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Director, Product Marketing

Crypto 301: Practical Implementations of Cryptography

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Problem #1

Clear understanding of the need for security…

...But no security architecture

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Problem #2

Rough security architecture design...

…No detailed implementation path

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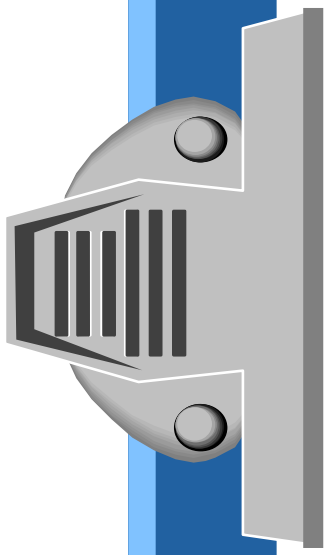
Task List



0) Get a grip on security

1) Home Banking Application

2) Secure Messaging Client

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Competitive Strategy/ Cryptography

What is Cryptography?

Cryptographer's View

- Privacy
- Data Integrity
- Authentication
- Non-Repudiation

Business View

- Trust/Comfort
- Fraud Protection
- Assent/Authentication
- Guarantee/Recourse

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Competitive Strategy/ Cryptography

Mapping Concepts to Practices - Cryptographic Analogs

Cryptographic Construct		Result
◆ Digital Envelope	⇒	◆ Privacy, Protection
◆ Digital Signature	⇒	◆ Assent, Authorization, Integrity
◆ Digital Certificate	⇒	◆ Identity

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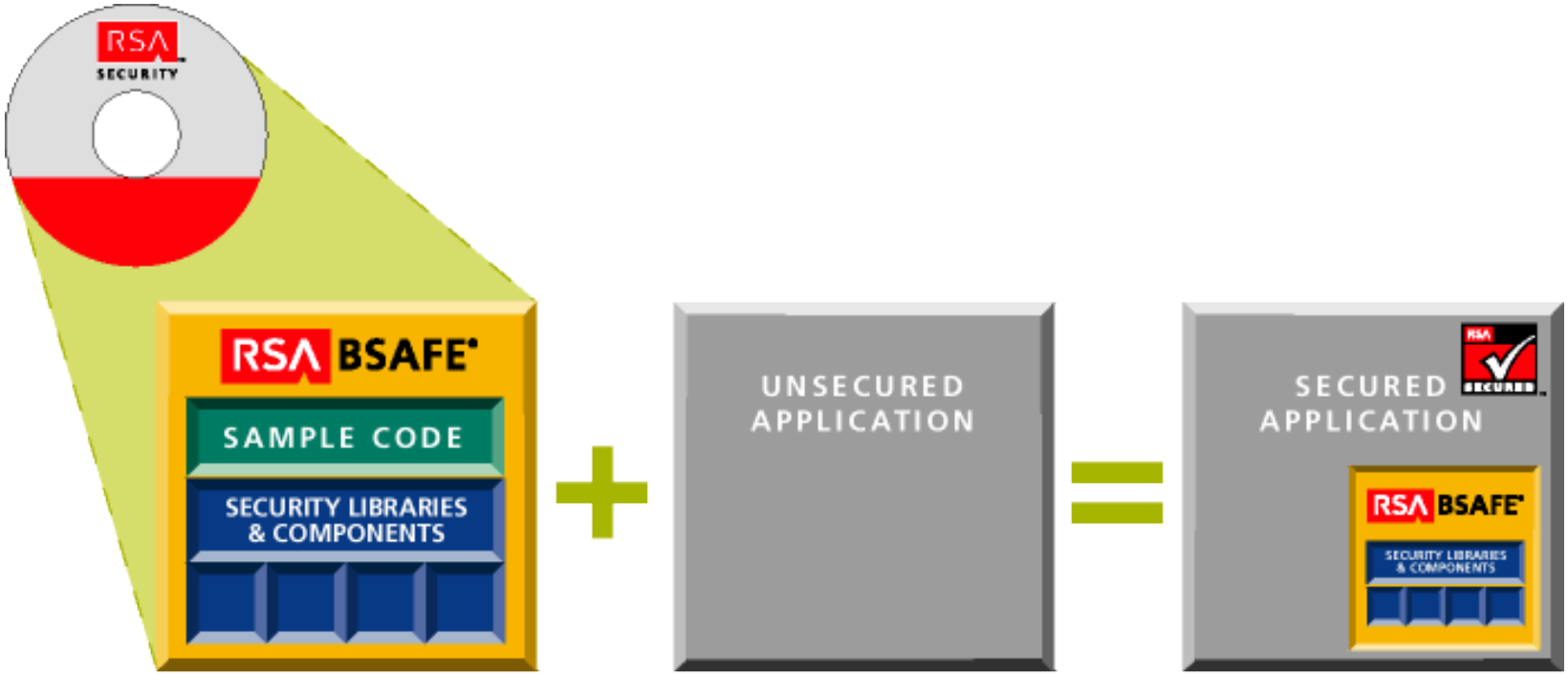
Building in Security



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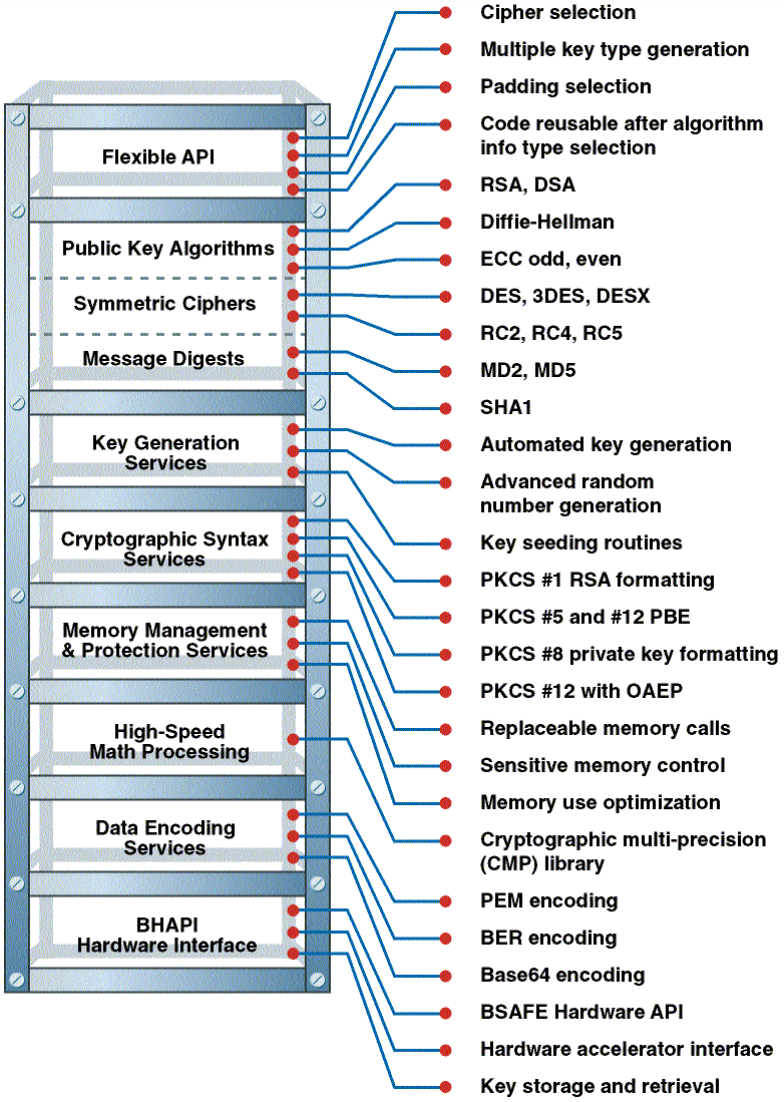
Inside a Crypto Stack



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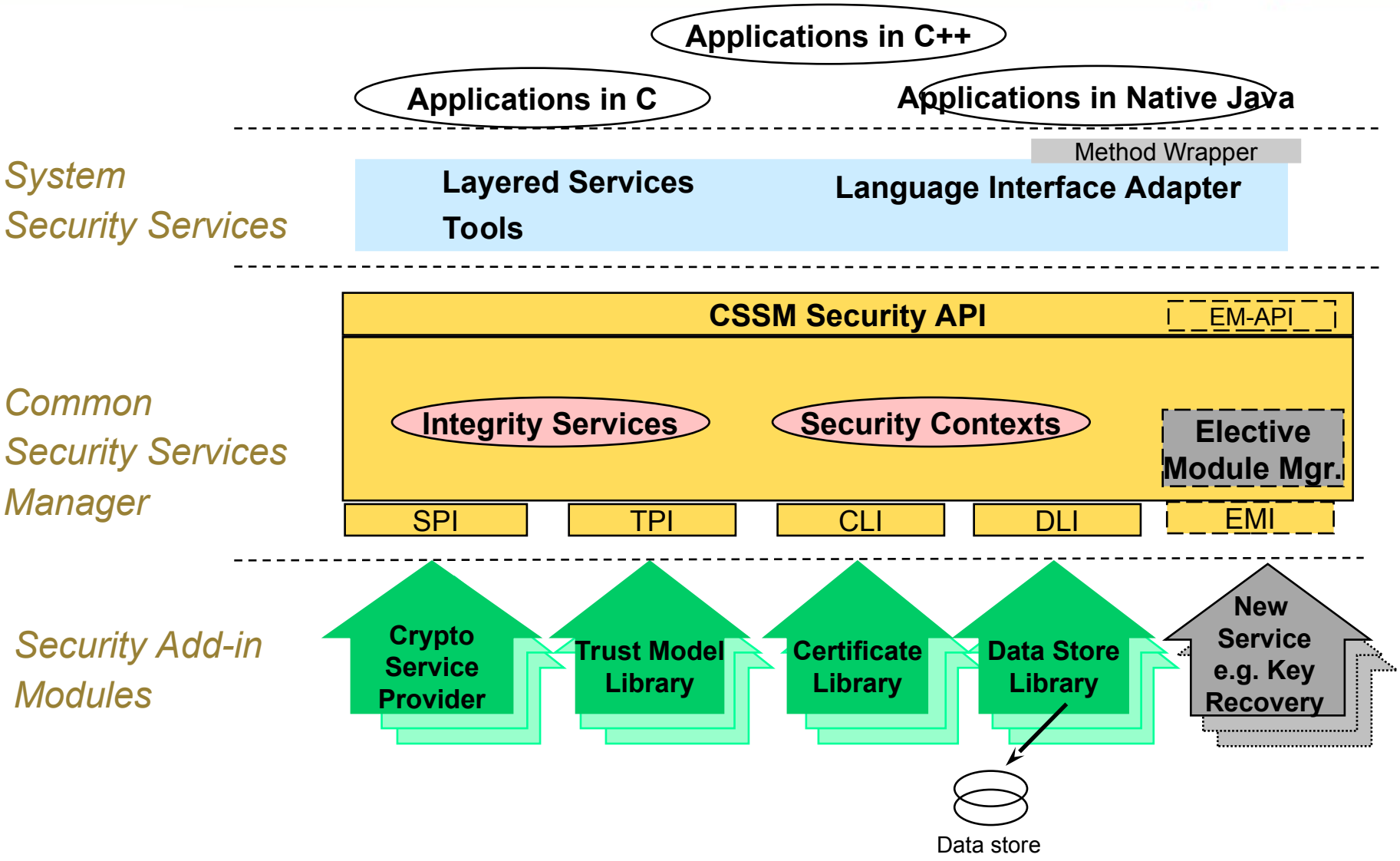
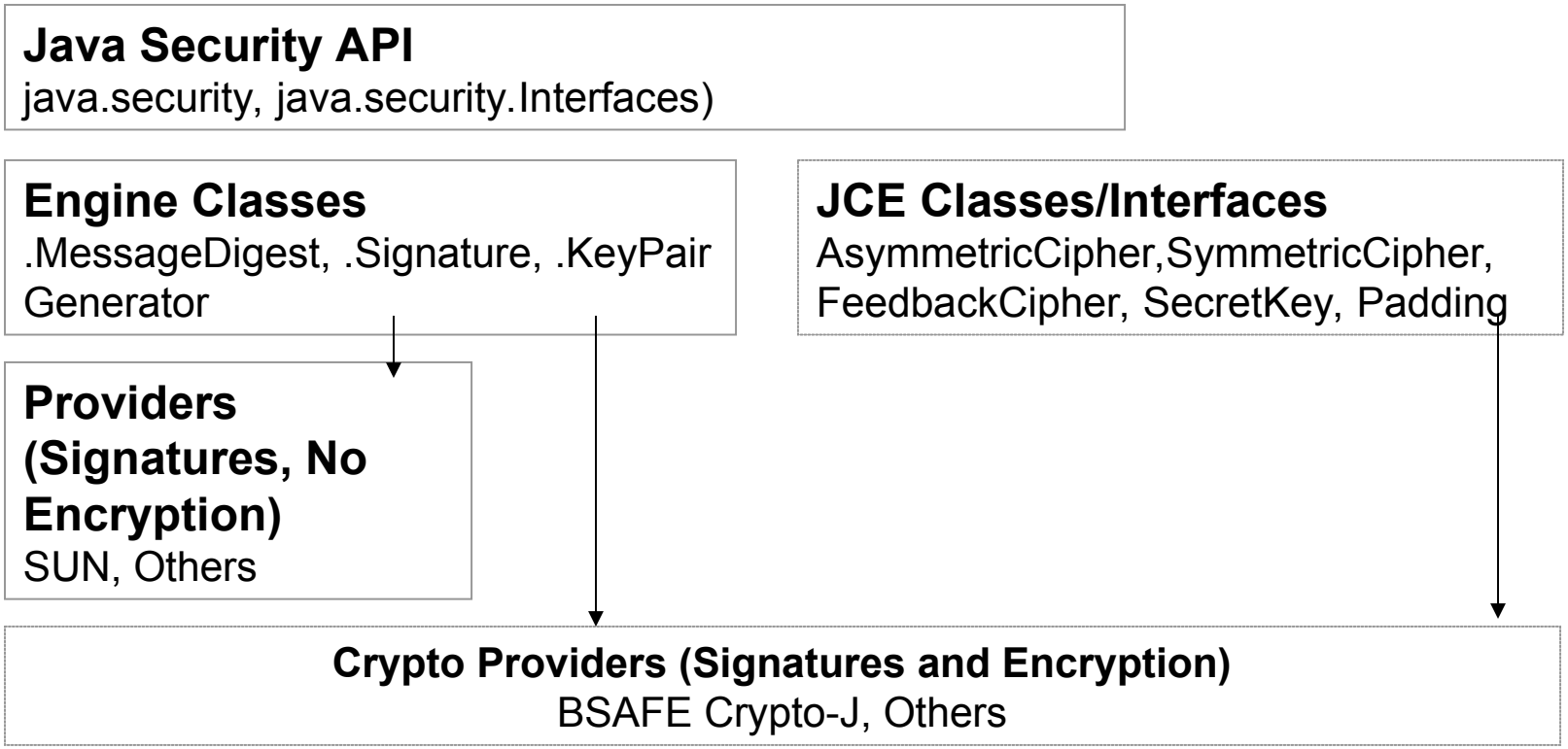
CDSA


Applications in C++
Applications in C
Applications in Native Java
System Security Services
Method Wrapper
Layered Services
Tools
Language Interface Adapter
Common Security Services Manager
CSSM Security API
EM-API
Integrity Services
Security Contexts
Elective Module Mgr.
SPI
TPI
CLI
DLI
EMI
Security Add-in Modules
Crypto Service Provider
Trust Model Library
Certificate Library
Data Store Library
New Service e.g. Key Recovery
Data store

The Java Security Model



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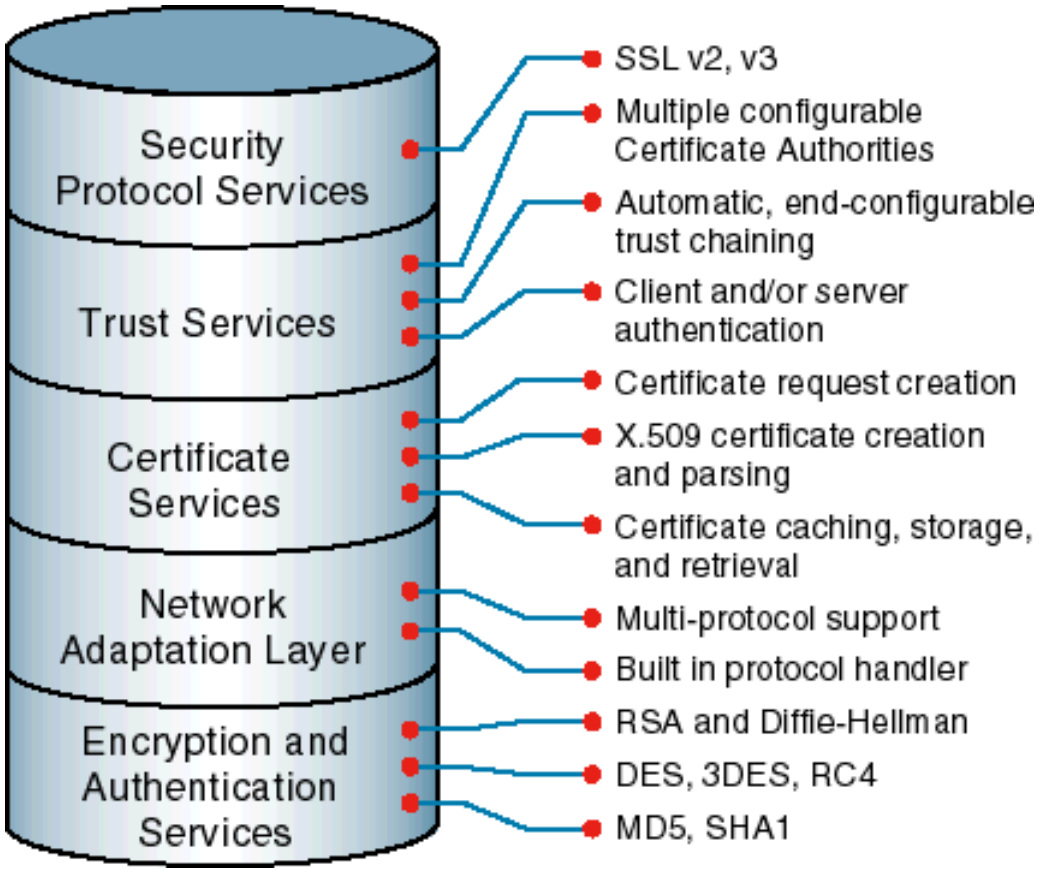
Functional Layers for SSL



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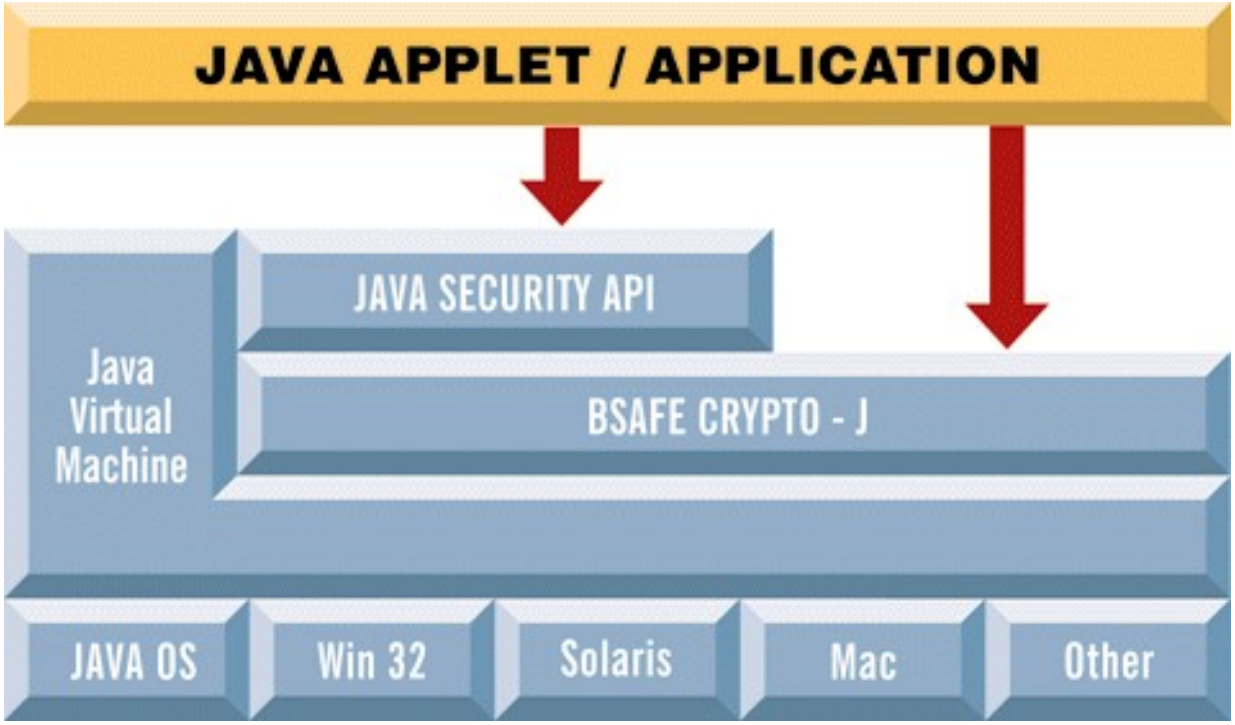
A Crypto Provider Example



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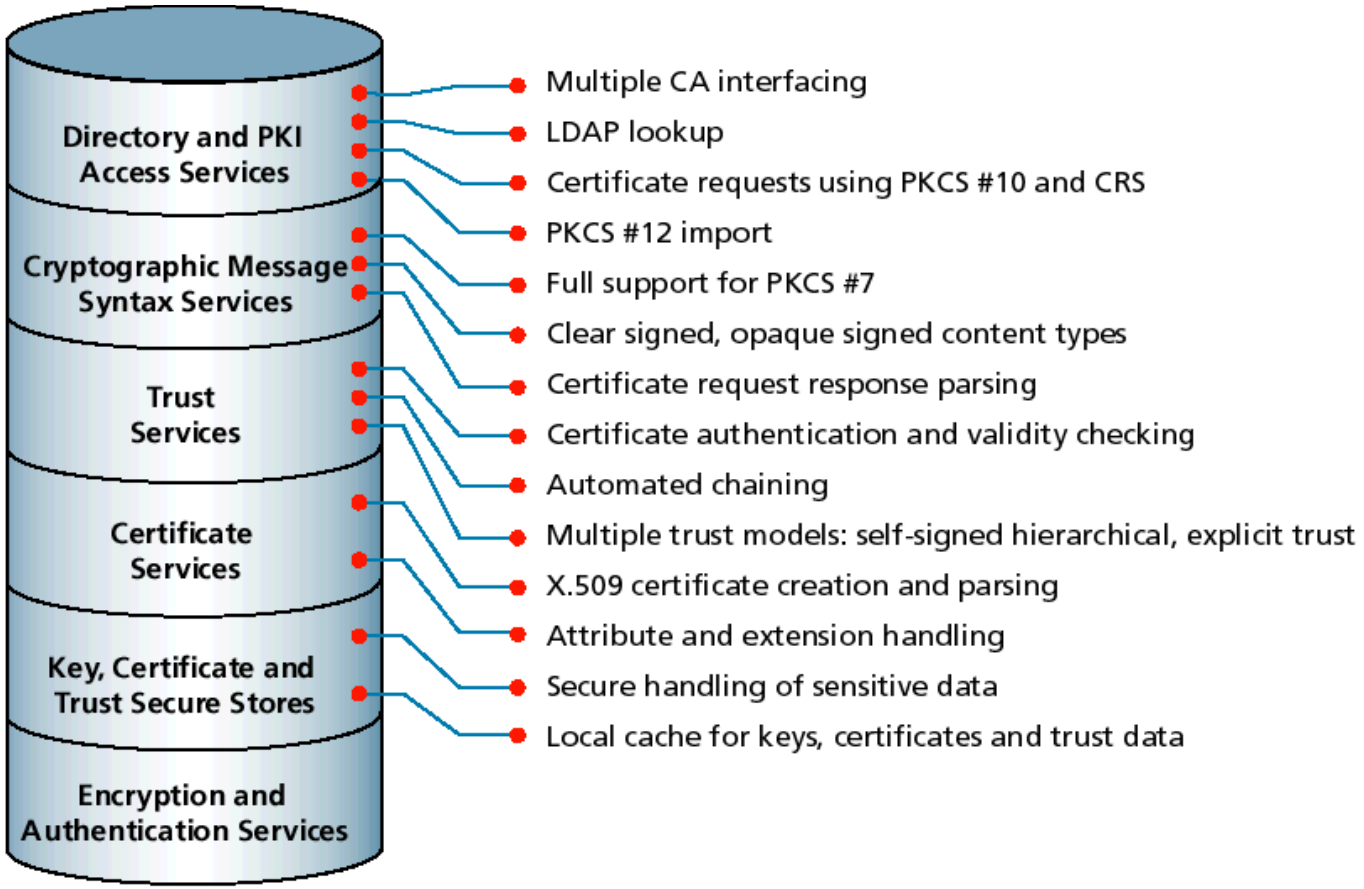
Functional Layers for PKI-Enabling



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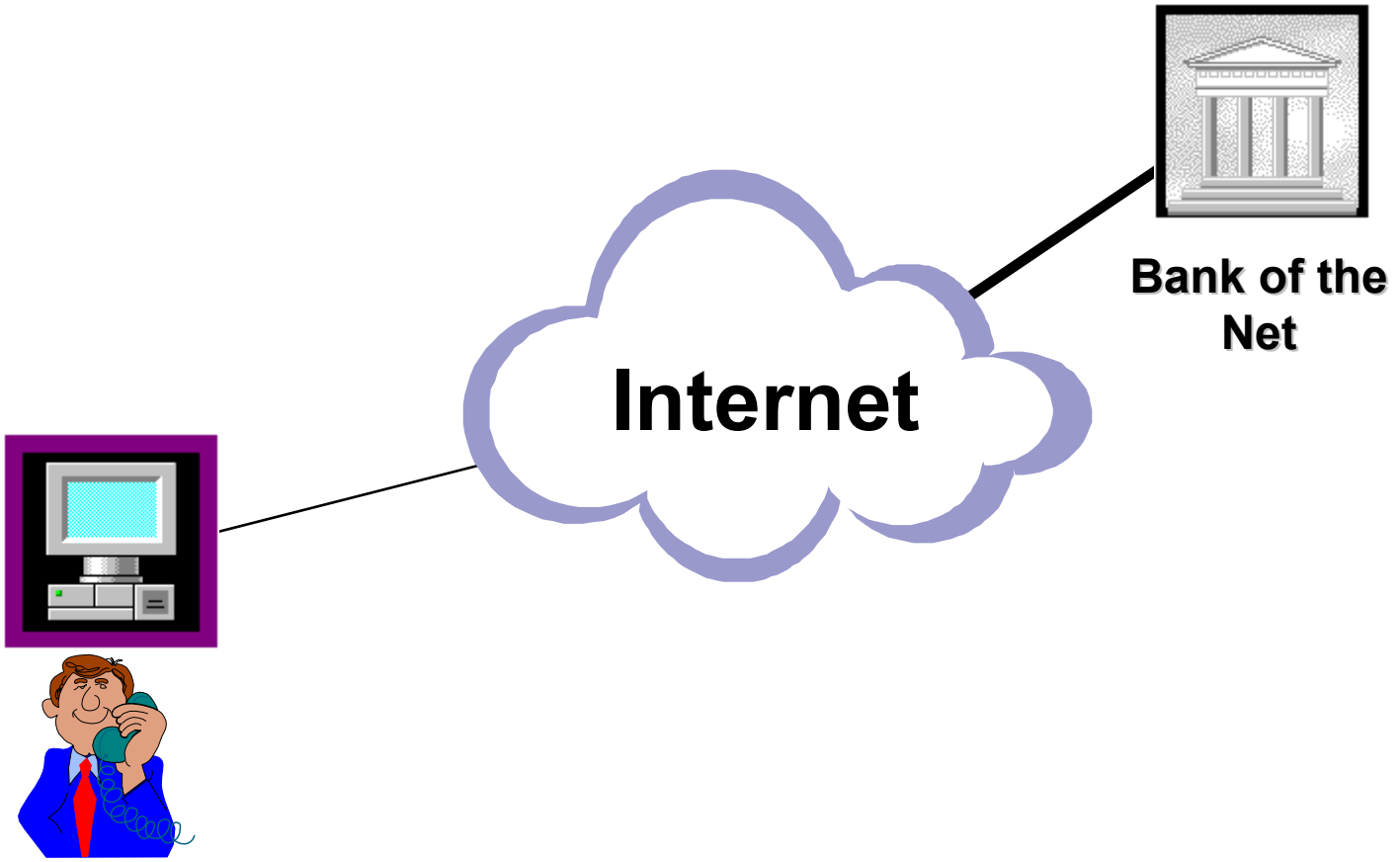
Task #1:
Home Banking Client/Server



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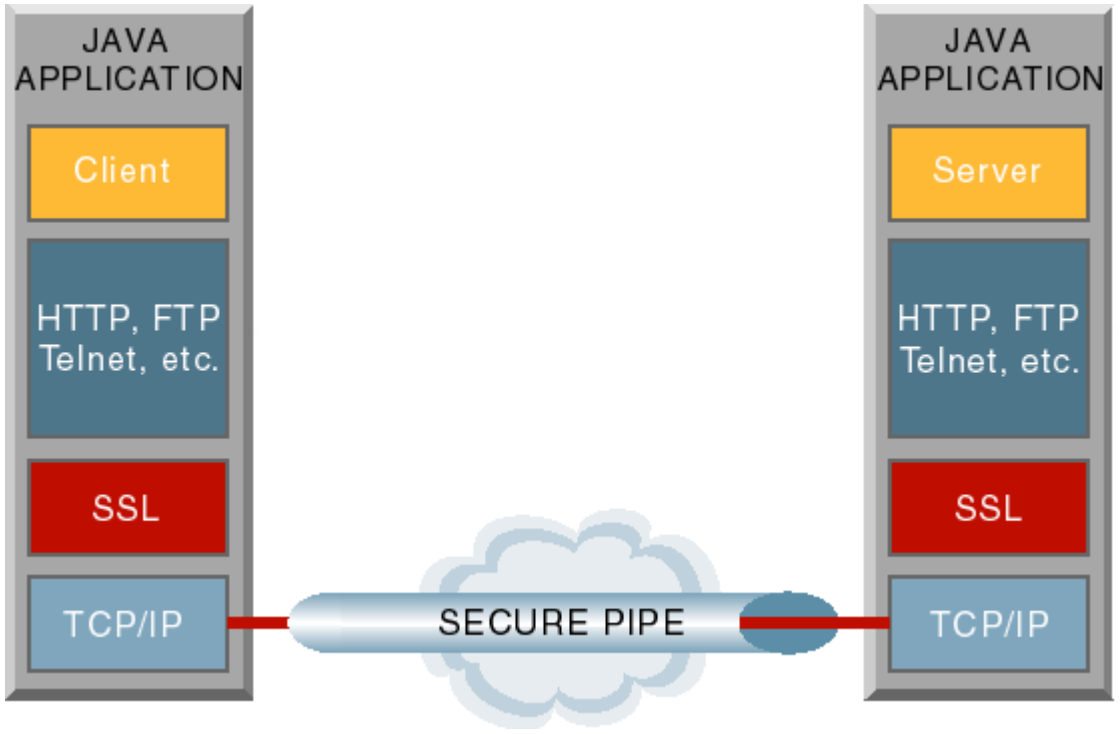
SSL in Java



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Electronic Banking Application: Needs

- Link Security
- Authentication Based on Account #'s
- Message Integrity
- Moderate Amount of Traffic

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Electronic Banking Application: Constructs

- Key Exchange **Diffie-Hellman**
- Symmetric Encryption **Triple-DES**
- Message Digest **SHA-1**

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BSAFE SSL-J API Calls

- `SSLParams.setCipherSuites (new DH_With_3DES_EDE_CBC_SHA());`
- `SSLSocket.getCipherSuite();`
- `SSLParams.setCertificateAndKey();`
- `SSLSocket.getPeerCertificateChain();`

- To initiate an SSL session, use
- `getInputStream()`
- To encrypt and decrypt, use `write()` and `read()`

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Other Applications

- Groupware
- Web Browser
- Internet Firewall
- Medical Record Security
- _____
- _____

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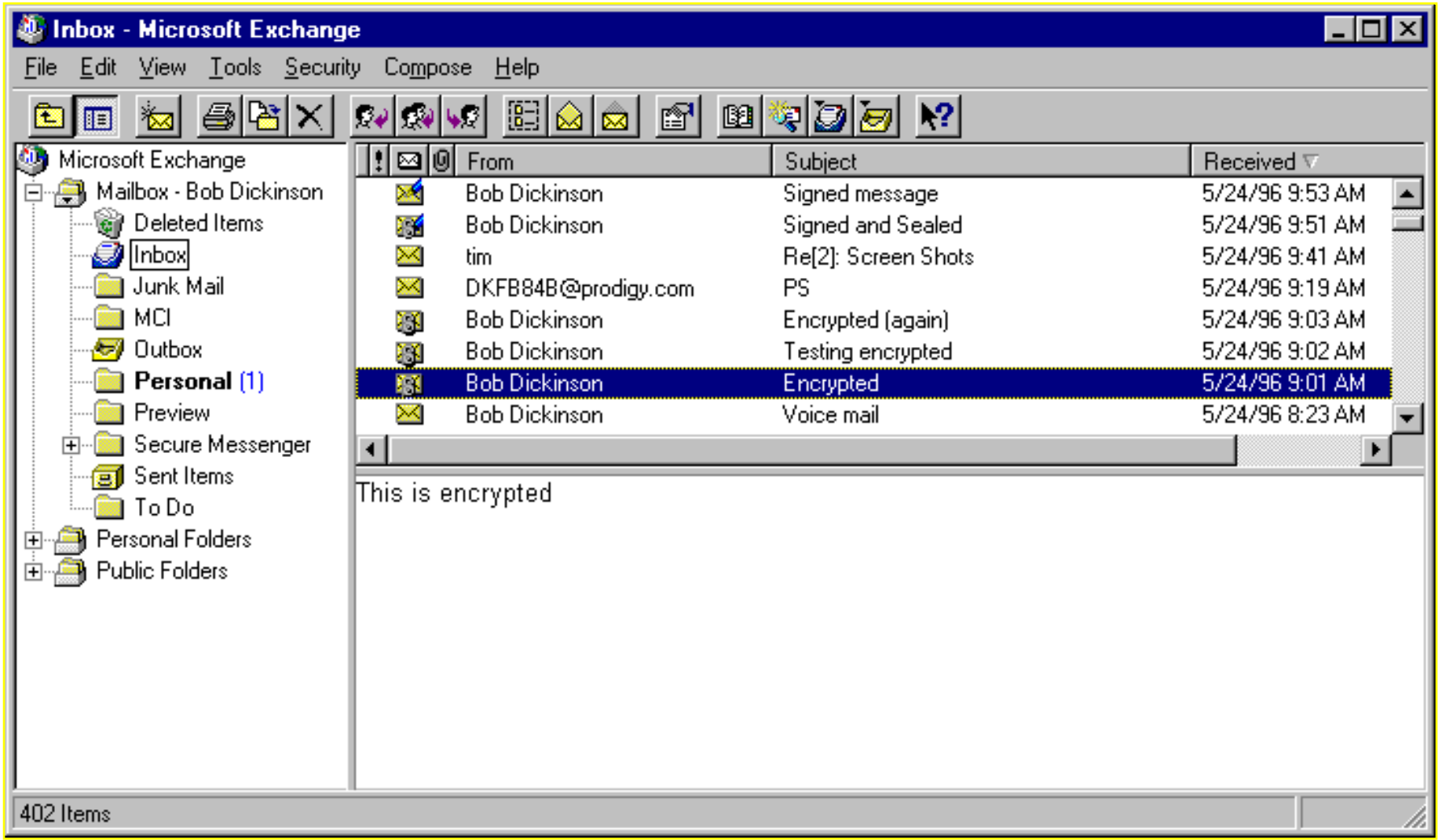
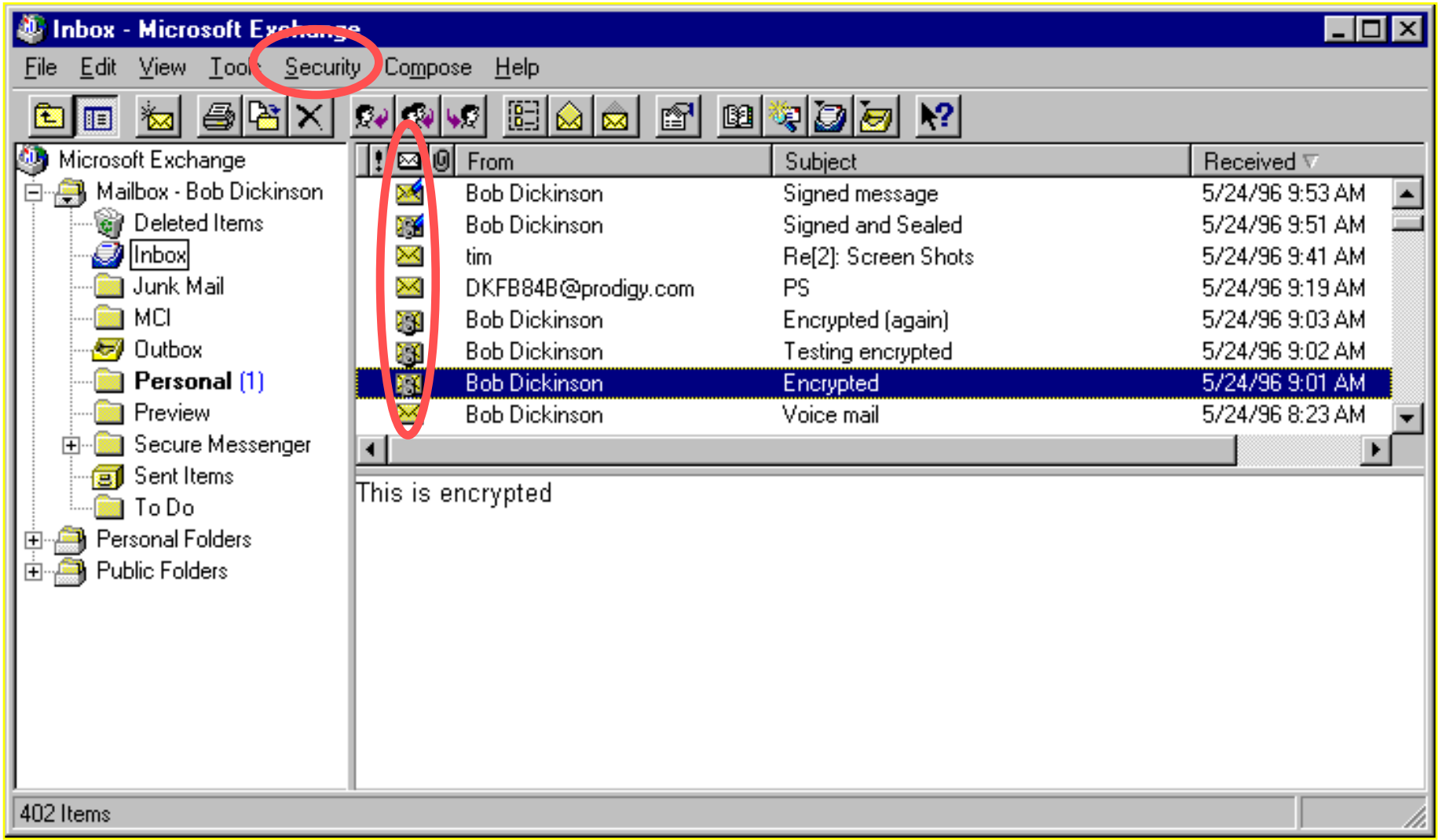
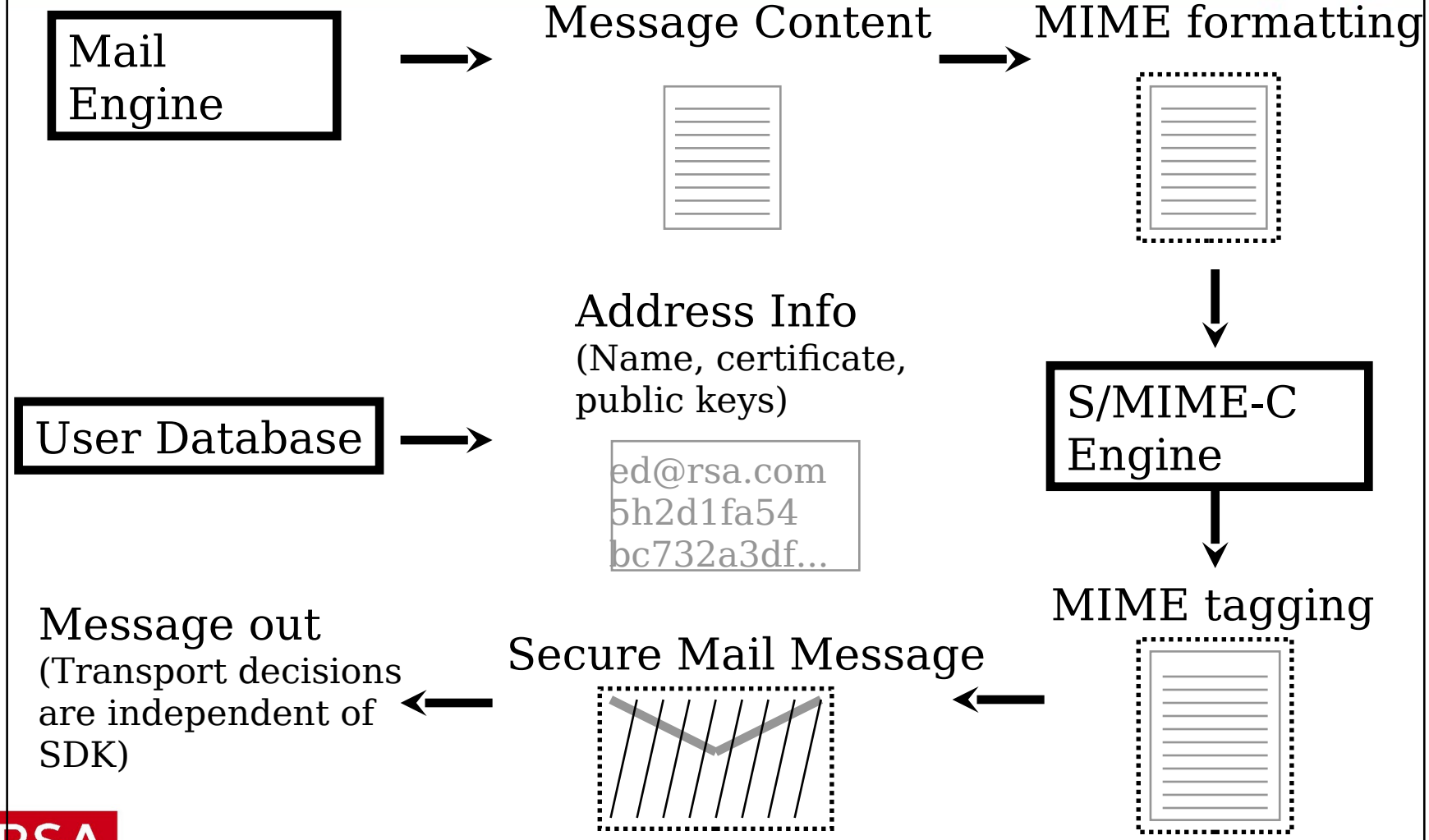
Task #2: Secure E-Mail Client



S/MIME E-Mail Client



S/MIME E-Mail Environment



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S/MIME E-mail Client: Needs

- Digital Envelopes
- Digital Signatures
- Certificate Chaining
- Certificate Requests
- Export

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S/MIME E-mail Client: Constructs

- Message Format PKCS #7
- Certificates X.509 v3
- Algorithms RSA, SHA-1, RC2, Triple-DES

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BSAFE S/MIME-C API Calls

- `SmtMsg_EncryptAndSign`
- `SmtMsg_DecryptAndVerify`
- `Also`
  - `SmtCert_EnumCerts`
  - `SmtAddress_AttachCertificate`

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Other Applications

- EDI Over Internet
- Downloading Secure Objects
- Executable Signing
- _____
- _____

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Links

- **This Presentation**
  - www.rsaconference.com/presentations/RSA00-Crypto301.ppt
- **Developing Secure Applications**
  - http://www.rsasecurity.com/developers/
- **Tim Matthews**
  - tim@rsasecurity.com

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