each security  
399 mechanism at each level separately. This leads to a complex representation within a CPP  
400 and a potential problem with an increased risk of improper configuration at the packaging  
401 stage where it must be decided which parts of the message security should be applied to.

402 To bootstrap the ebXML process, a set of profiles that represent typical business  
403 requirements must be established. If additional scenarios are identified, new profiles  
404 could be created/documented and added to the choices for parties defining business  
405 processes. Sample profiles could address particular business needs, and define those  
406 security services necessary to meet those needs. A good example profile would be one for  
407 non-repudiation of receipt (NRR). The business process might require that the sending  
408 party receive solid proof that the receiving party received the *payloads* unaltered. If NRR

409 is desired, signing will almost always be required as well. In addition it is most likely  
410 only necessary to sign the *payloads*, and generate the NRR response over the *payloads*. A  
411 profile could be created for this scenario, and the party generating the BP could simply  
412 choose to apply this profile rather than having to choose a more complex and obtuse set  
413 of security settings. In Appendix B Packaging Profiles, there are four sample profiles for  
414 secure packaging of the application payload:

- 415 • Application encryption over payload using PGP [PGP]
- 416 • Application encryption over payload using S/MIME [SMIMEV2][SMIMEV3]
- 417 • Application signing over payload using PGP]
- 418 • Application signing over payload using S/MIME

## 419 **10 Trading Partner Information**

420  
421 In order to reduce risk to an acceptable level, potential trading partners must be able to  
422 authenticate each other's identity, verify the integrity of the messages they exchange, and  
423 ensure the confidentiality of those messages as they transit the network (known  
424 collectively as an ebXML security policy). The degree to which they will want to do  
425 these things will vary greatly depending on the situation.

426  
427 There are many factors that can affect the ability to accomplish the desired level of trust.  
428 These include the following:

- 429  
430 • Some nations regulate the export, import, or use of cryptographic software. The  
431 only means to address this is to ensure that algorithms, key sizes etc are always  
432 identified
- 433  
434 • Most cryptographic protocols actually support a suite of algorithms and data  
435 structures (known collectively as mechanisms). So, even if both parties use  
436 XMLDSIG, partners will not be able to validate and verify a signature if one uses  
437 X.509[PKIX] [] mechanisms while the other only uses PGP. A potential way to  
438 address this is by defining some base-level profiles that all implementations  
439 support to identify which mechanisms a party uses so that “common operating  
440 dialects” can be found.
- 441  
442 • Even when using common mechanisms, proper interpretation of authentication  
443 data can be very difficult and error-prone. For example, even after years of  
444 standardization, correct specification of how to validate X.509 certificate paths  
445 proves elusive. Given the current state of PKIX[PKIX]development, deferring to  
446 the manual evaluation step in CPP/CPA negotiation may be the only appropriate  
447 action for agreeing to a certificate validation scheme.
- 448

- 449       • Important pieces of a complete on-line solution are not widely deployed or even  
450 specified. For example, determining if a partner's certificate has been revoked, or  
451 if they are authorized to make purchases, can only be solved –if at all—through a  
452 series of ad hoc methods. This technology will evolve but again, manual  
453 evaluation is the only practical option for establishing revocation policies at this  
454 time.  
455
- 456       ○ This document proposes that a trust anchor element be created within the  
457 CPP and that it be represented as an XML Digital Signature [XMLDSIG]  
458 KeyInfo element. It is an endpoint for a set of credentials used by the  
459 party. It is important to recognize that a single policy will probably have  
460 multiple anchors. For example, a small enterprise might have an SSL  
461 certificate from a DNS registrar, yet use PGP [PGP] keys signed by a  
462 particular staff member for all purchasing agents.  
463

464 In spite of these factors, it is still possible to create a secure association between trading  
465 partners, and automate a large portion of the establishment of that association by defining  
466 a **securityPolicy** element in the CPP. This element would advertise the set of security  
467 mechanisms a party understands, the profiles for those mechanisms, and the trust anchors  
468 that will be issuing the credentials used within that policy. The policies can be  
469 asymmetric, allowing separate identification of what it can accept from what it will,  
470 itself, generate. For example, a party might accept SSL-protected messages, but will  
471 itself, only generate [XMLDSIG] signed acknowledgements.  
472

473 In order to encourage maximum interoperability, the following standard mechanisms are  
474 identified and vendors are encouraged to implement them:

- 475 -
- 476       ▪ When exchanging identity information, use X.509v3 Certificates that follow the  
477 IETF profile (RFC2459 and its successors). [PKIX]
  - 478       ▪ When symmetric-key encryption is needed, use 3DES or the AES.
  - 479       ▪ When asymmetric encryption is needed, use RSA encryption with the OAEP  
480 encryption scheme and a key size of 1024 or 2048 bits.
  - 481       ▪ When hashing (or digesting) is needed, use SHA-1.
  - 482       ▪ When transport-level security is required, use SSLv3 or TLS with RSA keys and  
483 the RC4 (or ARC4) stream cipher.  
484

485 The intent of this document is to initially establish the profile above as a text reference  
486 and identify it by the URN *urn:security.ebxml.org/profiles/baseline*. Future versions of  
487 the ebXML standards may provide detailed profiles as the correct format for this  
488 information and its relationship to the CPP elements are further refined.  
489

## 490 **10.1 PKI Interoperability Issues**

491  
492 A Public Key Infrastructure is more than just technology. In fact, technical  
493 interoperability accounts for about 20% of the issues when organizations want to cross

494 certify or otherwise trust each other's certificates. There are a number of business,  
495 policy, procedure, audit and control issues that must be addressed prior to cross  
496 certification. This type of information should be covered in the CPA. Some of the key  
497 issues are covered below:

498

- 499 • Legal issues – for dispute resolution there may be a requirement to resolve  
500 the dispute in court and it should be determined up front what laws apply  
501 and in what jurisdiction
- 502 • Liability issues – who accepts liability, when and how much should be  
503 determined (usually per transaction but could be daily or some other means  
504 that meets both parties' needs)
- 505 • Level of assurance – in determining the limit of liability, the level of  
506 assurance (the level of assurance is based on the level of risk associated  
507 with identification, authentication, authorization and security of a  
508 certificate) must be determined for each organization and the proof of  
509 compliance to that level (compliance audit performed)
- 510 • Cultural and political issues – when dealing with entities external to an  
511 entity's borders there may be different cultural or political issues that must  
512 be addressed
- 513 • Policies and procedures (see level of assurance) there is a need to  
514 determine how certificates are managed such as revocation and timely  
515 posting to CRLs and/or OCSP responder, what applications are enabled,  
516 how they are enabled, key escrow (NOTE private signing keys should NOT  
517 be escrowed) etc.
- 518 • Technical – key size, certificate extensions, algorithms used, physical  
519 controls, key usage periods, private key protection, etc.

520

521 Appendix C documents a sample XML fragment for defining CPP elements related to  
522 public key policies.

## 523 **10.2 CPP/CPA Security Elements**

524

525 In the current version of the CPP/CPA, the specification of security elements is limited.  
526 It is recommended that XML schema be considered to more effectively express security  
527 attributes. For example, the security characteristic is a single element that contains  
528 attributes with Boolean values indicating whether or not a security attribute has been  
529 addressed. It would be useful to have the security characteristics have a type and be able  
530 to have a reference id to include on lower elements (like the transport element), which  
531 contain the details like the protocol.

532

533 In addition, it is entirely feasible to develop a super schema that would combine a  
534 description of the CPP with description of the CPA and correlate the relevant components  
535 of the two using the key/keyref mechanism of XML schema. This would allow a contract  
536 validator to match the correlated components to make sure that the contract is actually  
537 met.

538

539 The current CPP/CPA does not contain all the details needed to express both the policy  
 540 and the operational details for specifying security. It is important that any ebXML follow  
 541 on activity consider creating a group of participants from Business Process, Trading  
 542 Partners, Security and TR& P to evolve the security attributes currently specified in the  
 543 CPP.

544

545 It is unclear from the current analysis, where new elements should be attached within the  
 546 CPP. Two options considered are to attach them to a delivery channel or to attach them to  
 547 the service binding element of the CPP. If the details are attached to a delivery channel  
 548 the entire document must be parsed in order to look for matching security attributes. If  
 549 the details are attached to the service binding, it is easier to relate the security attributes  
 550 with the packaging elements currently specified in the service binding. Grouping Trust  
 551 Anchor elements like Certificate elements and allowing the channel specifications to  
 552 reference the id of a trust anchor subset should be considered. Below is sample text for  
 553 expressing Trust Anchors.

554

555

```

555     <SecurityPolicy>
556       <TrustAnchors>
557         <!-- a set of <ds:KeyInfo> elements. -->
558         <ds:KeyInfo ID='foo'>...</ds:KeyInfo>
559         <ds:KeyInfo ID='bar'>...</ds:KeyInfo>
560         <ds:KeyInfo ID='chumley'>...</ds:KeyInfo>
561       </TrustAnchors>
562       <Profiles>
563         <!-- A set of "Profile" elements. Each profile
564              identifies a profile, and then the anchors
565              used in that profile. -->
566         <Profile ID="pfl" URN="urn" ANCHORS="foo bar"/>
567       </Profiles>
568       <WillUse>
569         <-- A set of profiles the party will use. -->
570         <ProfileRef>pfl</ProfileRef>
571       </WillUse>
572       <WillAccept>
573         <-- A set of profiles the party will accept. -->
574         <ProfileRef>pfl</ProfileRef>
575       </WillAccept>
576     </SecurityPolicy>
  
```

577

578 To address the secure packaging part of the Transport Routing & Packaging  
 579 configuration in the CPP, the CPP should also document the packaging of the message  
 580 header, payload and attachments so that S/MIME or XMLDSIG can be used to protect  
 581 the appropriate elements of the message. If the packaging is well defined, it will allow  
 582 the security tags within the CPP to specify the appropriate certificate data (X.509, PGP,  
 583 etc.) to be applied to securely sign/encrypt the elements of the Message. This new  
 584 Packaging Element in the CPP has been proposed, but it needs to be reviewed and an  
 585 assessment made of whether it addresses this requirement

586

## 587 **11 Registry and Repository**

588 From a security perspective, the *Registry Service* of ebXML can be seen as a specific  
589 case of an ebXML transaction. It is possible to model its operations according to the  
590 ebXML Specification Schema and generate an appropriate CPP in the same way any  
591 other application would.

### 592 **11.1 Registry**

593 A security proposal for the Registry and Repository is documented in [REGSEC].

594 The following scenario illustrates how security for Registry processes *might* be  
595 specified. Note the following paragraphs and Appendix D Registry Sample documents an  
596 exercise to explore how an application might define its Business processes and messages  
597 as a way of illustrating the process of defining security for any ebXML application. The  
598 Registry group is encouraged to engage in such an exercise upon completion of their  
599 specification and to add to the profiles defined by the security group.

600 For the purposes of this exercise, the parties identified are the Registry Guest, the *Content*  
601 *owner of Submitting Organization* and the *Registry Service*. The *Content owner of*  
602 *Submitting Organization* wishes to register its business information in the ebXML  
603 Registry and Repository. The Content Owner evaluates the CPP in the Registry, which  
604 describes how a document can be submitted. It then creates and signs an ebXML  
605 document containing this business information and constructs a message  
606 (`RegistrySubmitManagedObject`) to send to the Registry Service.

607 The *Registry Authority* receives the registration request (via an XML document in a TRP  
608 message envelope)

609  
610 Any Registry Guest is able to read all business entries.

611  
612 Appendix D contains a skeletal CPP. In the CPP, the role of “content owner” is defined  
613 and a reference is made to an external document, which contains the Process  
614 Specification Document for ebXML Registry & Repository. A content owner who wants  
615 to add a CPP document to the Registry, creates a CPP document, signs it and sends it to  
616 the Registry. The Registry needs to know who is responsible for the document and the  
617 connection to the registry must be authenticated.

618

619 A second CPP is included which identifies the role of “registry guest”. Requests for  
620 information from a registry are public requests. There is no security required for the  
621 connection to the registry in this instance.

### 622 **11.2 Repository**

623 Security for the repository is currently the responsibility of the implementer. This is an  
624 appropriate security choice, but it may have implications for authorization of access to  
625 the registry. It is suggested that recommendations for implementers of a repository

626 include performing a risk assessment for the interface between the registry and the  
627 repository.

## 628 **12 Messaging Service Functionality**

629

630 The initial assessment of the *Message Service* was done on the December 2000 version of  
631 the document. Within the TRP document security issues are well documented and  
632 addressed primarily in Section 12. The latest TRP specification V0.99 includes a merging  
633 of ebXML messaging and the SOAP messaging model, and an initial assessment has  
634 been made of this new model. There are several topics some of which are not  
635 specifically related to security mechanisms that are identified here as topics to consider in  
636 future ebXML activity related to secure reliable messaging.

### 637 **12.1 SOAP-SEC extensions and Signatures in ebXML Messages**

638

639 Given that an ebXML message is carried within a SOAP message, there are currently two  
640 ways of signing messages. This may cause some confusion or runtime failures due to  
641 misinterpretation. There has been a note posted to the W3C, which identifies one possible  
642 set of processing instructions for signing SOAP messages. Below are some "similarities  
643 and differences" that may help people wade through the notations. In addition, there is a  
644 good reminder in the concluding section of the XMLDSIG note about digital signature  
645 not itself preventing replay attacks. The "no-dupes" of reliable messaging can be used to  
646 address this type of attack.

647

648

649 1. SOAP-SEC[SOAP-SEC] uses its own namespace and has a schema that wraps around  
650 the XMLDSIG namespace, unlike the ebXML example.

651

652 2. SOAP-SEC and ebXML Digital Signatures both have the signature under the SOAP-  
653 ENV:Header.

654

655 3. The SOAP-SEC schema allows just one signature

656

657 4. SOAP-SEC uses the SOAP-ENV:actor and SOAP-ENV:mustUnderstand elements,  
658 whereas the ebXML example does not.

659

660 5. The actual W3C XMLDSIG machinery is shared. Of course, the ebXML example  
661 illustrates using an XPATH transform to cut out the TraceHeaderList (though the S1  
662 value for the id attribute doesn't point to anything in the ebxml example)

663

664 6. The ebXML-Sig Reference [ebMS] mechanism uses cid: style URIs, but these are also  
665 acceptable in SOAP-SEC (section 3.2).

666

667 7. SOAP-SEC uses the soap protocol conventions of the mustUnderstand and actor  
668 constructs. It is not certain whether this is an advantage or just overhead. It might be a  
669 disadvantage if SOAP processing and ebXML MSH processing are "walled-off". In that

670 case, no defined lines of communication to the MSH from the SOAP layer exist so that  
671 MSH won't have access to the outcomes of checking. In general, it is difficult to assess  
672 the impact on implementations, but using SOAP-SEC within ebXML would tend to  
673 promote writing a SOAP processing layer as part of the MSH to facilitate  
674 communication.

675

## 676 **12.2 Lack of Processing Rules**

677

678 The TRP document addresses wire format only. Given the complex nature of composing  
679 a message that adequately reflects both security and reliability in addition to the correct  
680 business process data, there is a good deal of the processing of a business message  
681 through the MSH to the SOAP process that is left as an exercise for the reader. While the  
682 TRP specification makes a recommendation on how signatures should be applied to a  
683 *Message Envelope*, there are still areas of overlap between the SOAP envelope and the  
684 ebXML envelope that probably need further definition. As is mentioned in Section 12.1  
685 item 7, there is no defined line of communication to the MSH from the SOAP layer.  
686 There are several areas in which the specification of the sequence of processing of a  
687 message would be helpful.

688

689 Intermediaries and the processing of "via" elements in TRP and SOAP actors with  
690 mustUnderstand attributes is one area in which there is a risk of runtime failures if the  
691 message flow from both the SOAP processor and the ebXML processing agent is not well  
692 understood by all parties.

693

694 There are several other areas of processing that are just general areas of caution due to the  
695 relative immaturity of XML technology. Transformations are one such area of concern.  
696 TRP signing identifies style sheet transforms (as does the XMLDSIG specification) as of  
697 particular concern due to the inconsistency of output from different implementations. In  
698 particular caution should be used when data from a signed message is parsed and  
699 validated and then the data is to be included in another signed message. The data should  
700 be re-signed rather than attempting to pickup a signed piece of information within one  
701 message and appending it to another message. The technology to perform consistent  
702 transformations is something that will evolve over time. The addition of XML encryption  
703 in combination with XML Digital signatures will possibly make this even more complex  
704 before it becomes more consistent.

705

706

## 707 **12.3 Manifests**

708 Independently and collectively, SOAP (with and without attachments), XML digital  
709 signatures (and, prospectively, XML encryption) and ebXML offer multiple mechanisms  
710 for component reference. Most notable among these is the "manifest". These reference  
711 mechanisms allow the composition of macroscopic message structures from microscopic  
712 message components. Similarly, SOAP and ebXML each offers a way of routing



713 messages through intermediaries: the "actor" attribute in the case of SOAP and "via"  
714 element in the case of ebXML. These routing mechanisms can be thought of as a way of  
715 constructing processes on messages and this can be done dynamically.

716  
717 Any design environment offering multiple ways of accomplishing the same end  
718 challenges the application developer with choices that often seem unmotivated, hence  
719 difficult to explain. (The existence of the largely interchangeable attribute and element  
720 constructions in XML itself are a good example.) This greatly increases the likelihood of  
721 error. The deeper concern, however, is how these compositional mechanisms interact. As  
722 there are neither syntactic nor semantic constraints on the interleaving of these  
723 functionally similar features, it is probably wise to anticipate that there will be unpleasant  
724 system surprises, especially when independent developers make use of composability.  
725 While our concern is a generic one, it comes vividly into focus when combining security  
726 with messaging.

727  
728 A case in point is a scenario in which a SOAP-encoded ebXML message mentions "vias"  
729 V1 and V2. Suppose further that the SOAP envelope mentions "actors" A1 and A2. The  
730 designers' intention is that V1 signs the ebXML message and V2 does signature  
731 validation. On the other hand the SOAP server has been configured to direct all traffic  
732 through, A1 which encrypts while A2 decrypts. This means that A2 needs to process the  
733 decryption before V2 is readable. In this case, what if A2 does not know about V2? The  
734 "ebXML" process thought the message would go from V1 to V2 and was unaware of the  
735 outer routing. And this is a simple case. On the face of it, there seems to be nothing to  
736 prevent routing episodes in which attempted signing, encryption, validation and  
737 decryption may fail.

## 738 **12.4 Key Management**

739 Key management is a major issue that needs to be addressed with respect to the  
740 capabilities of the TR&P Message Service Handler. In particular, if the MSH will be  
741 called upon to apply digital signatures, the appropriate private keys must be available to  
742 the MSH. Private keys must be managed very carefully and deliberately. Thus, some  
743 configuration will be necessary to establish the key management mechanisms to be used  
744 by the MSH.

745 Another major issue of key management is the distributing and registering of public keys  
746 or certificates used in Public Key Infrastructure (PKI), which is broadly adopted by many  
747 applications now for signing or encrypting information.

748  
749 Currently a XML Key Management Specification [XKMS] proposed by VeriSign,  
750 Microsoft and webMethods has been submitted to W3C for consideration. It is intended  
751 to complement the emerging W3C standards activities in the XML Digital Signature and  
752 XML Encryption Working Group. There are two subparts in XKMS: the XML Key  
753 Information Service Specification (X-KISS) and the XML Key Registration Service  
754 Specification (X-KRSS).

755

## 756 **13 Conformance**

### 757 **13.1 Overview**

758 Conformance will be based on adhering to the specific conformance requirements  
759 delineated in the ebTA, ebRS, ebMS, ebBPSS and ebCPP specifications.

### 760 **13.2 Conformance Requirements**

761 Types of conformance requirements can be classified as:

- 762 a) Mandatory requirements: these are to be observed in all cases;  
763  
764 b) Conditional requirements: these are to be observed if certain conditions set out in  
765 the specification apply;  
766  
767 c) Optional requirements: these can be selected to suit the implementation, provided  
768 that any requirement applicable to the option is observed.

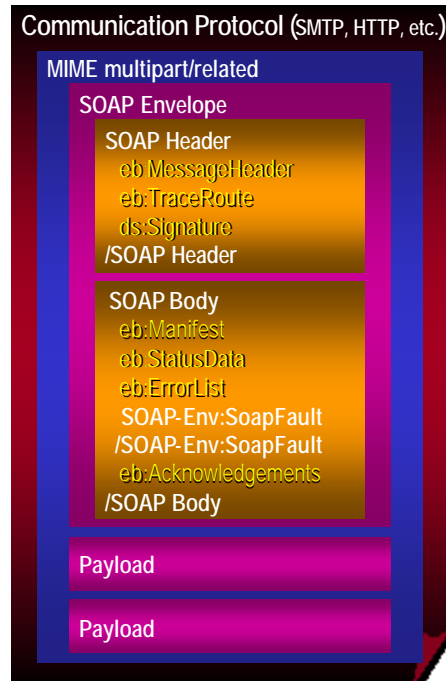
769 Furthermore, conformance requirements in a specification can be stated:

- 770 • Positively: they state what shall be done;  
771 • Negatively (prohibitions): they state what shall not be done.  
772

## 773 **14 Future Requirements**

### 774 **14.1 Multi-hop and third party security services**

775 The ability to simultaneously support multi-hop traceability and message integrity  
776 validation is an issue that must be addressed. For message integrity validation, it is  
777 desirable to apply a digital signature to of as much of the message as possible. To support  
778 multi-hop traceability, each intermediary must add a new section of signed traceability  
779 information. Care must be taken to establish message structuring and processing that  
780 allows the traceability information to be added without disturbing any pre-existing  
781 integrity or traceability components. With this in mind, it is constructive to consider the  
782 proposed ebXML message structure (shown below) in conjunction with potential security  
783 mechanisms.



784  
785

**Figure 7 ebXML message structure**

786 There have been discussions of applying S/MIME security mechanisms to the entire  
787 message (in the previous figure, this would include the elements grouped under the  
788 MIME multipart/related label).

789

790 The move to using an underlying SOAP message envelope may require the restructuring  
791 of the current CPP definition of the “nonrepudiation” element and its sub elements. The  
792 current tag specifies a protocol and hash algorithm but does not adequately express how  
793 this can be applied to an ebXML message (either parts or the complete message) to  
794 provide evidence that the receiver has adequately verified the receipt of a signed message  
795 and replied with a receipt acknowledging the same hash value over the signed message.

796 **14.2 Archiving**

797 The mechanisms for storing Business Process Information Models, Collaborative Partner  
798 Profiles and other related business information should supply assurances that the  
799 information stored and retrieved has not been modified by an unauthorized entity. The  
800 requirements state that the information should be able to be reconstructed at some point  
801 in the future, and at present it is difficult to know if this requirement has been met by the  
802 registry security proposal.

803 **14.3 Minimum Security**

804 It is currently assumed that the collaboration agreement (CPA) reached between two  
805 Trading Partners adequately reflects the ordering and priority of security policies stated in

806 the CPP, but there is no mechanism for establishing minimum security requirements.  
807 The current CPP DTD does not allow the tagging of security configuration at a level that  
808 indicates what is required, what is optional, or what is preferred. There is not sufficient  
809 detail regarding properties like geography or liability (financial as well as legal) that  
810 might affect the choice of security mechanisms in an automated negotiation process.

811 Describing business' capabilities may misrepresent the intent of the CPP.

#### 812 **14.4 Automated CPA Generation**

813 Within the Trading Partner group there is discussion about the dynamic generation of a  
814 CPA. The resolution of the CPA generation may require an additional version of this  
815 document to address the security issues in CPA negotiation, but it is currently out of  
816 scope.

#### 817 **14.5 Issues for non-repudiation of receipt (NRR)**

818 (NOTE: This discussion focuses on message level NRR. Application level responses are  
819 out of the scope of this discussion).

820 From a top level (business level) perspective, the most important issue is to determine  
821 exactly what parts of the message are subject to NRR. For example, should NRR be  
822 applied to the payload items and/or the header? One suggested solution would be to apply  
823 NRR to only those parts of the message that were signed by the originator.

824 Another issue concerns how the NRR response should be sent back to the message  
825 originator. Should the message be sent back as part of another ebXML message, or  
826 should a separate mechanism be used (such as AS1 and/or AS2)?

827 The third and final issue is determining what format the NRR response should take. If it  
828 is chosen to use an externally defined transport and format such as AS1 or AS2, then this  
829 decision is already made. If, however, ebXML is the chosen transport, it needs to be  
830 decided where the NRR response should reside (in the SOAP header, or body, etc.).  
831 Additionally, the content of the NRR needs to be decided. It has been proposed within the  
832 TRP group that a NRR response should simply be the acknowledgements element which  
833 has been signed, but that neglects to include a hash of the parts of the original document  
834 for which the NRR is being generated. At a minimum, the hash of the original message  
835 parts and a reference to those parts (such as the acknowledgements element) must be  
836 signed to supply NRR. As part of the format used, there must be a decision made about  
837 what algorithms and transformations will be used to sign the NRR response.

838 Once all of those issues have been decided, there must be some mechanism within the  
839 CPP for any optional information (such as the scope of the desired NRR) to be supplied.

#### 840 **14.6 Registry and Repository Authentication**

841 In selecting distinguished names as the binding mechanism to a key, the risk is run that  
842 other nonX.509 key binding schemes are ignored. A more generic alternative mechanism

843 is recommended for mapping from keying material to a unique identifier within the  
844 registry. A registration process to associate the keying material with the implementation  
845 identity would allow supporting alternative key binding schemes. (For further reading  
846 please see section 9.1 first paragraph of the [ebRS]).

#### 847 **14.7 Messaging without a CPA**

848

849 There has been discussion on the TRP mailing list including participants from TP and  
850 Security around the topic of CPPs and CPAs and whether they are required for  
851 Messaging. The risk analysis provided in the overview of this document is dependent  
852 upon an agreement between two trading partners being reflected in the creation of a CPA  
853 document. It is recommended that a CPA be signed by both parties to indicate their  
854 commitment to the agreement.

855

856 The TRP spec [ebMS] currently requires a CPAId element (a string that identifies the  
857 parameters that control the exchange of messages between the parties) in a message  
858 exchange. Businesses who engage in transactions without documenting their agreement  
859 should be aware that all assurance that the business process was adhered to is outside of  
860 the ebXML architecture and must be agreed upon and substantiated by some other means.

861

862

## 863 **15 Additional Requirements and Recommendations**

864

### 865 **Registry & Repository**

866

- 867 • A more generic alternative mechanism is recommended for mapping from keying
- 868 material to a unique identifier within the registry.
- 869 • It is recommended that implementers of a repository perform a risk assessment for the
- 870 interface between the registry and the repository.

871

### 872 **CPP/CPA**

873

- 874 • Additional policy-based elements need to be added to the CPP and several
- 875 suggestions are included in this document.
- 876 • A stronger use of schema to type security could aid in the automatic generation of
- 877 CPAs.
- 878 • Defining a set of common profiles would greatly improve chances for
- 879 interoperability.
- 880 • The coarse grained nature of the security characteristics element may increase the risk
- 881 of improper security configuration. Manual review of the CPA is therefore
- 882 recommended.

883

### 884 **Business Process**

885

- 886 • Modeling of the business process should include a finer grained expression of
- 887 security characteristics. The current set greatly limits the ability to represent security
- 888 throughout the creation and transport of the business content.

889

### 890 **Transport Routing and Packaging**

891

- 892 • The absence of processing rules for message composition in particular, with regard to
- 893 security in messages, may increase the risk of runtime failure due to
- 894 misunderstanding of the ordering of actions to successfully decompose the message.
- 895 • The absence of a clearly defined handoff between SOAP and ebXML and the
- 896 existence of “intermediaries” at both the SOAP and ebXML level may increase the
- 897 risk of runtime failures.

898 **16 Reference**

899

900 [BS-7799/ISO-17799] Information security management part 1 and 2.

901

902 [PGP] IETF RFC 2440 OpenPGP

903

904 [PKIX] IETF RFC 2459 PKIX Certificate & CRL Profile

905

906 [REGSEC] ebXML RegRep Security-003.doc, Farrukh Najmi, Krishna Sankar,  
907 December 9, 2000

908

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911

912 [SOAP-SEC] W3C Note, Applying Digital Signatures to SOAP,  
913 Hiroshi Maruyama, Blair Dillaway

914

915 [SMIMEV2] IETF RFC2311-2315, 2268

916

917 [SMIMEV3] IETF RFC2630-2634

918

919 [XKMS] draft version 1.0, Nov 27<sup>th</sup>, 2000, <http://www.verisign.com>

920

921 [XMLENC] W3C XML Encryption Syntax and Processing,  
922 <http://www.w3c.org/Encryption/2001/03/12-proposal.html>

923

924 XMLDSIG W3C XML Digital Signatures,

925 <http://www.w3.org/TR/2000/CR-xmlldsig-core-20001031/>

926

927 **17 Disclaimer**

928 The views and speculations expressed in this document are those of the authors and are  
929 not necessarily those of their employers. The authors and their employers specifically  
930 disclaim responsibility for any problems arising from correct or incorrect implementation  
931 or use of this design.

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950

951



952 **Appendix A. Security Assertion Markup Language (SAML) ebXML use case**

953 The Oasis Security Services Technical Committee is in the process of developing a set of  
954 requirements and use cases to develop a language for security assertions. The following  
955 use case has been submitted as a generalized use case for ebXML applications that  
956 require authentication and authorization. It is based on the work done by the security and  
957 registry groups in an exercise to develop a POC example for a business process that  
958 required authorization. The use case was submitted to the SAML group so that some  
959 ebXML application requirements would be considered in the specification that the SAML  
960 group will produce.

961 When the specification is issued, its use within ebXML will need to be explored and  
962 documented. Additional elements might be required in the CPP to provide the appropriate  
963 information about authorization and authentication authorities and parameters of the  
964 assertions.

965 The submitted ebXML use case was grouped with others in the “business to business”  
966 scenario.

967 Scenario 1: General Use cases for ebXML authorization

- 968 1) Party A wishes to engage with Party B in a business transaction. To do this, Party A  
969 accesses information stored in an ebXML CPP about Party B’s requirements for  
970 doing business. Some of this information might include:
- 971 a. Party B requires authorization credentials from AuthorizationServiceXyz
  - 972 b. Party B requires that Party A be authorized by XYZ in the BuyerQ role.
- 973 2) Party A then must be able to determine:
- 974 a. How to get these authorization credentials
  - 975 b. Where/how to insert these credentials in an ebXML message (need to define  
976 ebXML bindings)
- 977 3) Party B has received a digitally signed ebXML message from party A and wishes to  
978 obtain authorization information about party A
- 979 a. Authorization data must be retrievable based on the DN in the certificate used  
980 to sign the ebXML message
- 981 4) Party A has enrolled with AuthorizationServiceXYZ. Party A engages in ebXML  
982 business transactions and wants to restrict what entities are able to retrieve its  
983 authorization data.

## 984 **Appendix B. Packaging Profiles**

985

986

### 987 **PGP profile for application encryption of payload**

988

989 `<?xml version="1.0"?>`990 `<!-- Simple ebXML PGP profile for application encryption of payload. No`991 `signature supplied by application. -->`992 `<Packaging>`993  `<ProcessingCapabilities generate="Yes" parse="Yes"/>`994  `<SimplePart id="header" mimetype="application/vnd.eb+xml" >`995  `</SimplePart>`996  `<SimplePart id="pgpversion"`997  `mimetype="application/pgp-encrypted" >`998  `</SimplePart>`999  `<SimplePart id="payload" mimetype="application/xml" >`1000  `</SimplePart>`1001  `<CompositeList>`1002  `<Encapsulation id="encryptedpayload"`1003  `mimetype="application/octet-stream" >`1004  `<Constituent idref="payload" />`1005  `</Encapsulation>`1006  `<Composite`1007  `id="envelopedpayload" mimetype="multipart/encrypted"`1008  `mimeparameters=`1009  `"protocol=&quot;application/pgpencrypted&quot;;"`1010  `<Constituent idref="pgpversion" >`1011  `<Constituent idref="encryptedpayload" />`1012  `</Composite>`1013  `<Composite id="ebxmlmessage" mimetype="multipart/related"`1014  `mimeparameters="type=&quot;application/vnd.eb+xml&quot;;`1015  `version=&quot;1.0&quot;;"`1016  `<Constituent idref="header" />`1017  `<Constituent idref="envelopedpayload" />`1018  `</Composite>`1019  `</CompositeList>`1020 `</Packaging>`

1021

### 1022 **PGP profile for application signing of payload**

1023

1024 `<?xml version="1.0" ?>`1025 `<!-- Simple ebXML PGP profile with application signing of the`1026 `payload. Confidentiality if needed can be supplied at the`1027 `network or transport layers. -->`1028 `<Packaging>`1029  `<ProcessingCapabilities generate="Yes" parse="Yes" />`1030  `<SimplePart id="header" mimetype="application/vnd.eb+xml" />`1031  `<SimplePart id="payload" mimetype="application/xml" />`1032  `<CompositeList>`1033  `<Encapsulation id="pgpsig" mimetype="application/pgp-`1034 `signature">`1035  `<Constituent idref="payload" />`1036  `</Encapsulation>`

```

1037     <Composite id="signedpayload" mimetype="multipart/signed"
1038         mimeparameters="protocol="application/pgp-
1039             signature";micalg="pgp-md5">
1040         <Constituent idref="payload" />
1041         <Constituent idref="pgpsig" />
1042     </Composite>
1043     <Composite id="ebxmlmessage"
1044         mimetype="multipart/related">
1045         <Constituent idref="header" />
1046         <Constituent idref="signedpayload" />
1047     </Composite>
1048 </CompositeList>
1049 </Packaging>

```

1050

### 1051 **S/MIME profile for application encryption of payload**

1052

```

1053 <?xml version="1.0" ?>
1054 <!--
1055 Simple ebXML S/MIME for application-based payload encryption. No
1056 authentication supplied.
1057 -->
1058 <Packaging>
1059     <ProcessingCapabilities generate="Yes" parse="Yes" />
1060     <SimplePart id="I001" mimetype="application/vnd.eb+xml" />
1061     <SimplePart id="I002" mimetype="application/xml" />
1062     <CompositeList>
1063         <Encapsulation id="I003" mimetype="application/pkcs7-
1064             mime" mimeparameters="smime-type="enveloped-data">
1065             <Constituent idref="payload" />
1066         </Encapsulation>
1067         -<Composite id="I004" mimetype="multipart/related"
1068             mimeparameters="type="application/vnd.eb+xml";version
1069             "1.0">
1070             <Constituent idref="I001" />
1071             <Constituent idref="I003" />
1072         </Composite>
1073     </CompositeList>
1074 </Packaging>

```

1075

### 1076 **S/MIME profile for application signing of payload**

1077

```

1078 <?xml version="1.0" ?>
1079 <!-- Simple ebXML S/MIME profile for application-based,
1080 clear/detached signing of payload. Confidentiality can be
1081 supplied at the network or transport layers. -->
1082 <Packaging>
1083     <ProcessingCapabilities generate="Yes" parse="Yes" />
1084     <SimplePart id="I001" mimetype="application/vnd.eb+xml" />
1085     <SimplePart id="I002" mimetype="application/xml" />
1086     <CompositeList>
1087         <Encapsulation id="I003" mimetype="application/pkcs7-
1088             signature">
1089             <Constituent idref="I002" />
1090         </Encapsulation>

```

```
1091     <Composite id="I004" mimetype="multipart/signed"
1092         mimeparameters="protocol="application/pkcs7-
1093         signature";micalg="rsa-sha1">
1094         <Constituent idref="I002" />
1095         <Constituent idref="I003" />
1096     </Composite>
1097     <Composite id="I005" mimetype="multipart/related"
1098         mimeparameters="type="application/vnd.eb+xml";version=
1099         "1.0">
1100         <Constituent idref="I001" />
1101         <Constituent idref="I004" />
1102     </Composite>
1103 </CompositeList>
1104 </Packaging>
1105
```

1106

1107 **Appendix C. Sample Certificate Policy Element**

```

1108 <?xml version="1.0" encoding="UTF-8" ?>
1109 <CertificatePolicies
1110   xmlns:ds="http://www.w3.org/2000/09/xmldsig#">
1111   <CertificateProfile id="C06" version="X.509 Version 3">
1112     <ds:KeyInfo>
1113       <ds:X509Data>
1114         <!--
1115           two pointers to certificate-A
1116         -->
1117         <ds:X509IssuerSerial>
1118           <ds:X509IssuerName>CN=John Doe, OU=TRL,
1119             O=ebXML,L=location, ST=state/province,
1120             C=country</ds:X509IssuerName>
1121           <ds:X509SerialNumber>12345678</ds:X509SerialNu
1122             mber>
1123         </ds:X509IssuerSerial>
1124         <ds:X509SKI>31d97bd7</ds:X509SKI>
1125       </ds:X509Data>
1126       <ds:X509Data>
1127         <!--
1128           single pointer to certificate-B
1129         -->
1130         <ds:X509SubjectName>Subject of Certificate
1131           B</ds:X509SubjectName>
1132       </ds:X509Data>
1133     <!--
1134       certificate chain
1135     -->
1136     <ds:X509Data>
1137       <!--
1138       Signer cert, issuer CN=arbolCA,OU=FVT,O=IBM,C=US,
1139       serial 4
1140       -->
1141       <ds:X509Certificate>MIICXTCCA..</ds:X509Certificat
1142         e>
1143       <!--
1144       Intermediate cert subject
1145       CN=arbolCA,OU=FVTO=IBM,C=US
1146       issuer,CN=tootiseCA,OU=FVT,O=Bridgepoint,C=US
1147       -->
1148       <ds:X509Certificate>MIICPzCCA...</ds:X509Certifica
1149         te>
1150       <!--
1151       Root cert subject
1152       CN=tootiseCA,OU=FVT,O=Bridgepoint,C=US
1153       -->
1154       <ds:X509Certificate>MIICSTCCA...</ds:X509Certifica
1155         te>
1156     </ds:X509Data>
1157   </ds:KeyInfo>
1158   <PolicyInformation oid="">
1159   <PolicyConstraints>

```

```
1160      <!--  
1161      Liability constraints, etc.  
1162      -->  
1163      <Constraint>  
1164      <ConstraintProcessing />  
1165      </Constraint>  
1166    </PolicyConstraints>  
1167    <PolicyQualifiers>  
1168      <Qualifier />  
1169    </PolicyQualifiers>  
1170    <CertificateExtensions>  
1171      <Extension />  
1172    </CertificateExtensions>  
1173    <CRLProfile version="">  
1174      <CRLDistributionPoints>  
1175        <DistributionPoint />  
1176      </CRLDistributionPoints>  
1177      <CRLExtensions>  
1178        <Extension support="mandatory" />  
1179        <Extension support="optional" />  
1180      </CRLExtensions>  
1181    </CRLProfile>  
1182  </PolicyInformation>  
1183 </CertificateProfile>  
1184 </CertificatePolicies>  
  
1185
```

1186

1187 **Appendix D. Registry Sample**

1188

1189

&lt;?xml version = "1.0"?&gt;

1190

1191

&lt;CollaborationProtocolProfile&gt;

1192

&lt;PartyInfo&gt;

1193

&lt;PartyId type =

1194

"urn:DUNS:nineplusfour"&gt;9876543211234&lt;/PartyId&gt;

1195

&lt;PartyRef xlink:type = "simple"

1196

xlink:href =

1197

"http://www.collaborationparticipant.com/myid.html"/&gt;

1198

&lt;CollaborationRole roleId = "I1001"&gt;

1199

&lt;CollaborationProtocol version = "1.0"

1200

name = "RegistrySubmitManagedObject"

1201

"locator"

1202

xlink:href =

1203

"http://www.ebxml.org/namespaces/RegistrySubmitManagedObjec

1204

t.xsd"/&gt;

1205

&lt;Role name = "RegistryServer"

1206

xlink:href =

1207

"http://www.ebxml.org/namespaces/RegistrySubmitManagedObjec

1208

t.xsd"

1209

xlink:type = "simple"&gt;RegistryServer

1210

&lt;/Role&gt;

1211

&lt;CertificateRef certId = "I10002"&gt;

1212

CN=CollaborationsRUs;O=CollaborationParticipant;C=US

1213

&lt;/CertificateRef&gt;

1214

&lt;ServiceBinding channelId = "I1010" name = "RegistryServices"&gt;

1215

&lt;Packaging id="I1003" parse = "yes" generate = "yes"&gt;

1216

&lt;SimplePart id = "I1004" mimetype = "application/eb+xml"/&gt;

1217

&lt;SimplePart id = "I1005" mimetype = "application/xml"/&gt;

1218

1219

&lt;CompositeList&gt;

1220

&lt;Encapsulation mimetype = "application/pkcs-signed"

1221

id = "I1006"

1222

mimeparameters = "smime-type=signed"&gt;

1223

&lt;Constituent idref = "I1005"/&gt;

1224

&lt;/Encapsulation&gt;

1225

&lt;Composite mimetype = "multipart/signed"

1226

id = "I1007" mimeparameters = ""&gt;

1227

&lt;Constituent idref = "I1005"/&gt;

1228

&lt;Constituent idref = "I1006"/&gt;

1229

&lt;/Composite&gt;

1230

&lt;Composite mimetype = "multipart/related"

1231

id = "I1008"

1232

mimeparameters = "type=application/eb+xml"&gt;

1233

&lt;Constituent idref = "I1004"/&gt;

1234

&lt;Constituent idref = "I1007"/&gt;

1235

&lt;/Composite&gt;

1236

&lt;/CompositeList&gt;

1237

&lt;/Packaging&gt;

1238

&lt;Characteristics

1239

nonrepudiationOfOrigin = "true"

1240

nonrepudiationOfReceipt = "false"

```

1241         secureTransport = "true"
1242         confidentiality = "true"
1243         authenticated = "true" />
1244     </ServiceBinding>
1245 </CollaborationRole>
1246 <Certificate certId = "I1002">
1247     <KeyInfo>
1248     <KeyValue>
1249         <RSAKeyValue>
1250             <Modulus>
1251                 zO7xXoKl4jPRpcUzLdPD3XJjdwop2LsU2sd1Dr3kb0bR04z
1252                 X8SnAl3ov93eVGhylSRPrTpjTpOw3uUmPYgXolk639GYqmn
1253                 VAuffAlTz6BTrMN2OScjq2VLI5i6YxAMP0eXzKw+NXa9KI5
1254                 MfM2zV/IouSeo3M6t60/dG4IiBe6N8=
1255             </Modulus>
1256             <Exponent>AQAB</Exponent>
1257         </RSAKeyValue>
1258     </KeyValue>
1259     <X509Data>
1260         <X509SubjectName>C=US, O=CollaborationParticipant,
1261         CN=CollaborationsRUs</X509SubjectName>
1262         <X509Certificate>
1263             IICWjCCAcOgAwIBAgIBAJANBgkqhkiG9w0BAQQFADBMMRow
1264             GAYDVQQDExFDb2xsYWJvcnF0aW9u1JVczEhMB8GA1UEChMY
1265             Q29sbGFib3JhdGlvblBhcnRyY2lwYW50MQswCQYDVQQGEWJ
1266             VUzAeFw0wTAzMtYmMzAwMzJaFw0wMjAzMjYwMTAwMzJaMEw
1267             xGjAYBgNVBAMTEUNvbGxhYm9yYXRpb25zUlVzSEwHwYDVQQ
1268             KEExDb2xsYWJvcnF0aW9uUGFydG1jaXBhbnQxYzA1YzA1YzA1
1269             YTA1VTMIGfMA0GCSqGSIb3DQEBAQUAA4GNADCBiQKBgQDM7v
1270             FegqXiM9GlxTmt08PdcnN3CinYuxTax3UOveRvRtE7jnfx
1271             CXei/3d5UaHKVJE+tOmNOK7De5SY9iBeiWTrf0ZiqadUC59
1272             8CVPPoF0sw3Y5JyOrZUuLmLpjEA/R5fMrD41dr0ojkx8zbN
1273             X8ii5J6jczq3rT90bgiIF7o3wIDAQAB0wwsJAMBGNVHRMB
1274             Af8EAJAADoGA1UdeEQzMDGBl2NvbGxhYm9yYXRpb25zUlVz
1275             QHNtdHAuY29sbGFib3JhdGlvbnBhcnRyZXIu29tMA0GCSqG
1276             SIb3DQEBAUAA4GBAMv/9o/rc2sVmxRB/D/3o2/k2HH1kN8
1277             AHx3fd9unqlDjKvhLt1JtqYwkHK897o3MwmE+yWKEWMAQsO
1278             l0bVCmT1q4QrXcU6mAcB/QxPnObri5vRRVQ1AoZ1Jn2JqMj
1279             xheLZWCfOQoxtpOph84HQGHnyn891aLw6JHOzogXFRNR0
1280         </X509Certificate>
1281     </X509Data>
1282 </KeyInfo>
1283 </Certificate>
1284 <Certificate certId = "I1050">
1285     <KeyInfo>
1286     <KeyValue>
1287         <RSAKeyValue>
1288             <Modulus>
1289                 zO7xXoKl4jPRpcUzLdPD3XJjdwop2LsU2sd1Dr3kb
1290                 0bR04zX8SnAl3ov93eVGhylSRPrTpjTpOw3uUmPYg
1291                 Xolk639GYqmnVAuffAlTz6BTrMN2OScjq2VLI5i6Y
1292                 xAMP0eXzKw+NXa9KI5MfM2zV/IouSeo3M6t60/dG4
1293                 IiBe6N8=
1294             </Modulus>
1295             <Exponent>AQAB</Exponent>
1296         </RSAKeyValue>
1297     </KeyValue>

```



```

1298         <X509Data>
1299             <X509SubjectName>C=US, O=CollaborationParticipant,
1300             CN=CollaborationsRUs</X509SubjectName>
1301         <X509Certificate>
1302             IICWjCCAcOgAwIBAgIBAjANBgbkqhkiG9w0BAQQFADBMMRowGAYDV
1303             QQDExFDb2xsYWJvcnF0aW9u1JVczEhMB8GA1UEChMYQ29sbGFib3J
1304             hdGlvblBhcnRyY2lwYW50MQswCQYDVQQGEWJVUzAeFw0wTAzMTYwM
1305             TAwMzJaFw0wMjAzMTYwMTAwMzJhMEwxGjAYBgNVBAMTEUNvbGxhYm
1306             9yYXRpb25zUlVzSEwHwYDVQQKEWhDb2xsYWJvcnF0aW9uUGFydGJj
1307             aXBhbnQxCzAJBgNVBAYTAlVTMIGfMA0GCSqGIB3DQEBQUAA4GNAD
1308             CBiQKBgcQDM7vFegqXiM9GlxTmt08PdcnN3CinYuxTax3UOverVrTE
1309             7jnfxccXei/3d5UaHKVJE+tOmNok7De5SY9iBeiWTrf0ZiqadUC59
1310             8CVPPoFOsw3Y5JyOrZUuLmLpjEA/R5fMrD41dr0ojkx8zbNX8ii5J
1311             6jczq3rT90bgiIF7o3wIDAQABo0wwSjAMBGNVHRMBAf8EAjAADoGA
1312             1UdEQQzMDGBl2NvbGxhYm9yYXRpb25zUlVzQHNTdHAuY29sbGFib3
1313             JhdGlvbnBhcnRuZXIu29tMA0GCSqGSIB3DQEBBAUAA4GBAMv/9o/r
1314             c2sVmxRB/D/3o2/k2HHlkN8AHx3fd9unqlDjKvhlT1JtqYwkHK897
1315             o3MwmE+yWKEWMAQsOl0bVCmTlq4QrXcU6mAcB/QxpNobri5vRRVQ1
1316             AoZ1Jn2JqMjxheLZWCfOQoxtpOph84HQGHnyn891ALw6JHOzogXFR
1317             NR0
1318         </X509Certificate>
1319     </X509Data>
1320 </KeyInfo>
1321 </Certificate>
1322 <DeliveryChannel
1323     channelId = "I1010" transportId = "I1011"
1324     docExchangeId = "I1012">
1325 </DeliveryChannel>
1326 <Transport transportId = "I1011">
1327     <SendingProtocol>HTTP-Synch</SendingProtocol>
1328     <ReceivingProtocol>
1329         <Endpoint uri =
1330             "https://www.collaborationpartner.com/RegistryRespons
1331             eSink" type = "allPurpose"/>
1332     </ReceivingProtocol>
1333     <TransportSecurity>
1334         <Protocol version = "1.0">TLS</Protocol>
1335         <Protocol version = "3.0">SSL</Protocol>
1336         <CertificateRef certId = "I1002">
1337             CN=CollaborationsRUs;O=CollaborationParticipant
1338             ;C=US
1339         </CertificateRef>
1340     </TransportSecurity>
1341 </Transport>
1342 <DocExchange docExchangeId = "I1012">
1343     <ebXMLBinding version = "1.0">
1344     <ReliableMessaging
1345         deliverySemantics = "BestEffort"
1346         idempotency = "true">
1347         <Timeout>10000</Timeout>
1348         <Retries>5</Retries>
1349         <RetryInterval>1000</RetryInterval>
1350     </ReliableMessaging>
1351     <NonRepudiation>
1352         <Protocol version = "1.0">S/MIME</Protocol>
1353         <HashFunction>SHA-1</HashFunction>
1354         <SignatureAlgorithm>RSA</SignatureAlgorithm>

```

```
1355         <CertificateRef
1356             certId = "I1050">string
1357         </CertificateRef>
1358     </NonRepudiation>
1359     <NamespaceSupported
1360         schemaLocation =
1361         "http://www.ebxml.com/namespace/RegistryServices.xsd"
1362         version = "1.0">
1363     </NamespaceSupported>
1364     <NamespaceSupported
1365         schemaLocation = "http://www.w3.org/2000/09/xmldsig#"
1366         version = "1.0">
1367     </NamespaceSupported>
1368     </ebXMLBinding>
1369 </DocExchange>
1370 </PartyInfo>
1371 <ds:Signature/>
1372     <Comment>This sample includes packaging and role element
1373     changes, v32 or so. It is not at 1.0!!</Comment>
1374 </CollaborationProtocolProfile>
1375
1376
```

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