Remote Attestation for vNSFs

draft-pastor-i2nsf-vnsf-attestation

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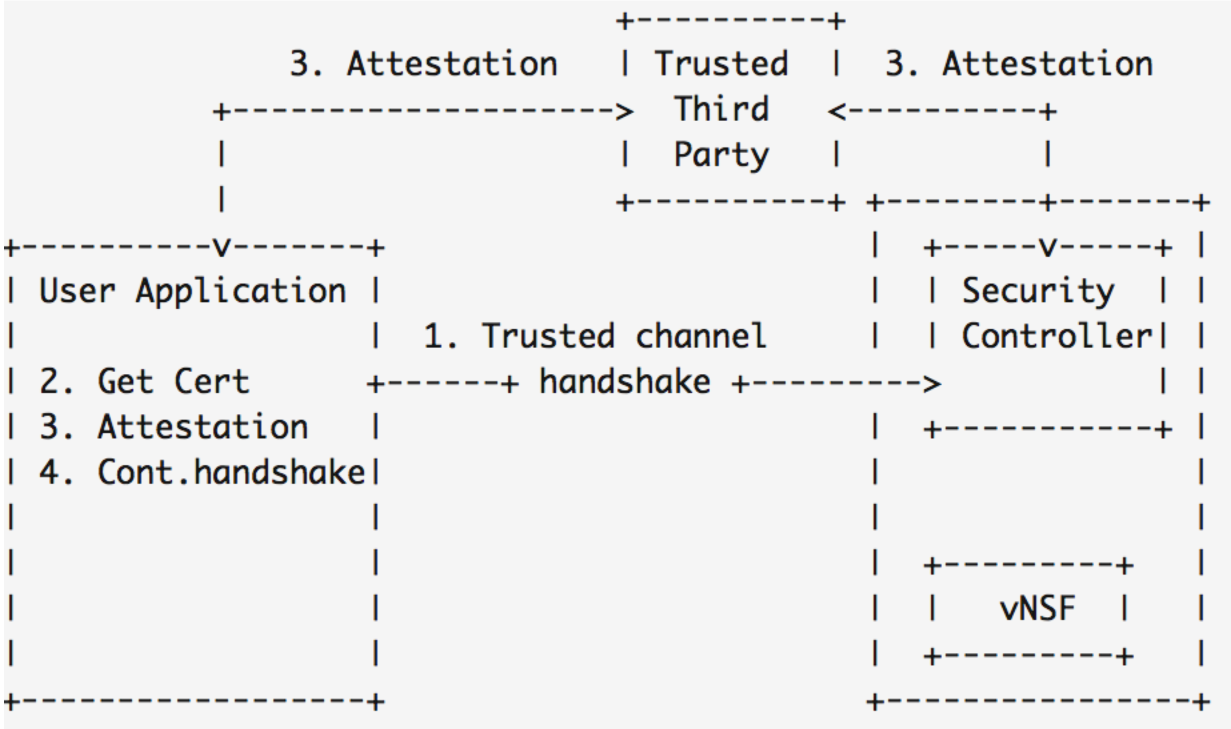
Why Attestation

- Virtualization applied to the NSF environment (vNSF) implies several additional concerns in security
- User impersonation can become especially serious due to the additional flexibility provided by the virtualization platform
    - Especially when privileges are granted by the virtualization platform
- Altered virtualized elements can try to take control of a vNSF or the virtualization platform
    - Or alter the traffic patterns through the vNSFs
- Physical access to the virtualization platform can further translate into modifying the components or attempting

- These threats can be addressed to an acceptable level of risk by
    - Mutual authentication
    - Attestation of the virtualization platform and the vNSFs
- The Security Controller constitutes the natural focal point for the attestation procedures
    - Mutual authentication with a well-known point
    - Orchestration of the attestation

The Attestation Principles

- The virtualization platform runs a TPM
  - Collecting measurements of the platform, the Security Controller, and the vNSFs
- Users and the Security Controller mutually authenticate
  - Establishing a desired level of assurance



```
                                +----------+
               3. Attestation   | Trusted  |  3. Attestation
           +-------------------->  Third   <----------+
           |                    |  Party   |          |
           |                    +----------+ +--------+-------+
+----------v-------+                         |  +-----v-----+ |
| User Application |                         |  | Security  | |
|                  |  1. Trusted channel     |  | Controller| |
| 2. Get Cert      +------+ handshake +--------->           | |
| 3. Attestation   |                         |  +-----------+ |
| 4. Cont.handshake|                         |                |
|                  |                         |                |
|                  |                         |  +---------+   |
|                  |                         |  |   vNSF  |   |
|                  |                         |  +---------+   |
+------------------+                         +-----------------+
```

- Trusted connection with the Security Controller
  - Or an endpoint designated by it
  - Through which all traffic to and from the virtualized NSF environment will flow
- The Security Controller makes the attestation measurements available to the user
  - Directly or through a trusted third party
  - The mechanisms for this are under evaluation
    - Results from WGs such as NEA and SACM to be considered

The Attestation Procedures

1. Create a trusted channel with the Security Controller
   - The establishment of the trusted channel is completed after the next step
   - The usage of a TPM and the requirements on the attestation measurements allow for the use of self-signed certificates for this
2. Security Controller attestation
   - The Security Controller retrieves the measurements and asks the TPM to sign the PCRs with an Attestation Identity Key (AIK)
   - The Security Controller shares the measurements with the user
   - As part of the verification, the application also checks that the digest of the certificate, received during the trusted channel handshake, is present among measurements, so the channel is completely established
   - A TTP can be used as intermediary for the verification
3. Platform attestation
   - The Security Controller makes the vNSFs measurements available for verification
   - Similar steps to the ones described for (2) above
   - This step can be applied periodically if the level of assurance requires it

Current Status and Next Steps

- Initial -00 derived from a deliverable of the SECURED project on virtual security environments
  - Too detailed on TCG procedures
  - No specification of the remote attestation procedures
  - Lack of details on the trusted channel between user and the Security Controller
- Make -01 evolve the document to align it better with this presentation
  - And include more context on secure instantiation and management of vNSFs
- And, for sure, address any comments this mostly respected community may have