TURMOIL VPN PROCESSING

27 October 2009

[redacted]

The overall classification for this brief is:
[TOPSECRET//COMINT//REL TO USA, FVEY]

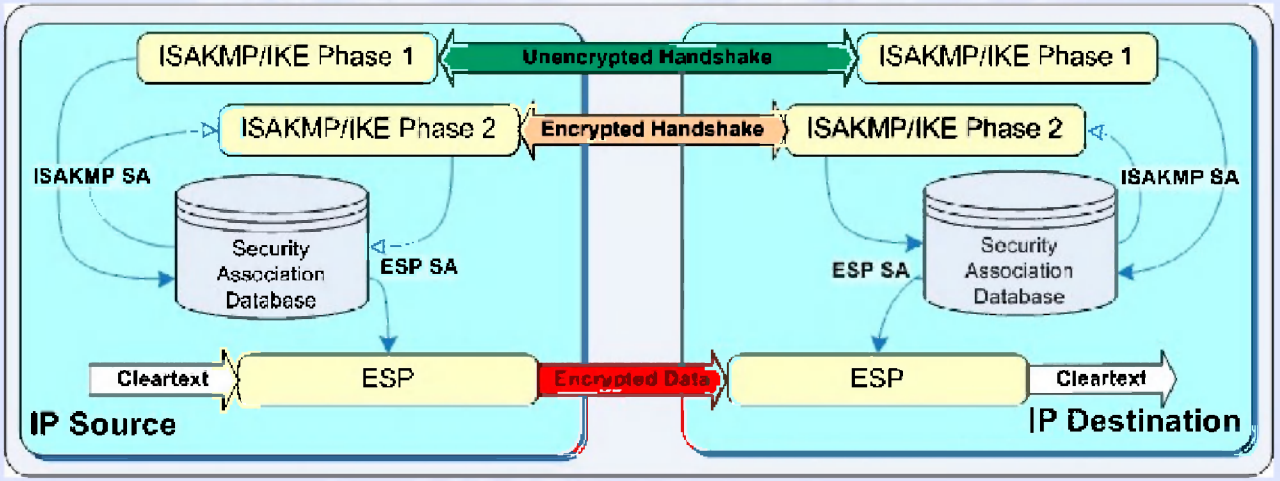
Agenda

- VPN Technology Overview
- Dataflows and Interfaces
- LPT Implementation
- Metrics

Overview – VPN Mission Opportunity

(S//SI//REL) Exploit Virtual Private Network (**VPN**) communications that use IP Security (**IPsec**) algorithms and protocols:

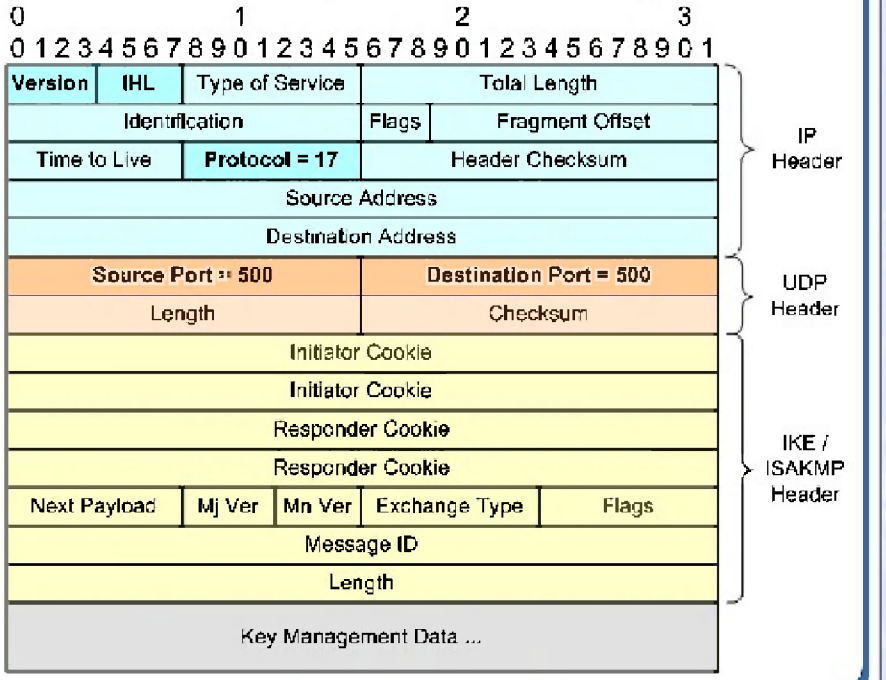
- (U) **ISAKMP** – Internet Security Association and Key Management Protocol (RFC2407, RFC2408) provides an authentication and key exchange framework.
- (U) **IKE** – Internet Key Exchange (RFC2409) provides authentication and key exchange mechanisms.
- (U) **ESP** - Encapsulating Security Payload (RFC2406) provides traffic confidentiality (encryption) and optional integrity protection.
- (U) **AH** – Authentication Header (RFC2402) provides integrity protection that includes IP Header. Sometimes AH is used to wrap ESP for additional integrity.



IKE-ISAKMP Protocol

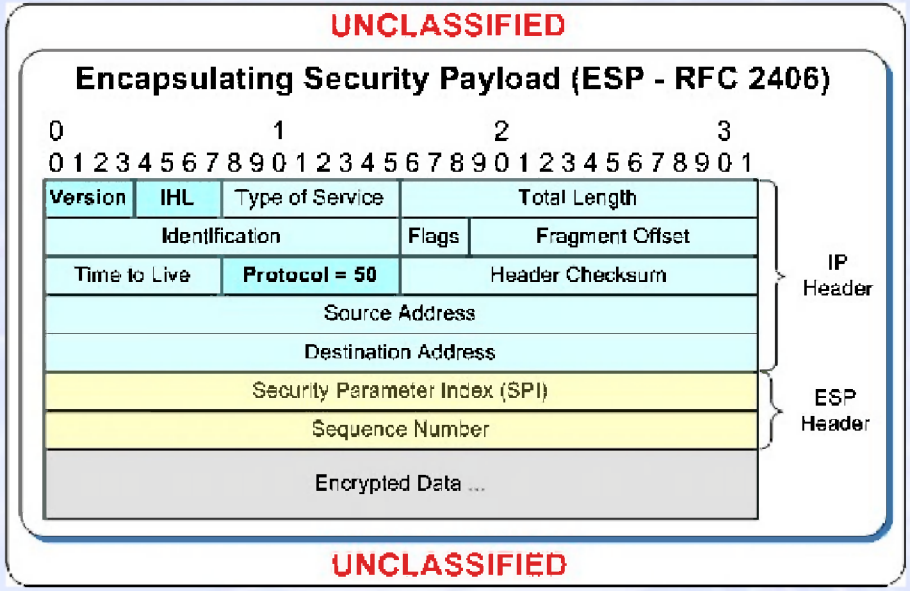
UNCLASSIFIED

Internet Key Exchange (IKE – RFC 2409)
Internet Security Association and Key Management Protocol (ISAKMP – RFC 2408)



UNCLASSIFIED

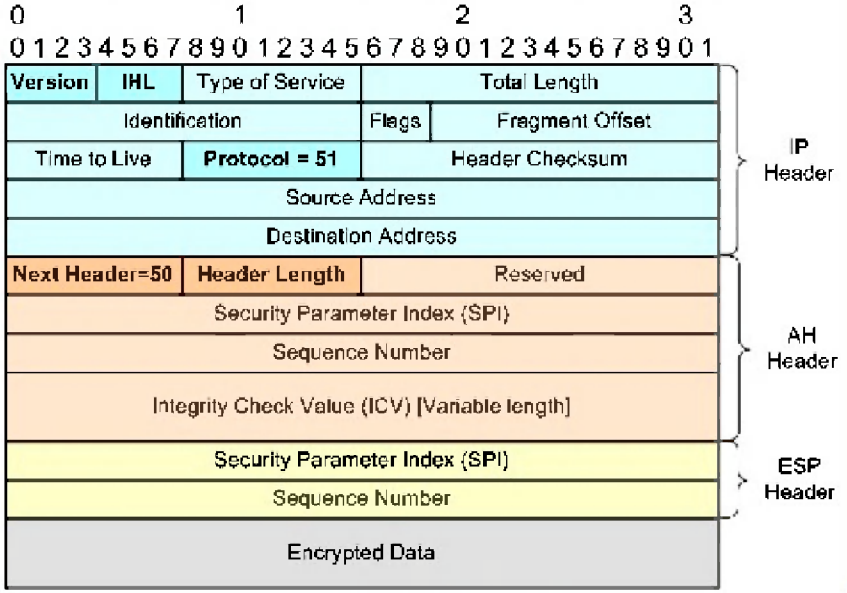
ESP Protocol



AH-ESP Protocol

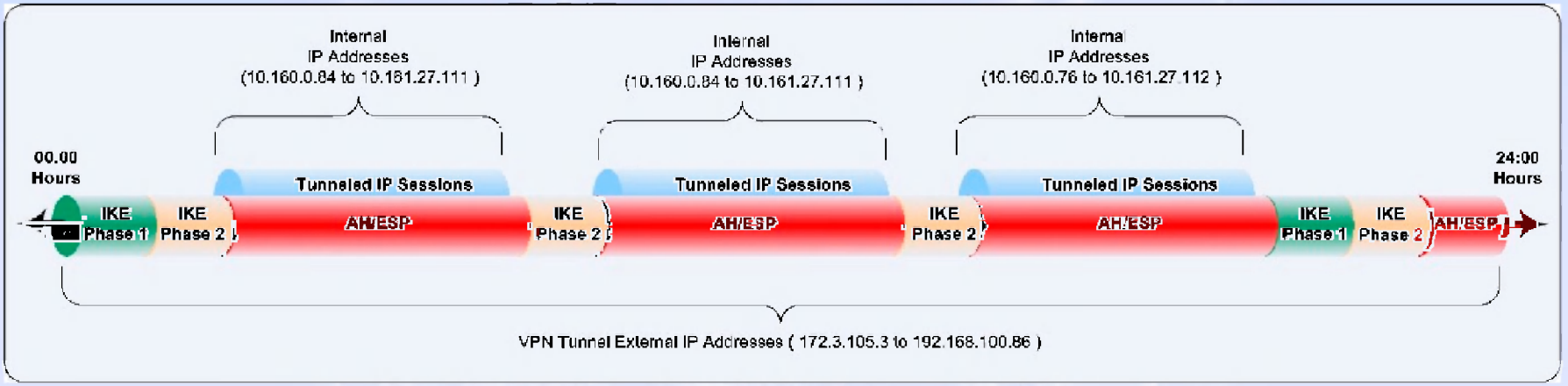
UNCLASSIFIED

Authentication Header (AH – RFC 2402)
Encapsulating Security Payload (ESP - RFC 2406)



UNCLASSIFIED

Overview – VPN IPsec Collection



- (TS//SI//REL) Collection requires ***dwell time*** to capture IKE associated with ESP
- (TS//SI//REL) Collection requires ***link diversity*** to capture IKE associated with ESP

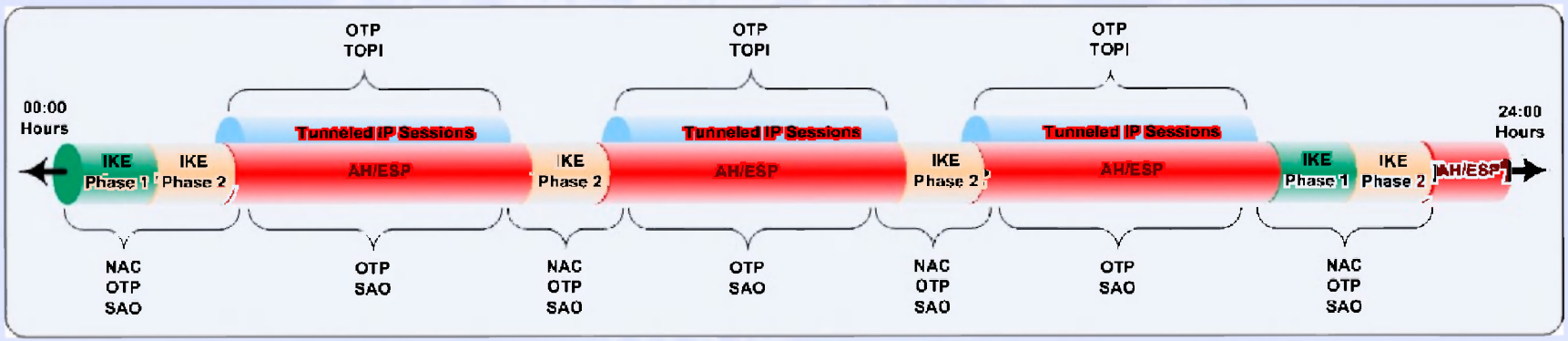
  (S//SI//REL) There is no guarantee that IKE and ESP will use the same link.
- (S//SI//REL) Collection requires ***multiple selectors*** to target external and tunneled sessions

  (S//SI//REL) VPN Tunnel External IP Addresses – To Target Decryption

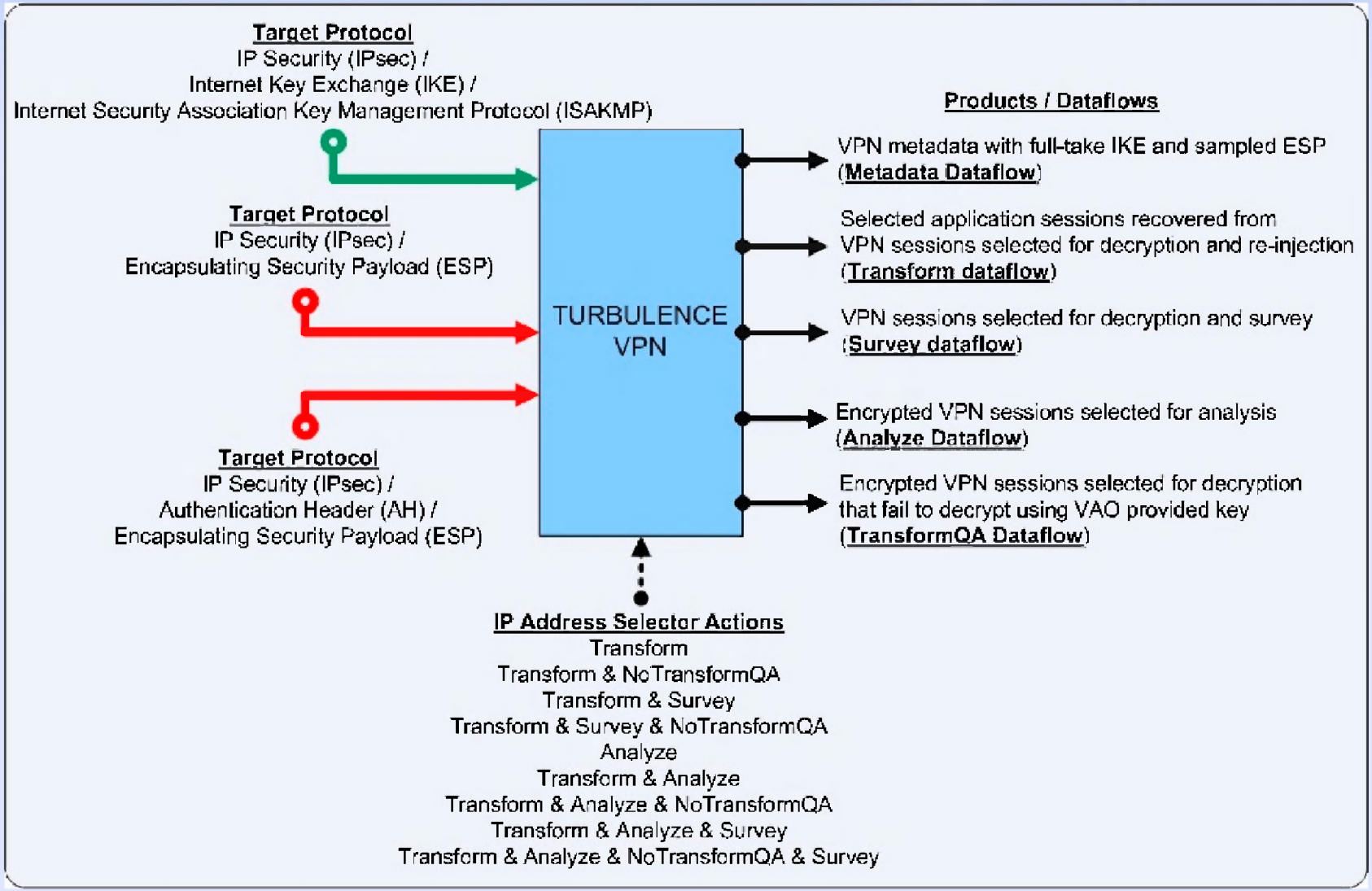
  (S//SI//REL) Strong Selectors on Internal IP Links – To Target VPN Content

Overview – Customer Needs

Customer	Functions	Needs
SIGINT Analyst (TOPI)	•Target and Analyze Traffic •Report SIGINT	•Target IDs, Target Links, Target Value •Unencrypted Targeted Traffic
Network Analysis Center (NAC)	•Identify target VPN's •Report VPN Target IDs and Links	•VPN IKE and ESP Metadata
Office of Target Pursuit (OTP)	•Search and survey for VPN's of interest •Report VPN Traffic Intelligence Value	•VPN IKE and ESP Metadata •VPN Encrypted Surveys •VPN Unencrypted Surveys
Systems Analysis Office (SAO)	•Identify VPN Technologies •Identify VPN Vulnerabilities •Support VPN Exploitation	•VPN IKE and ESP Metadata •VPN Encrypted Surveys •VPN Decryption Quality

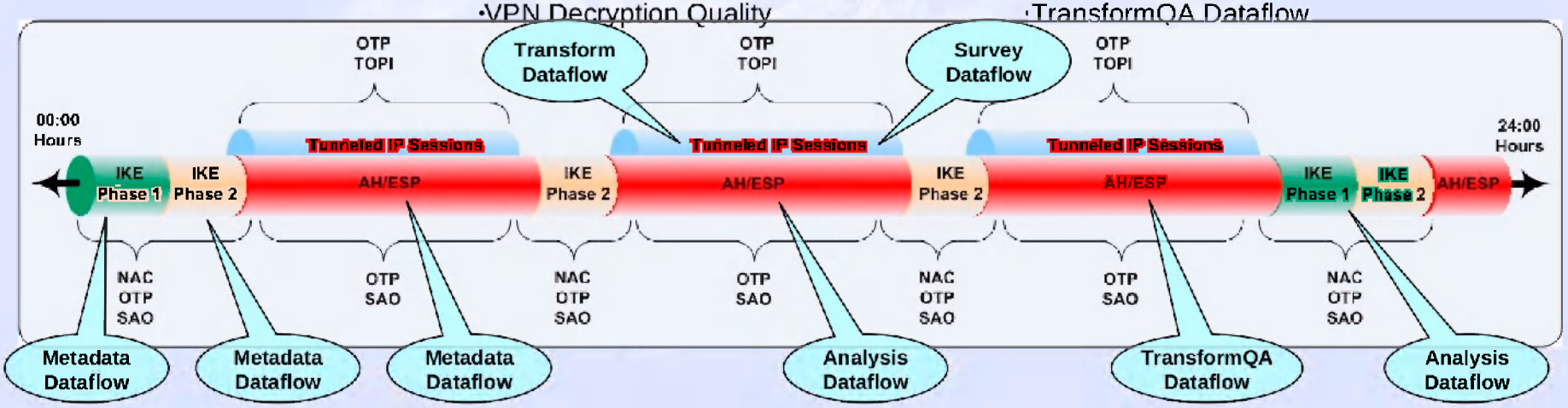


Overview – VPN Products

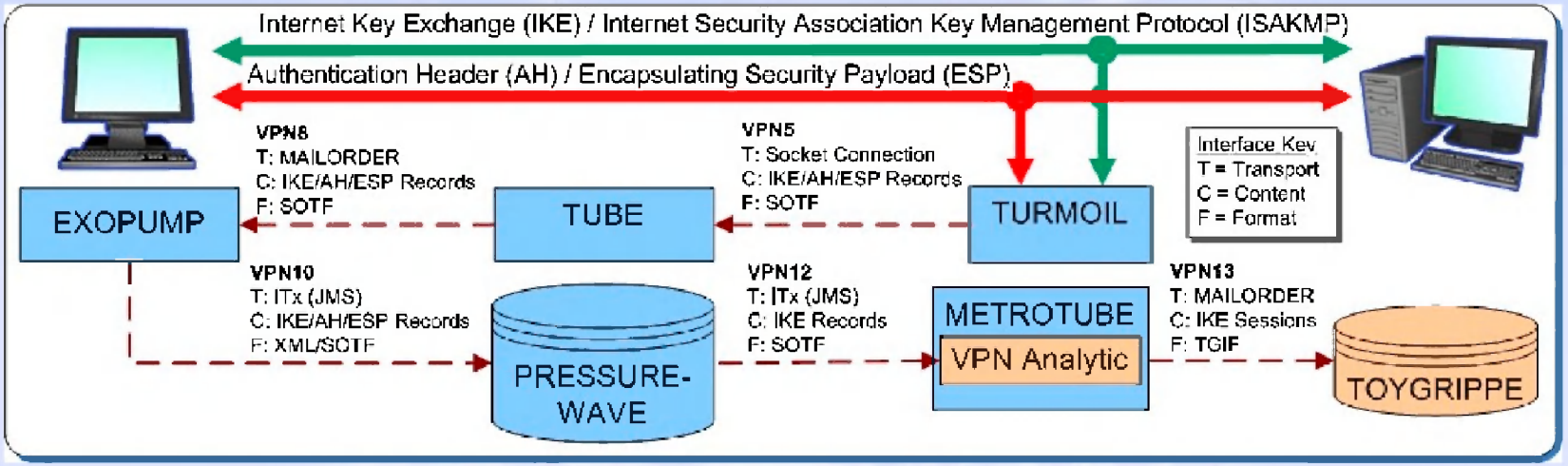


Overview – Needs and Products

Customer	Needs	Products
SIGINT Analyst (TOPI)	•Target IDs, Target Links, Target Value •Unencrypted Targeted Traffic	•Transform Dataflow
Network Analysis Center (NAC)	•VPN IKE and ESP Metadata	•Metadata Dataflow – IKE Fulltake •Metadata Dataflow – ESP Samples
Office of Target Pursuit (OTP)	•VPN IKE and ESP Metadata	•Metadata Dataflow – IKE Fulltake •Metadata Dataflow – ESP Samples
	•VPN Encrypted Surveys	•Analysis Dataflow
	•VPN Unencrypted Surveys	•Survey Dataflow
Systems Analysic Office (SAO)	•VPN IKE and ESP Metadata	•Metadata Dataflow – IKE Fulltake •Metadata Dataflow – ESP Samples
	•VPN Encrypted Surveys	•Analysis Dataflow
	•VPN Decryption Quality	•TransformQA Dataflow

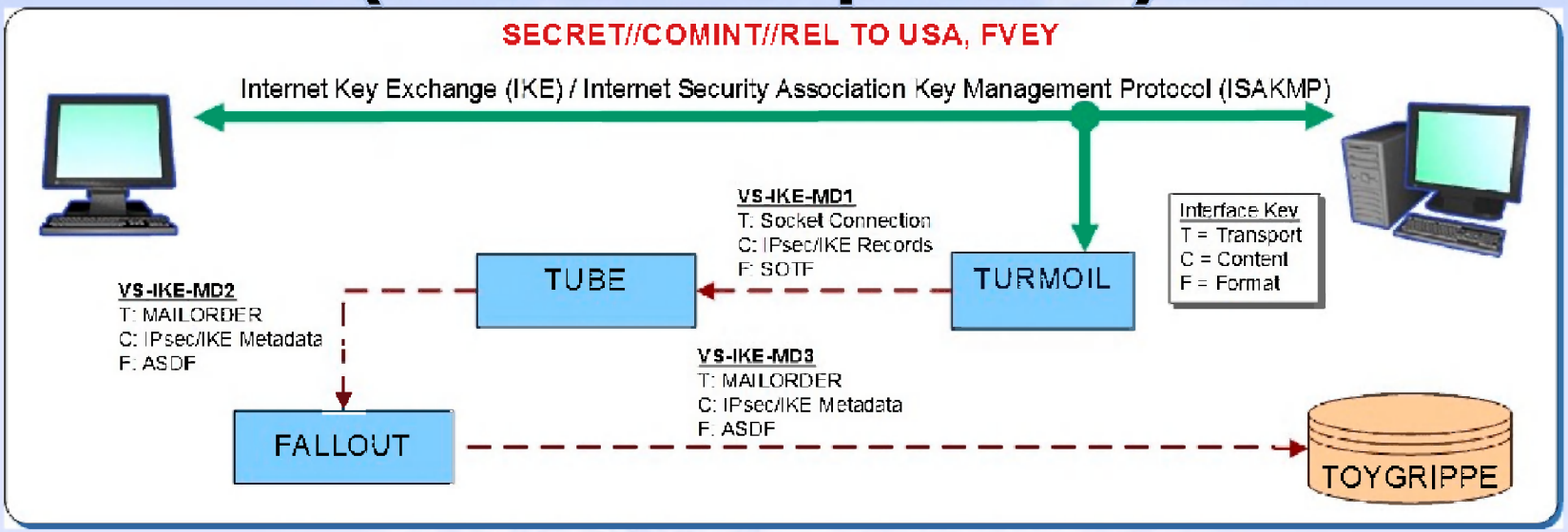


Dataflows and Interfaces - Metadata (Classic)



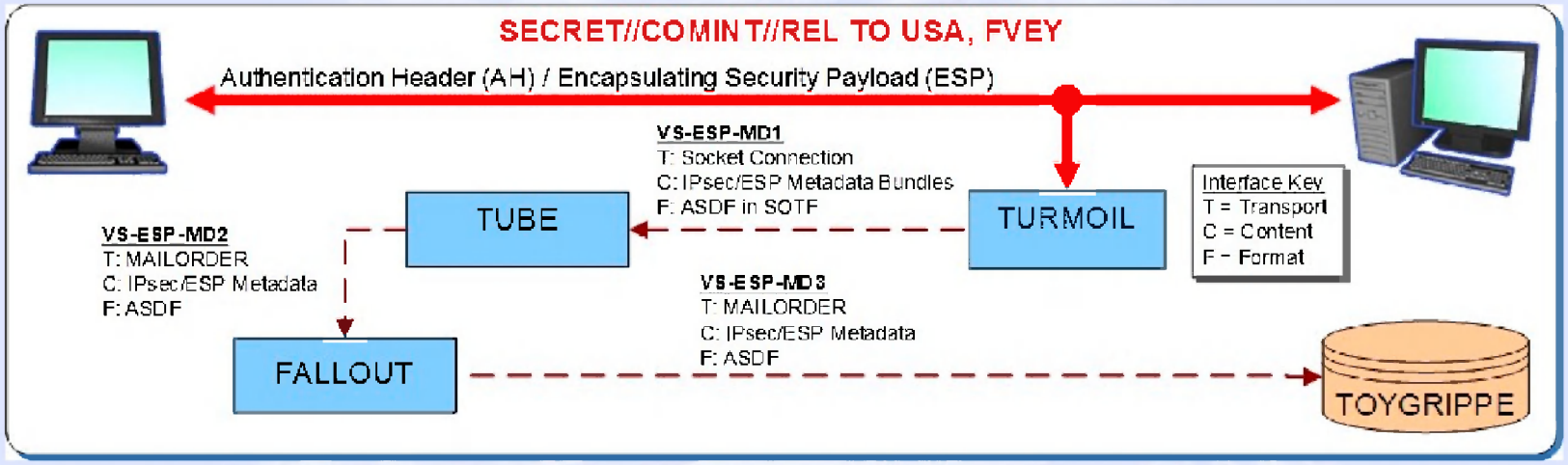
- (S//SI//REL) VPN IKE/ISAKMP Metadata in TOYGRIPPE is ***full-take***
- (S//SI//REL) VPN ESP Metadata Sessions in PRESSUREWAVE is ***sampled*** (1/16th)
- (S//SI//REL) VPN AH/ESP Metadata Sessions in PRESSUREWAVE is ***sampled*** (1/16th)

Dataflows and Interfaces – IKE Metadata (New and Improved!)

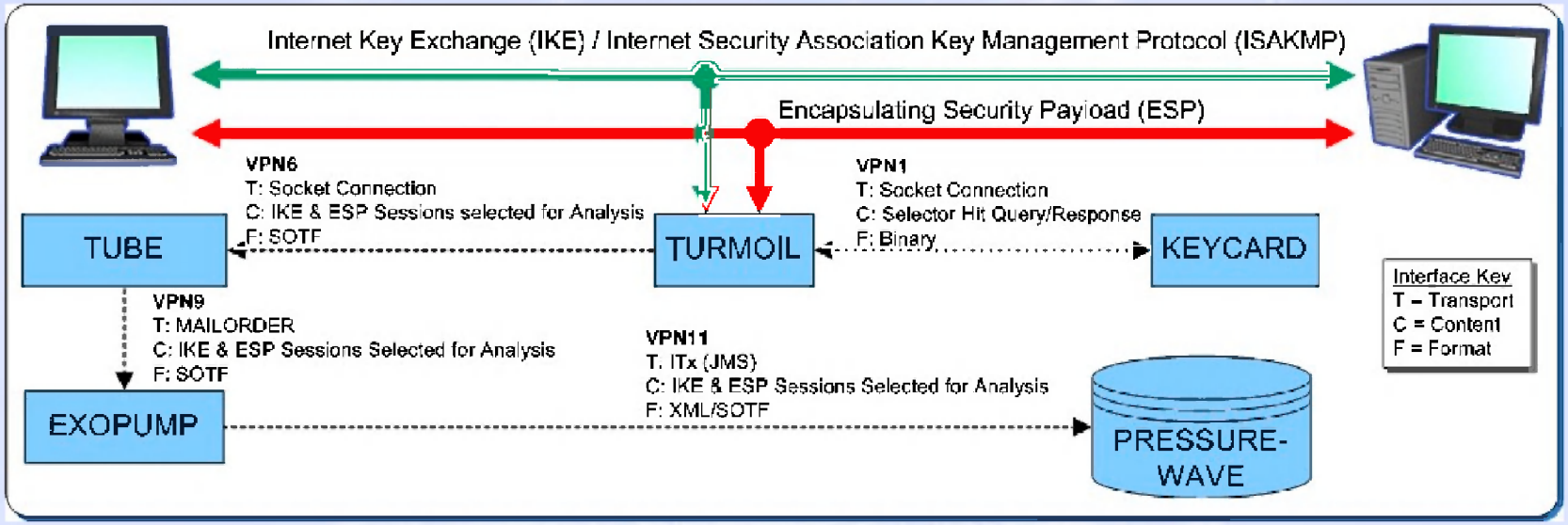


- (S//SI//REL) VPN IKE/ISAKMP Metadata in TOYGRIPPE is ***full-take***
- (S//SI//REL) VPN ESP Metadata Sessions in PRESSUREWAVE is ***sampled*** (1/16th)
- (S//SI//REL) VPN AH/ESP Metadata Sessions in PRESSUREWAVE is ***sampled*** (1/16th)

Dataflows and Interfaces - ESP Metadata

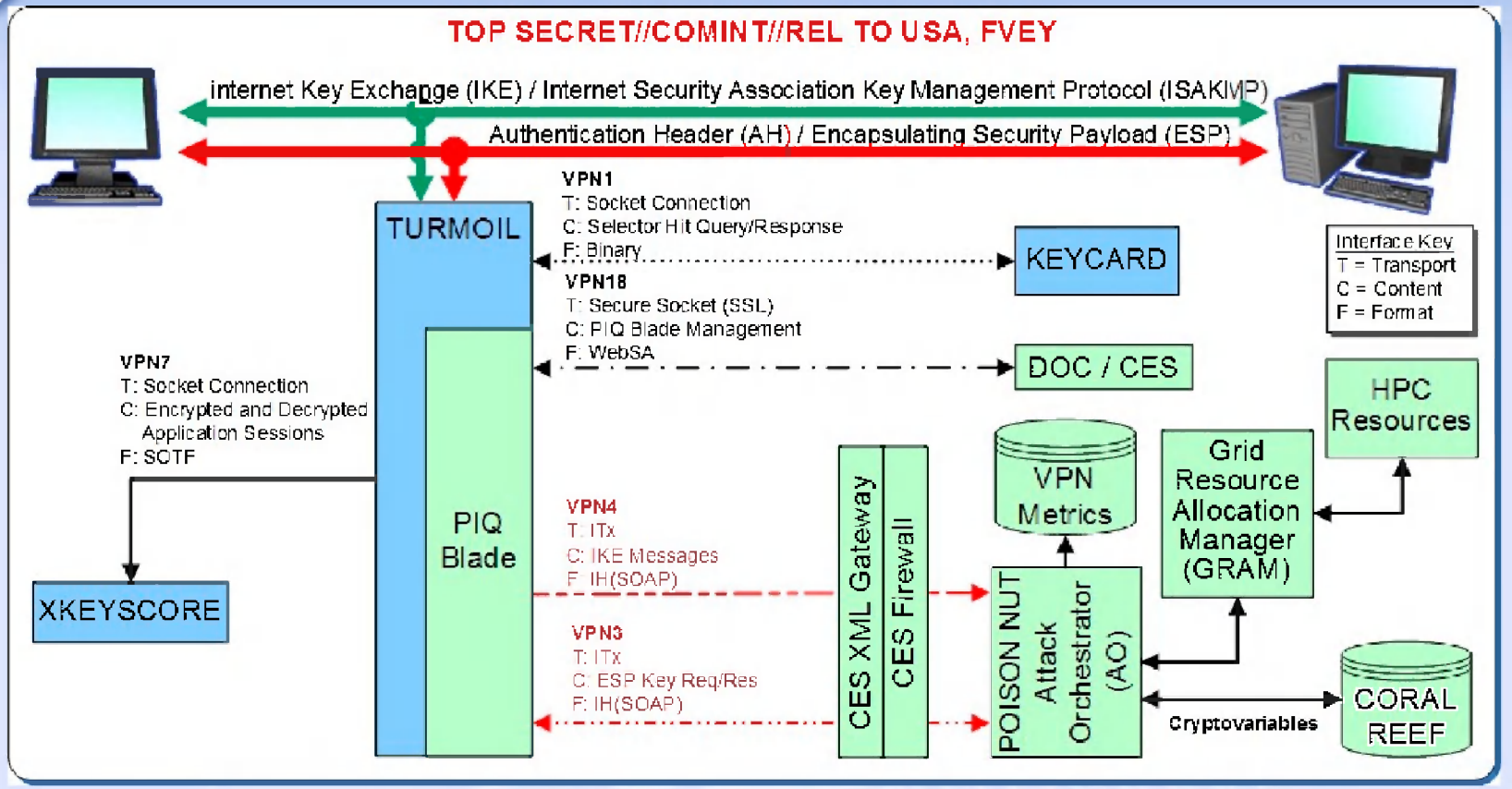


Dataflows and Interfaces - Analyze



- (U//FOUO) KEYCARD IP Target Action must be *ANALYZE*
- (U//FOUO) Full-take of IKE/ESP Sessions.
- (U//FOUO) No Analytic at this time

Dataflows and Interfaces - Survey

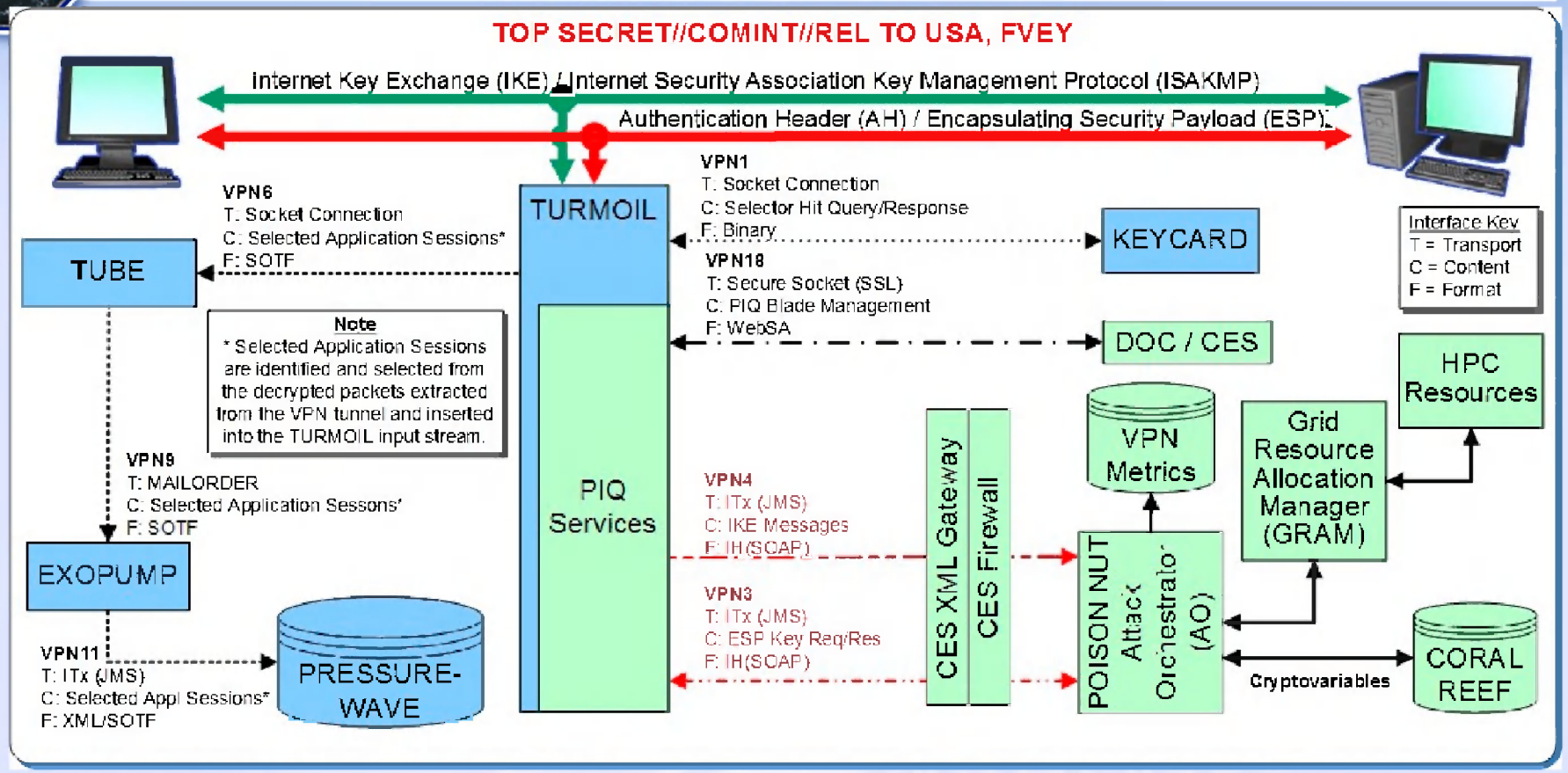


- (U//FOUO) KEYCARD IP Target Action must be *TRANSFORM* & *SURVEY*
- (TS//SI//REL) Candidate Sessions for Decryption include BME:

  vpnID = “08000000-0000-0000-0000-000000000001”
- (TS//SI//REL) Decrypted Sessions include BME:

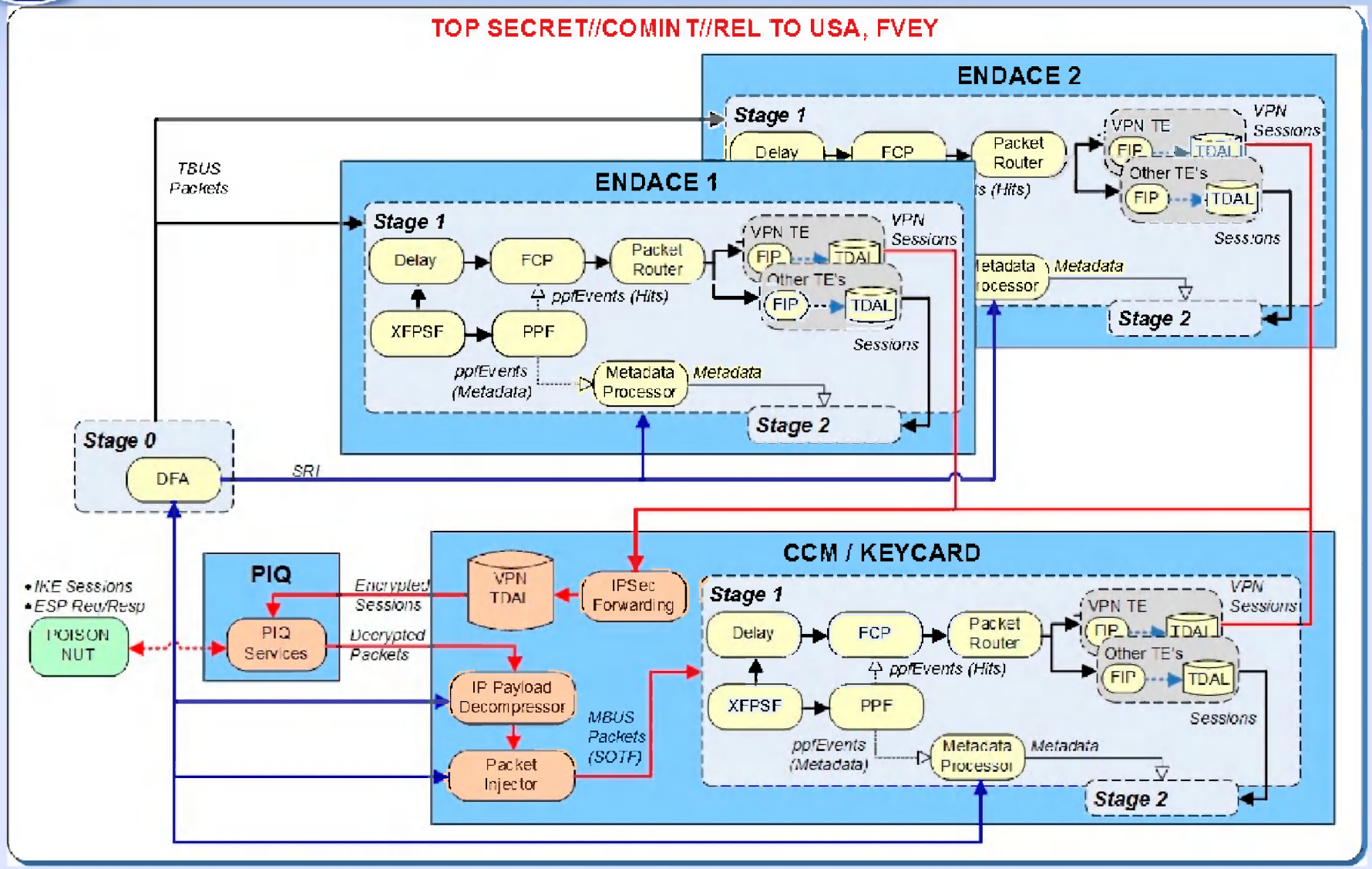
  vpnID ≠ “08000000-0000-0000-0000-000000000001”

Dataflows and Interfaces - Transform

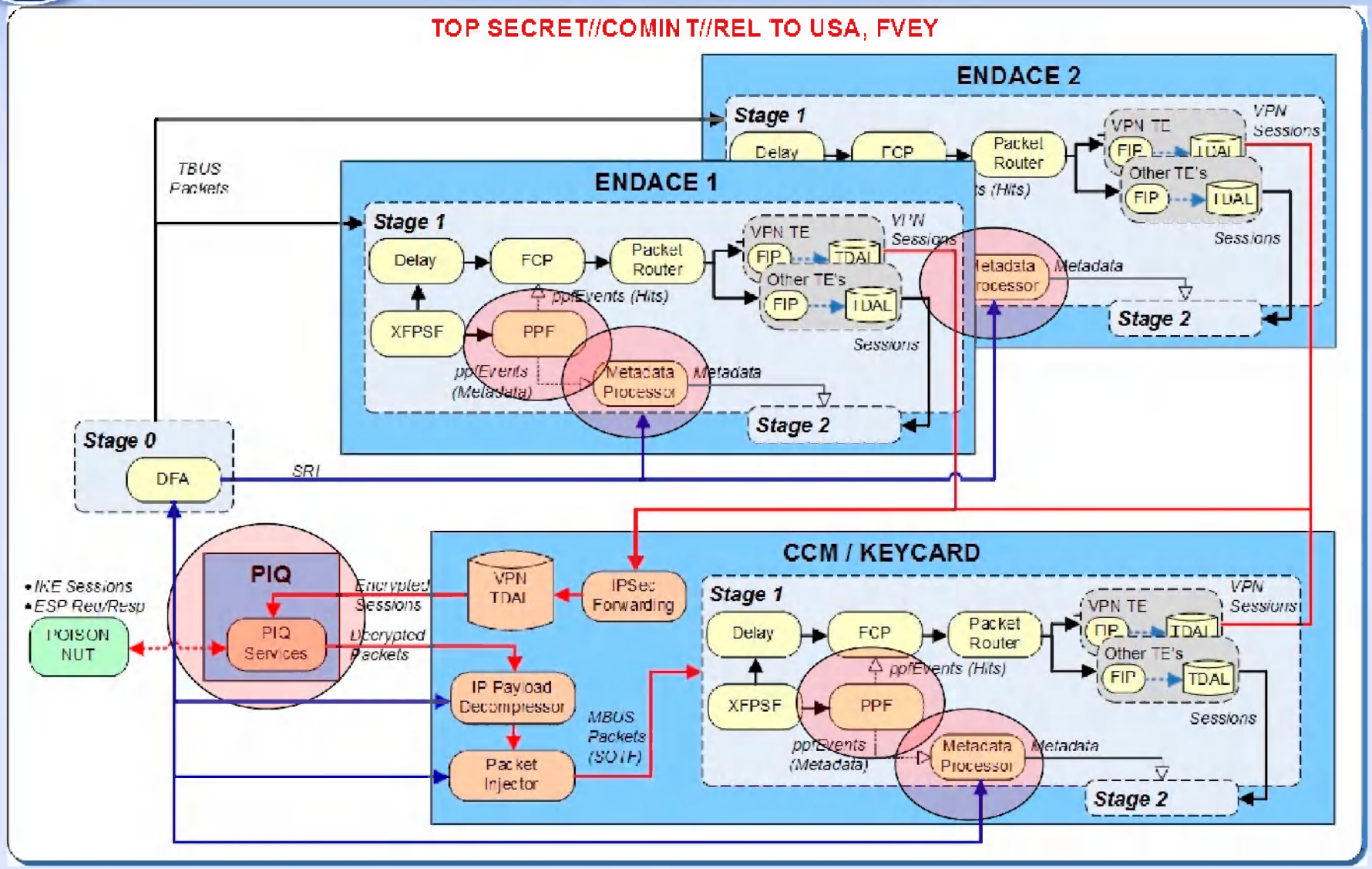


- (TS//SI//REL) PIQ Blade provides PIQ-Services, PICARESQUE ECI Compartmented
- (TS//SI//REL) Transform is Sanitization of Decrypt
- (S//SI//REL) VPN **AH/ESP** Session Transform capability is not available in Spin 12
- (U//FOUO) KEYCARD IP Target Action must be ***TRANSFORM***
- (TS//SI//REL) Decrypted sessions have BME vpnID ≠ "08000000-0000-0000-0000-000000000001"

VPN on Dell LPT

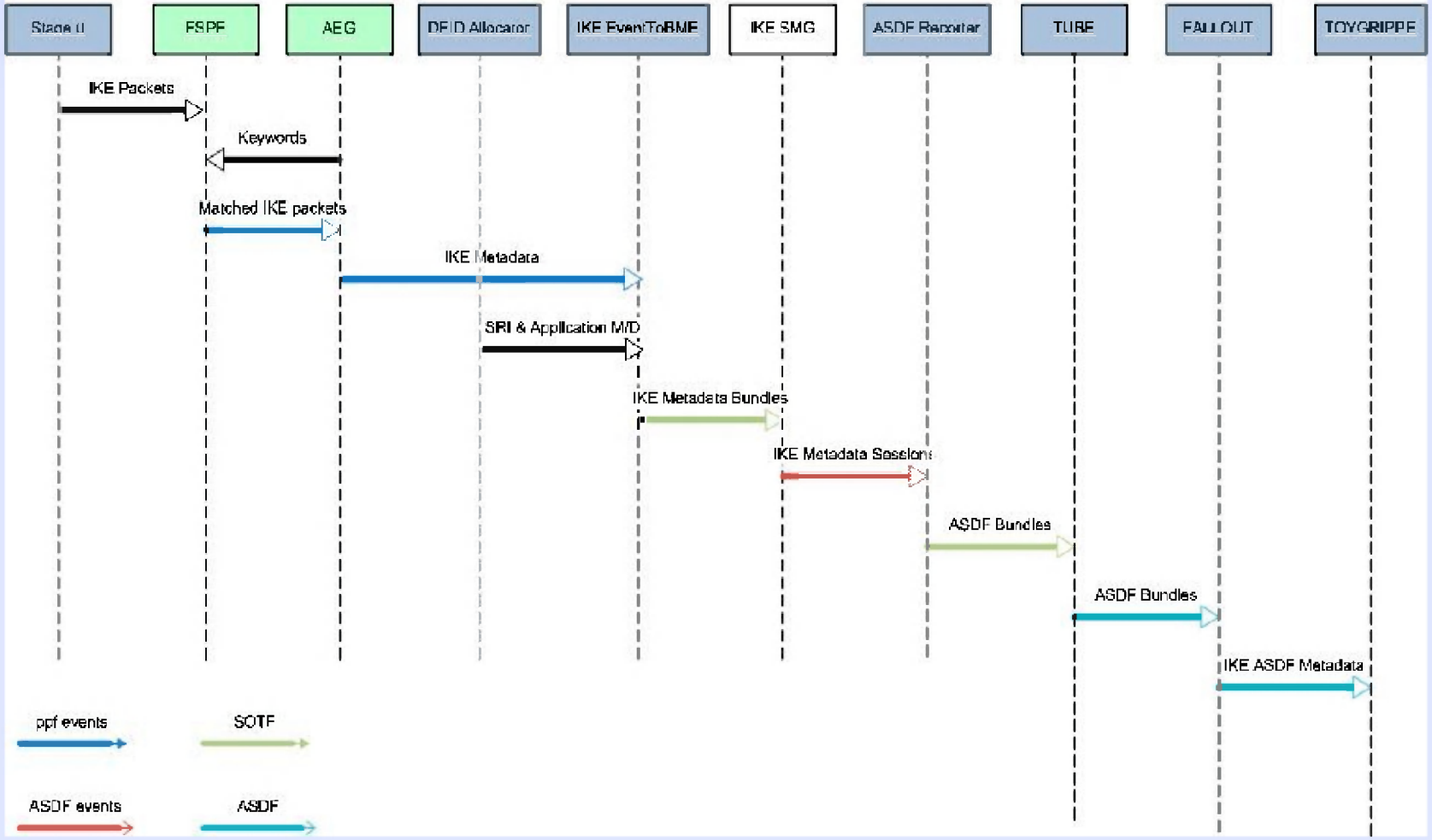


VPN on Dell LPT



Sample stats : 14-22 Oct 2009

System	KeyRequests	KeyResponses	KeyNotRecovered	Packets Decrypted
MHS_DEV	8076	0	0	0
MHS_LIVE	26501	12200	0	8041883
MHS_LPT	1725	0	0	0
SMK6	43087	4755	0	1413532

IKE Metadata Sequence

TOP SECRET//COMINT//REL TO FVEY