certspec

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What is certspec?

urn:cert:issuersn:CN=Atlantis;2A

- Uniform syntax for
- identifying
- a *specific* certificate
- in a textual format

URN Primer

- Resource identifiers that are **persistent**, **location-independent**, **text-based** (**transcribable** by keyboard & **recognizable** by humans), **mappable** to other URIs
- RFC 2141; urnbis
- Examples:
  - urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6
  - urn:oid:1.3.6.1.4.1
  - urn:ietf:rfc:2141
  - urn:isbn:0-395-36341-1

What’s the

ISBN of this

book?

Motivation

- Apps
    - in preferences for runtime retrieval
    - for exchange
- Protocols

—IN TEXT—

Use Cases

```
<?xml version=“1.0”?>
<props>
 <host>service.example.com</host>
 <port>443</port>
 <tls enabled=“true” minVersion=“1.1”>
   <sni enabled=“true”/>
   <servercert>urn:cert:SHA-1:b1f090a8e2d70353107454f9618347b18b321bf1</servercert>
 </tls>
</props>
```

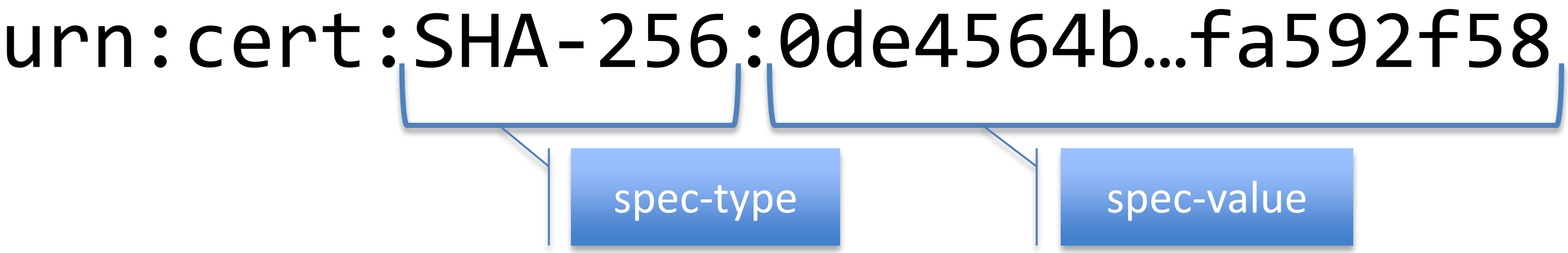
JSON (“trusted certs”)

```
[“urn:cert:SHA-256:0de4564b5c09c7fbd2a1fade71d5d3ae5613e2e33de49c8f15fec2cafa592f58”,
“urn:cert:SHA-512:f2d956ab9510adffd38c26e84f3d2116ec8174190c587ee26147d57bba2dccb2e0e09
44ea60086a045d490df6f8648dae673fe66877e05d632efdd3a8cdb1bdb”,
“urn:cert:base64:MIHuMIGfoAMCAQICASowCQYHKoZIzj0EATAMMQowCAYDVQQDEwFRMB4XDTEyM
DczMDExMjc0MVoXDTE0MDczMDExMjc0MVowDDEKMAgGA1UEAxMBUTBOMBAGByqGSM49AgEGB
SuBBAAhAzoABOcIALyjNzblvjALOb1mHIqQnpJGBGaKqmLgK1siIgLAiMbMaVdVvwR6IeSNVF/PnV02qTRi
j6YKMAkGByqGSM49BAEDPwAwPAIcG6jgr8tVG6un50rqHuN48ZxzRYQjfJnuSNzpTwIceTJpAVPSdk3Yz2
evgSfZktTpfl8vkJvLiEcHzA==”]
```

Features of Certs

- Standardized objects (X.509, PKIX)
- Have canonical encoding (DER)
- Variable size (in-band or OOB may be better depending on application)
- Have a hierarchical namespace (issuer + serial number) or can be identified by exactly one hash*
- Used in security protocols; accurate identification is critical

Mechanisms



`urn:cert:SHA-256:0de4564b…fa592f58`

spec-type

spec-value

- by-reference
  - by-hash (SHA-1, SHA-2) (not “parameterized”)
  - by-data (issuersn)
- by-value
  - data (base64, hex)

Comparisons & Next Steps

Compare certspec and status quo

- Meets URN criteria
- Existing preferences not portable, exchangeable, or algorithm-agile
- Different protocols reinvent the wheel
- Want by-value and by-ref agility
  - Longest hash (128)
  - Shortest (practical) value (241/329)
    - eliminates DoS vector, lookup time

Compare certspec and ni

certspec	ni
URN	URI
Canonical encoding	No canonicalization
Resolves to any URI/protocol	Implies “ni-capable protocol” with specific (but unspecified) behaviors
Accurate, unique identifier	Not unique
No truncation allowed (“security”)	Truncation encouraged (“flexibility/brevity”)
One identifier per URN, not query lang	Multiple identifiers
Different algorithm considerations	
Limited to certs	Digital things
Trivial transcription from crypto tools	Full support requires new implementations

Next Steps

- Harmonize with urnbis
- Improve Motivation section
- Discuss extensibility aspects
- Allocate NID

Questions?