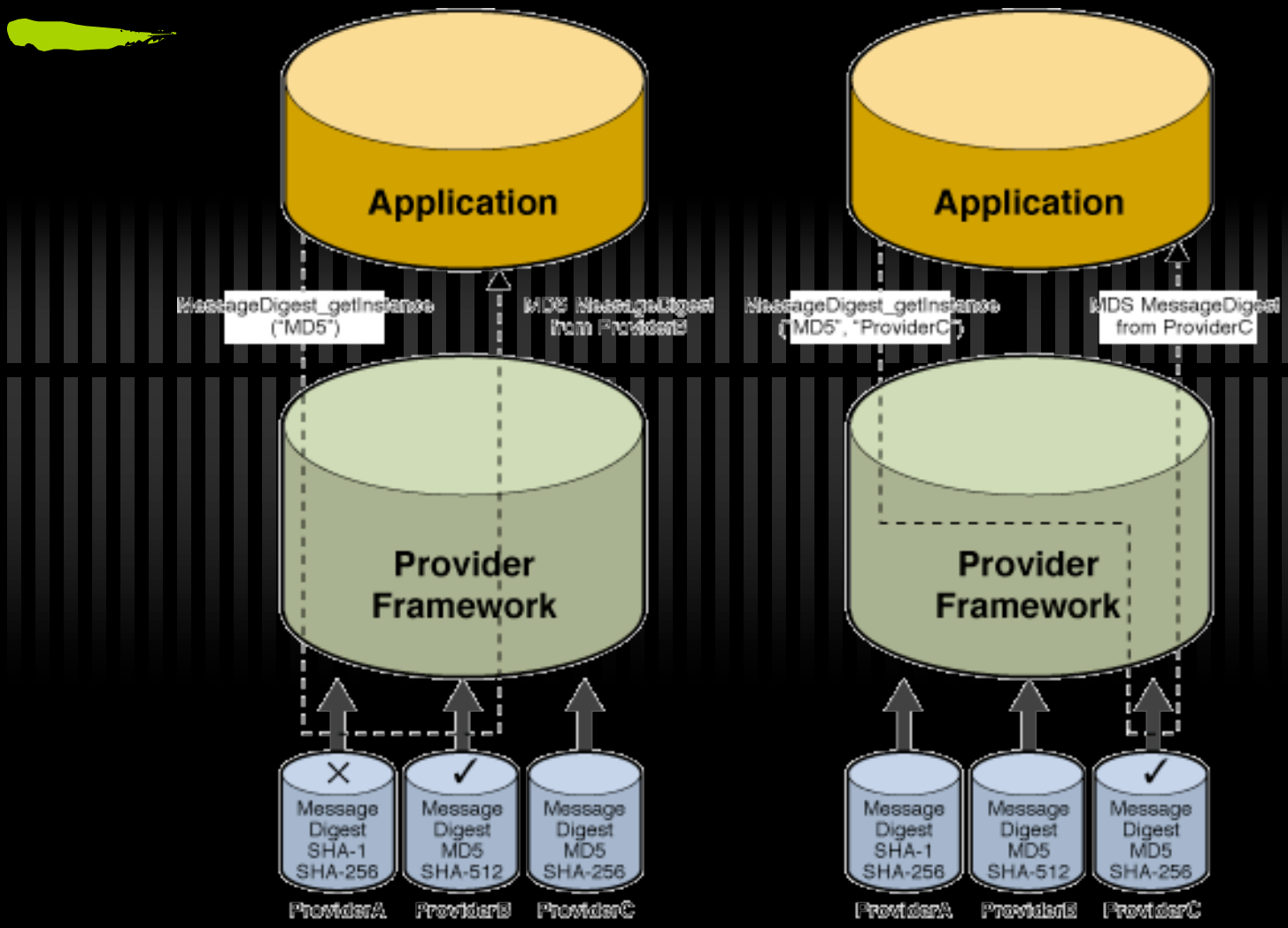
Java Cryptography Architecture

http://java.sun.com/javase/6/docs/technotes/guides/security/crypto/CryptoSpec.html

Design principles

- Implementation independence
  - Applications do not need to implement security algorithms
  - Services are implemented in providers pluggable into the Java platform
- Implementation interoperability - providers are interoperable
- Algorithm exntensibility

Architecture



Providers

- java.security.Provider - base class of all providers
  - advertises algorithms
- Supply concrete implementations

```
md = MessageDigest.getInstance("MD5")
md = MessageDigest.getInstance("MD5","ProviderC")
```

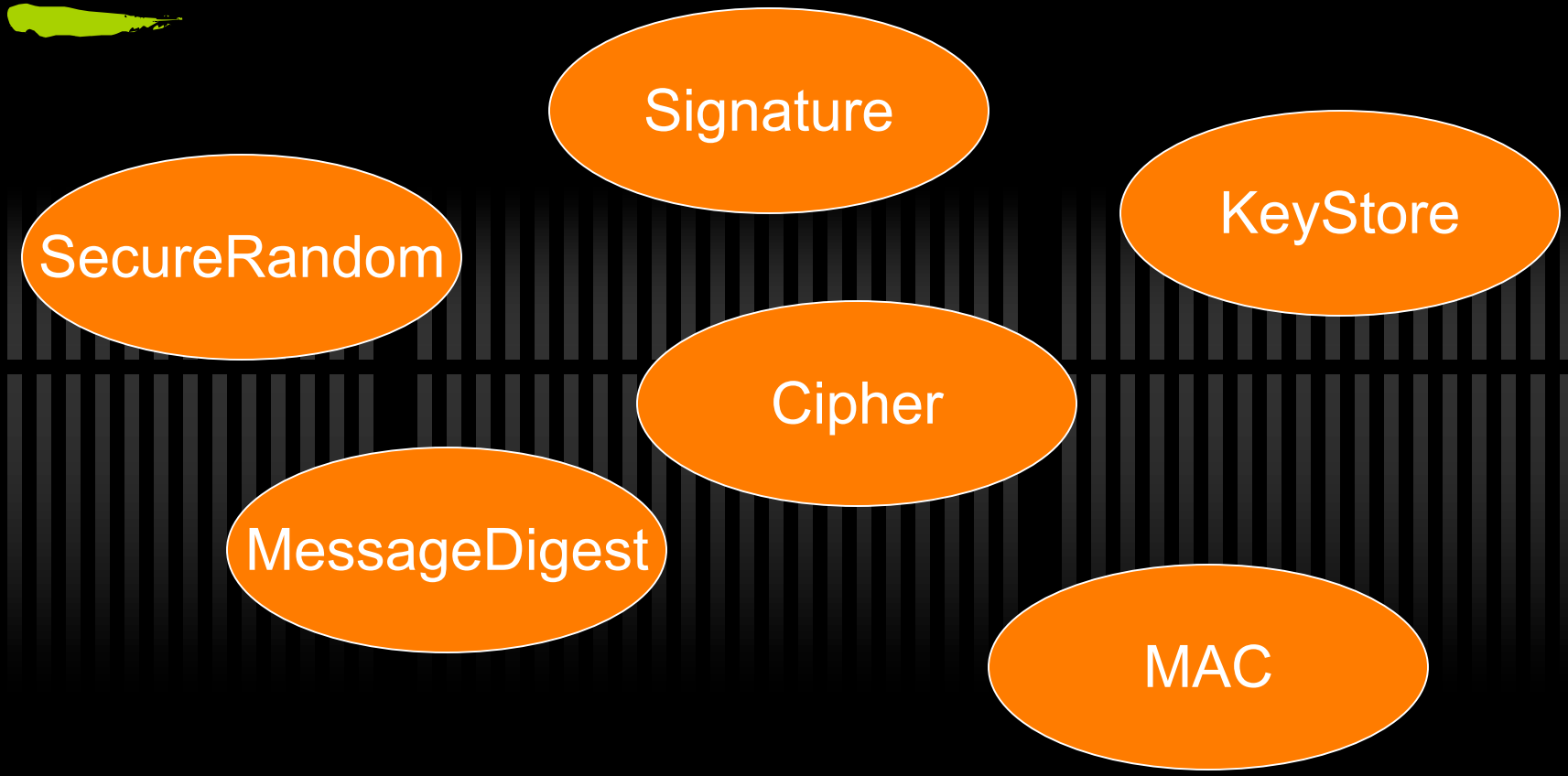
Provider implicit

Provider explicit

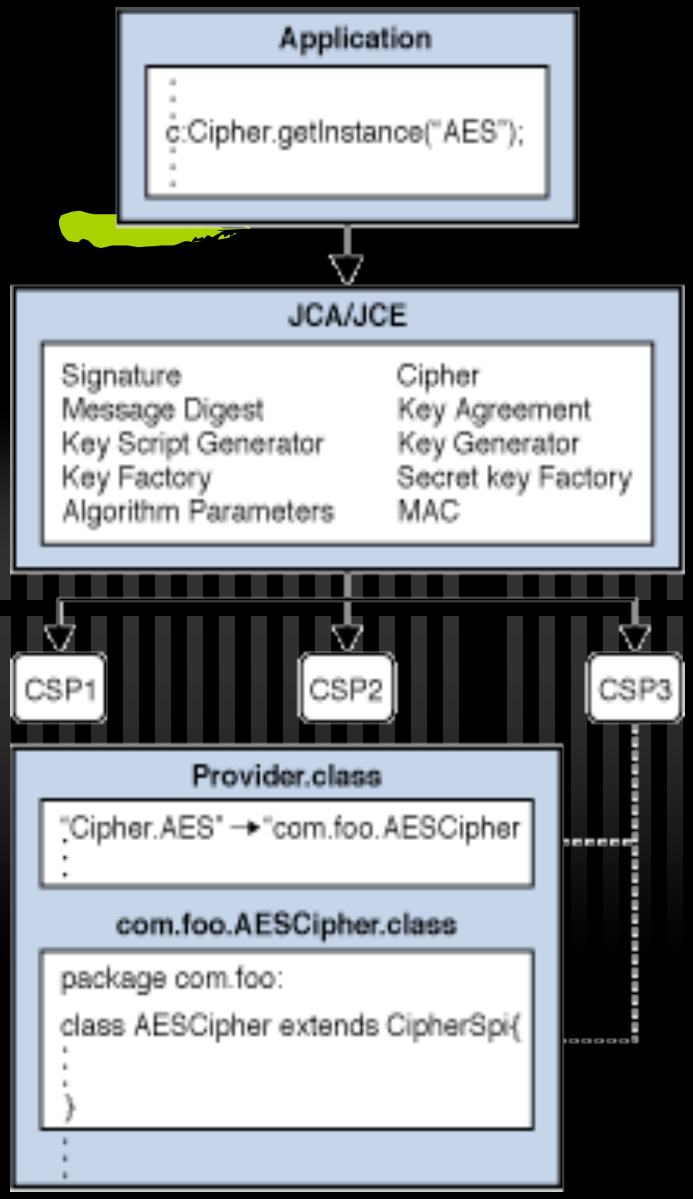
Engine Classes

- Provide the interface to a specific type of cryptographic service
  - cryptographic operatoins
  - generators or converers of cryptographic material
  - objects (keystores or certificates)

Example Engine Classes



How does it work?




```
import javax.crypto.*;

Cipher c = Cipher.getInstance("AES");
c.init(ENCRYPT_MODE, key);
```

SecureRandom

- ✓ Seeding

```
synchronized public void setSeed(byte[] seed)
public void setSeed(long seed)
```

- ✓ Using the object

```
synchronized public void nextBytes(byte[] bytes)
```

- ✓ Generate seed bytes

```
byte[] generateSeed(int numBytes)
```

MessageDigest

- Updating the object

```
void update(byte input)
void update(byte[] input)
```

- Computing the digest

```
byte[] digest()
byte[] digest(byte[] input)
```

Your Best Friend

- Look up API docs for the relevant packages
  - `java.security`
  - `javax.crypto`
- JCA reference guide
  - http://java.sun.com/javase/6/docs/technotes/guides/security/crypto/CryptoSpec.html