Department of Defense
PKI Use Case/Experiences

PKI IMPLEMENTATION WORKSHOP

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DoD Public Key Infrastructure

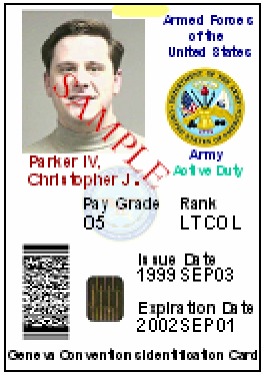
Agenda

- ~~Current Statistics~~
- Program Enhancements (Otherwise knows as lessons learned…)
- New Milestones for PK-Enabling
- FIPS 201 Challenges

DoD Public Key Infrastructure

Current Statistics…

- Common Access Cards (CAC) Issued – 10 M
  - More than 90% of target population has a **CAC**
  - 500,000 **software certificates** being used
    - 98% of DoD web servers have certificates



SAMPLE

Armed Forces of the United States

Parker IV, Christopher J.

Army Active Duty

Pay Grade 05

Rank LTCOL

Issue Date 1999SEP03

Expiration Date 2002SEP01

Geneva Conventions Identification Card

- PKI Certificates issued on NIPRNet – 22M+
- PKI Certificates issued on SIPRNet - 10000
  - All Software certificates
  - NSA is currently working on enhancements to the CAC for its use on SIPRNET
- Other holders of DoD PKI Certificates
  - Intelligence Community
  - CCEB Nations (5-Eyes)
- **Typical CAC issuing time with PKI Certificates**
  - **12-15 minutes**
  - **As many as 20,000 in a day**

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Program Enhancements

Robust Certificate Validation Service

- **<u>Issue</u>:** Real-time certificate validation needed to minimize bandwidth impact
- **Field RCVS Nodes**
  - **Mechanicsburg**
  - **San Antonio**
  - EUCOM
  - PACOM
  - CONUS (2-TBD)
  - SIPRNet
- **Operational Issues**
  - CRL Size
  - Rollout of OCSP Plugins

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Non-person Entity Certificates (i.e., Device)

- **Issue**: Need to Extend PKI to support a net-centric environment by enabling recognition and authentication of those entities that operate on/within our networks.
- Currently Developing
  - System Requirements Spec
  - Concept of Operation (CONOP)
  - Authoritative Naming Spec
- Develop Authoritative Naming System
- Develop Registration Processes & Controls
  - Certificate Expiration Notification
  - Determine Types of Devices To Be Supported
- Develop Device Certificate Profiles
- Implement Support for Certificate Request Protocols (HW & SW)
- Field CAs for NIPRNet and SIPRNet
- Continue To Evolve PKI to Support Future Devices

Windows Domain Controller Certificates

- **Issue**: Need to support smart card logon (with CACs) in a Microsoft Network Environment
- Develop Policy
- Design Certificate Issuance Process and Profiles
- Establish Subordinate CA for Domain Controller Certificates
- Support for SIPRNet

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Automated PKI Monitoring

- **Issue**: Need capability to remotely monitor performance of key infrastructure components
- Develop Base Monitoring Functions
- Add Monitoring of Red Hat CMS
- Add Monitoring of Auto Key Recovery
- Auto Local Registration Authority Application
- Field at JITC
- Field at Chambersburg
- Field at Denver

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Government Control of PKI Applets (aka HAPKI)

- **Issue**: Need for the DoD to acquire control of the PKI Java applets that are downloaded to the CAC for performing PKI functions
- Develop CONOP
- Develop System Requirements Specification
- Design CAC To Support Multiple Global Platform Security Domains
- Design CAC To Only Accept Government Signed Applets
- Develop Applets Under Government Control and/or Review
- Establish Mechanism To Sign Government Applets and Load CACs
- Develop CAC Proof-of-Possession for IP Issued Certificates
- Relocate PKI Sensitive Functions From CAC Infrastructure To The PKI Infrastructure

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Bulk Revocation by Components

- **Issue**: DoD Components require a capability to efficiently revoke large numbers of certificates
- Develop Prototype
- Deploy in Operational Environment
- Develop Federated Database
- Deploy in SIPRNet

Citizenship Information

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- **<u>Issue</u>**: DoD relying parties have a requirement for citizenship information in certificates
- Determine Owner of Citizenship Information
- Determine Source of Citizenship Information
- Determine Usage Requirements for Citizenship Information
- Design System for Hosting Citizenship Information
- Implement Citizenship Information
- Develop Training for Collecting Citizenship Information

DoD Public Key Infrastructure

Architecture Improvements

- Design and Implement Improvements To The Overall Architecture of The DoD PKI
- Architecture Improvements include:
  - Second Source Certification Authorities
    - Second Source Certification Authorities implement CA software from a second vendor to remove the dependency that the DoD currently has on a single vendor to support the DoD PKI
  - Automated Load Balancing for Issuance Portals (IP) and LRAs
    - Automated Load Balancing provides a load balancer between the CAs and the LRAs and CAC Issuance. By implementing a load balancing capability, LRA workstations and IPs could all be configured to access the load balancer, which would automatically route the request to an available CA

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Other Slated Enhancements

- Trust Relationships with External PKIs
- Group/role certificates
- Distribution of the DoD Root CA certificate to all subscribers and relying parties in a trusted manor
- Improvements of compliance audits
- Enhance archival process of DoD PKI objects
- Access to encrypted data
- Trusted Timestamp

New Milestones for PK-Enabling

Past PK-Enabling Guidance

- August 12, 2000
  - Updated DoD policies for development and implementation of a Department-wide PKI
  - Aligned PKI activities and milestones with those of the DoD CAC program
- May 17, 2001
  - Provided specific guidelines for the Public Key Enabling of Applications, Web Servers, and Networks for DoD
- May 21, 2002
  - Mandated CAC as primary token platform for PKI certificates
  - Adjusted milestone dates of two earlier memorandum

The Force is With Us

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New Milestones Set for PK-Enabling Within the DoD Community

- The DRIVING FORCE:
  - JOINT TASK FORCE - GLOBAL NETWORK OPERATIONS (JTF-GNO) - Responsible for operation and defense of the Global Information Grid (GIG) framework for DoD
- JTF-GNO Actions:
  - Issued a WARNING ORDER (WARNORD)
  - Issued a COMMUNICATIONS TASKING ORDER (CTO)
    - Directed compliance with specified tasks
    - Provided dates for compliance, options for waivers, and percentages for completion within tasks by various deadlines

All DoD Components Directed To:

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- Provide **lessons learned** from CAC/PKI implementation efforts
- Complete **PKI training** for all System Admins
- Implement **SCL** to the NIPRNet
- Develop an initial plan for **email encryption** and **digital signature** using DoD PKI
- Allow only **certificate-based client authentication** to private DoD web-servers using certificates issued by the DoD PKI
- **Verify** CAC readers, middleware, and ensure CAC users' required information and certificates are correct

FIPS 201 CHALLENGES!

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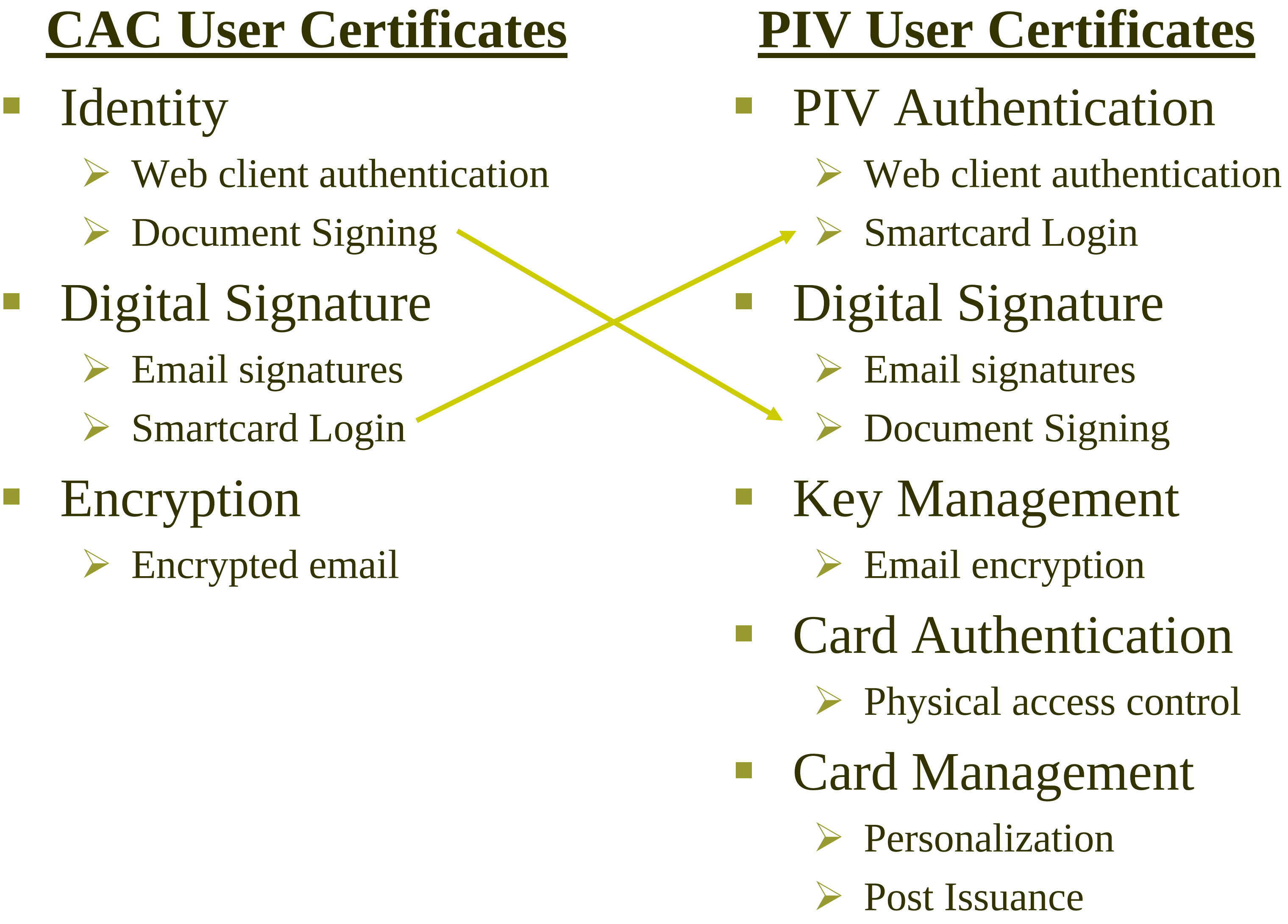
Comparison of CAC and PIV Certificate Usage



CAC User Certificates

- Identity
  - Web client authentication
  - Document Signing
- Digital Signature
  - Email signatures
  - Smartcard Login
- Encryption
  - Encrypted email

PIV User Certificates

- PIV Authentication
  - Web client authentication
  - Smartcard Login
- Digital Signature
  - Email signatures
  - Document Signing
- Key Management
  - Email encryption
- Card Authentication
  - Physical access control
- Card Management
  - Personalization
  - Post Issuance

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Alignment with Common Policy

- **Requirement**: January 1, 2008 - Legacy PKIs cross certified with the Federal Bridge have to assert common policy oids in certs
  - Aug 2005 - Established team to look at differences between DoD Certificate Policy and Federal Common Policy
  - Sep 2005 - Briefed Federal Bridge Policy Authority
  - Oct 2005 - Briefed Federal Certificate Policy Working Group
- Even though we are compliant with the Federal Bridge policy we aren’t compliant with the Federal Common Policy
- There are some **Significant** care-abouts
- We’re working with Judy Spencer and the federal community to harmonize policies and try to come to some mutual agreement for a way forward.
- Federal entities operating legacy PKIs need to perform a similar analysis

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Other PIV Challenges

- Certificate Profiles – changes to our existing ones
  - Issuer Signature Algorithm
    - Phased approach for changes
  - CRL Distribution Point
  - Subject Public Key Information
  - AIA
- Need additional certificate profile – Card Issuer Certificate
- Foreign National Identity Proofing
  - Within the US
  - OCONUS
  - Ties into our Citizenship initiative