Special Interest Group

APNIC Certificate Authority
Status Report

March 1st, Korea, Seoul

APNIC CA Project

Cryptography and PKI Overview

APNIC CA project

Benefits and costs

Project plans

Future developments

References

Questions?

Cryptography - Terms

Public key cryptography

- Cryptography technique using different keys for encoding and decoding messages

Keypair

- Private key and public key, generated together, used in public key cryptography

Encryption/Decryption

- To encode/decode a message using a public or private key

Public Key Cryptography

- Encryption

Retrieve Public Key

Keypair

Message

Encrypted Message

Encrypted Message

Message

Transmit

Encrypt

Decrypt

Public Key Cryptography

- Encryption

Retrieve Public Key

Keypair

Message

"Signed" Message

"Signed" Message

Message

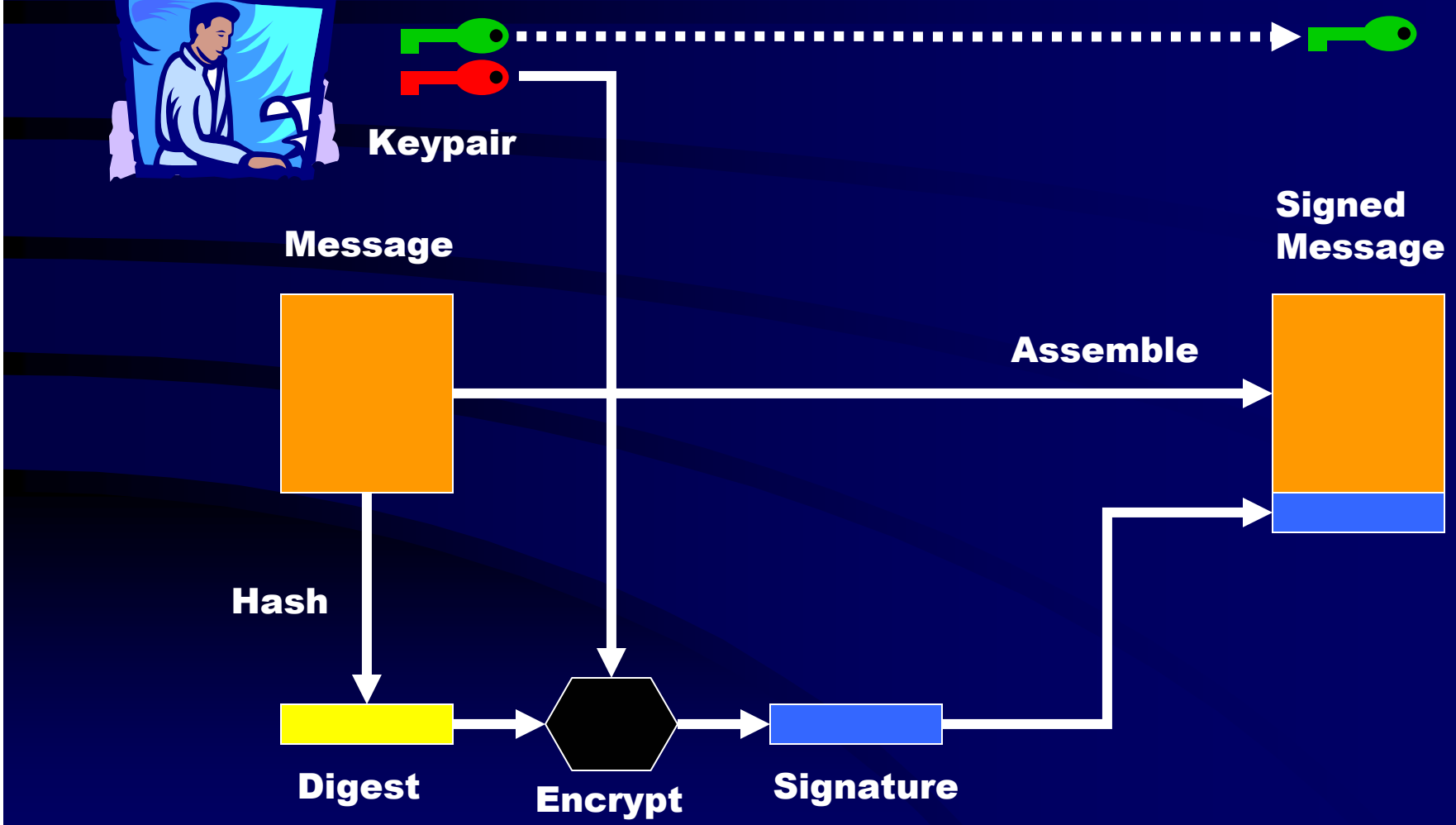
Transmit

Encrypt

Decrypt

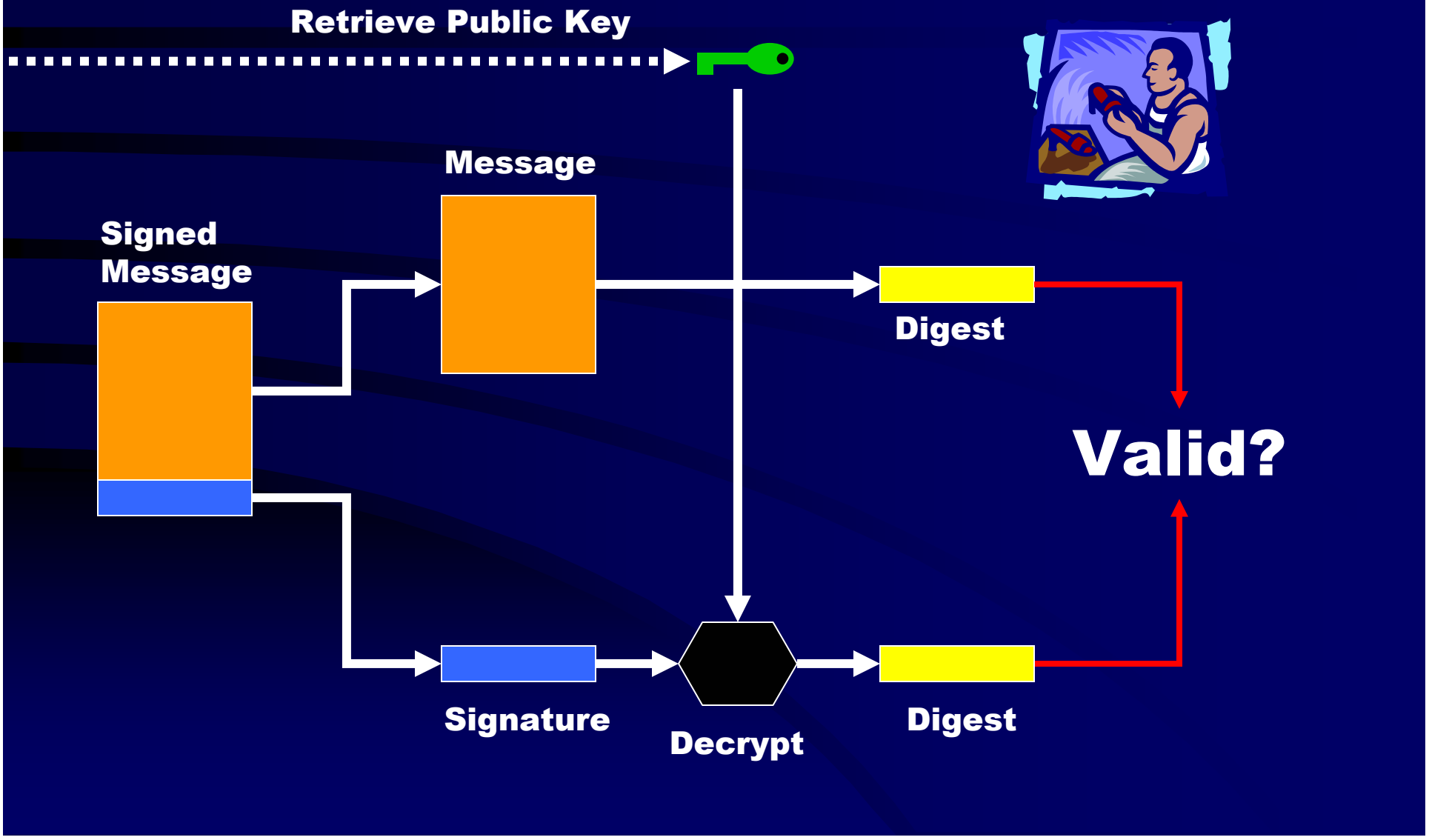
Public Key Cryptography

- Digital Signature



Public Key Cryptography

- *Digital Signature*



PKI - Terminology

Public Key Infrastructure (PKI)

- Administrative structure for support of public key cryptography

Public Key Certificate (Digital Certificate)

- Document linking a Public Key to an identity, signed by a CA, defined by X.509

Certificate Authority (CA)

- Trusted authority which issues digital certificates

Digital Certificates

A digital certificate contains:

- Identity details
  - eg Personal ID, email address, web site URL
- Public key of identity
- Issuer (Certification Authority)
- Validity period
- Attributes

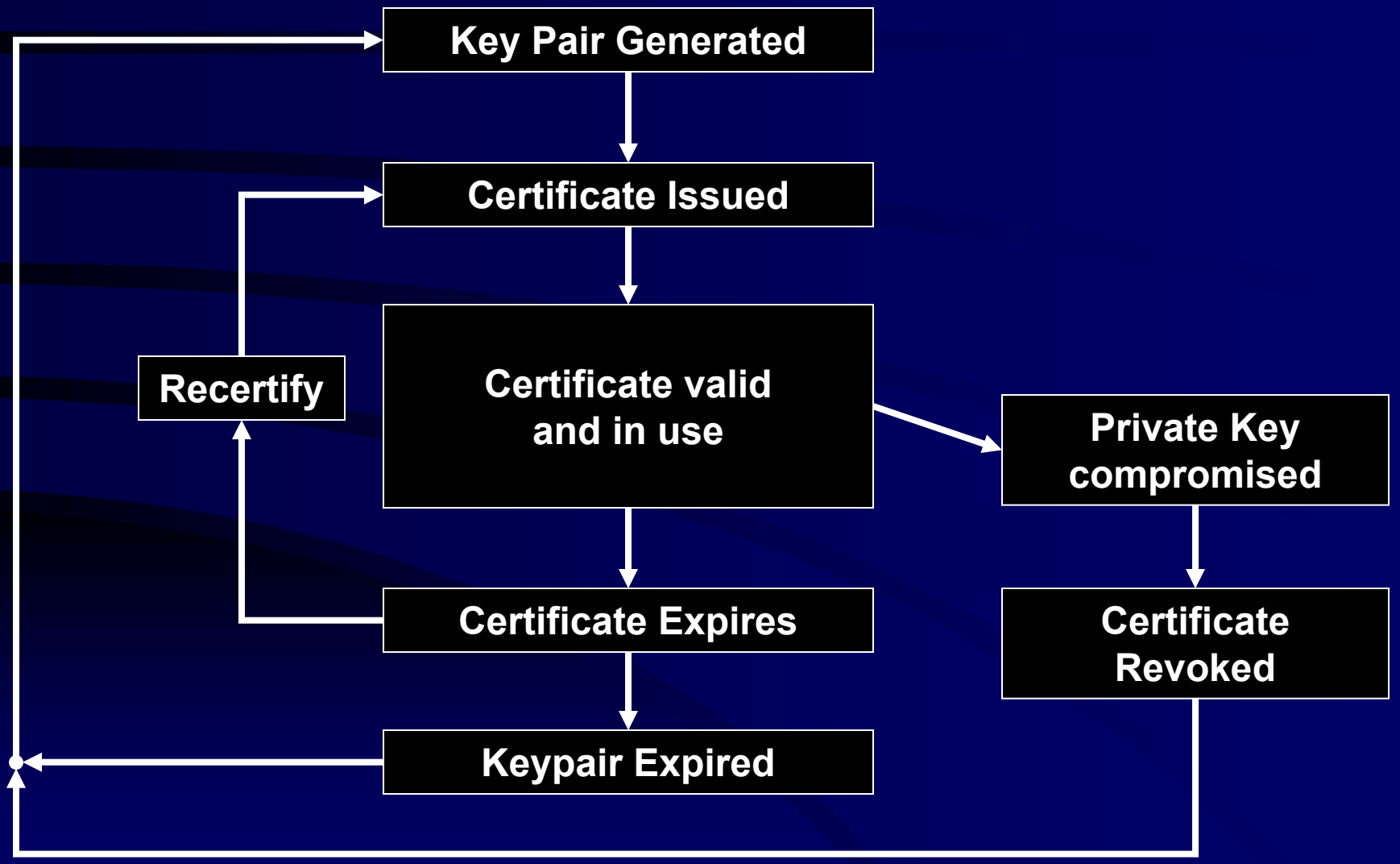
The certificate is *signed* by the CA

Digital Certificate - Example

```
Certificate ::= SEQUENCE {
        tbsCertificate                  TBSCertificate,
        signatureAlgorithm              AlgorithmIdentifier,
        signature                       BIT STRING
    }

TBSCertificate ::= SEQUENCE {
        version                 [0]     EXPLICIT Version DEFAULT v1,
        serialNumber                    CertificateSerialNumber,
        signature                       AlgorithmIdentifier,
        issuer                          Name,
        validity                        Validity,
        subject                         Name,
        subjectPublicKeyInfo            SubjectPublicKeyInfo,
        issuerUniqueID          [1]     IMPLICIT UniqueIdentifier OPTIONAL,
        subjectUniqueID         [2]     IMPLICIT UniqueIdentifier OPTIONAL,
        extensions              [3]     EXPLICIT Extensions OPTIONAL
    }
```

Digital Certificate - Lifecycle



APNIC CA - Why?

In response to

- Membership concern for greater security
  - Confidential info exchange with APNIC
  - Is my database transaction secure?
  - Whose prefixes do you accept?
- Internet community interest in security, and PKI / digital certificates
  - e.g. rps-auth
  - IETF working group: PKIX

APNIC CA - Overview

Certificate issued to APNIC member

- Corresponds to *Membership* of APNIC
- Provides uniform mechanism for all security needs:
  - Encryption and signature of email with APNIC
  - Authentication of access to APNIC web site
  - Secure maintainer mechanism for APNIC database
  - Future authorisation mechanism for Internet resources

APNIC CA - Benefits/Costs

Benefits

- Uniform industry-standard mechanism for “single password” security, authentication and authorisation
- Strong public key cryptography, end-to-end

Costs

- Server and client software
- Change to current procedures
- New policies
- Establishment: software purchase and/or development

APNIC CA - Timeline

Scoping project	Oct 1999 - Jan 2000
Pilot project	Apr - Jun 2000
Development	Jun - Sep 2000
Prototype testing	Oct - Dec 2000
Production deployment	From Jan 2001

APNIC CA - Scoping Project

October 1999 to January 2000

Objectives

- Analyse impact of introducing PKI
- Provide focus for discussions
- Raise awareness of PKI in general

Conclusions

- Significant benefits for members' security
- Growing standards support for PKI
- See: http://www.apnic.net/ca

APNIC CA - Pilot Project

April to May 2000

Deliverables

- Project scope - specific areas where PKI will be introduced
- Project plan - timeline for developing software and procedures
- Risk Analysis

APNIC CA - Future

Generalised CA function

- APNIC Certificates may be used for general purposes
- Requires tight policy and quality framework for APNIC certificates to be trusted

Hierarchical certification

- APNIC Members may use their certificates to certify their own members or customers
- May be applicable for ISPs and NIRs

APNIC CA - Future

Public Key Certificates

- X.509 certificate linking a Public Key to an identity, issued by CA

Attribute Certificates

- X.509 certificate linking Attributes to an identity, issued by CA or other authority
- Provides *authorisation*, rather than *authentication,* information
- Not yet widely deployed or supported

APNIC CA - Consultation

Mailing list open after Apricot2000

- pki-wg@lists.apnic.net
- http://www.apnic.net/wilma-bin/wilma/pki-wg

Further developments

- See: http://www.apnic.net/ca

APNIC CA - Documents

IETF PKIX drafts:

draft-ietf-pkix-roadmap-04.txt

"Internet X.509 Public Key Infrastructure PKIX Roadmap"

draft-clynn-bgp-x509-auth-01.txt

"X.509 Extensions for Authorization of IP Addresses AS Numbers, and Routers within an AS"

draft-ietf-pkix-ac509prof-01.txt

"An Internet Attribute Certificate Profile for Authorization"

- http://www.ietf.org/html.charters/pkix-charter.html

Questions?