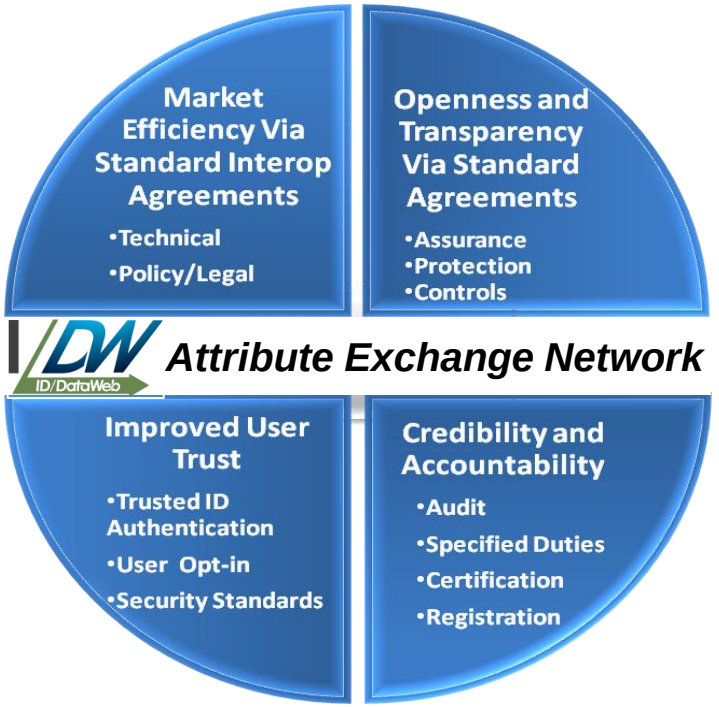
Online Identity Attribute Exchange
2013 - 2014 Initiatives

Agenda

- Overview
- AXN Services Framework
- ABAC Services
- Demonstration
- Summary



Business Challenge & Opportunity

Online Identity Is Broken

Lack of Business, Legal, and Technical Interoperability

- Password re-use degrades security and privacy
- Unknown cross jurisdictional legal risks and liability overhang

$1B+ Opportunity

Affordable + On-Demand + Verified User Attributes = Internet Growth

- Identity verification and interoperability are critical
- Reduce online global legal patchwork and friction/cost

Industry Driven Approach

Increased Use of Trusted Attributes Online with Minimized Friction

- User asserts and permissions binding of verified real world & online identities
- Interoperable technology and legal standards - predictable and enforceable at Internet scale

Trust Economics

Efficient Online Identity Ecosystems Drive Market Faster/Further

Reliability + Repeatability = Trust ⟹ Predictable Behavior ⟹ Metrics & Benefits

Use of Verified Attributes ⟹ Increases Trust ⟹ Decreases Friction

Quantitative Trust = ⬆ Revenue

Metrics	Benefits
↑ Speed	Expand Existing Markets
↓ Costs	Enable New Services
↓ Risk	Mitigate Fraud
↑ Transactions	Competitive Differentiation

Qualitative Trust ~ ⬆ Brand Value

↑ Perceptions of transparency, security and privacy

Criterion NSTIC Pilots

Pilot Program Outcome: Implement a user-centric online Identity Ecosystem and demonstrate an Attribute Exchange Trust Framework using the ID Dataweb (IDW) Attribute Exchange Network (AXN)

Project Approach:

- Demonstrate online credential and attribute exchange operations and features of an attribute exchange trust framework
  - User, AP, IdP, and RP interfaces and process/data flows
  - Legal, policy, and technical interoperability, security, and scalability
  - Business and market monetization models
  - Assessor roles and processes

Project Objectives:

- Simplify AP, RP, and IdP participation, deploy new online services and demonstrate asset monetization via the IDW AXN platform using:
  - Real-time AP online verification services
  - Out of band verification services – SMS to device, device IDs, biometric verification services
- Live user data from commercial and government RPs
- RP billing (monthly) and AP/IdP transaction/payment statements
- Commercial contracts and Terms of Service that transition pilots to commercial operations

NSTIC Pilot Use Case Scenarios:

- Basic Use Case scenarios will initially be limited to key identity attributes: Name, e-mail, Address, Telephone Number (NEAT) and sending one-time passwords via SMS to a mobile device
- Increasingly complex and advanced Use Cases will include additional attributes, interoperability between an OpenID or SAML credential, CAC/PIV card credentials, and identity linkage to end-user devices
- ***For each RP Use Case:*** Free market trial of verified attribute services for 180 days or 50,000 users, whichever occurs first

AXN Demonstration

Year End Progress Summary

- Tight Budget with Large Mission and Expanding Scope
  - Original schedule to move the AXN Ecosystem in line with NSTIC Principles was aggressive – ***disruptive strategy and "crossing the chasm"*** with identity federation
  - Migration completed to AWS with privacy enhancements
- AXN Value Proposition & Community Outreach is Impacting the Ecosystem
  - Important lessons learned from early adopter pilots
  - Well defined mission and federation use cases
  - Short term RP contractual hurtles are nearing conclusion
  - 20+ solution providers working to join the AXN and are adapting to AXN privacy and data minimization requirements
  - Device ID, Biometrics, ABAC and UMA requirements in 2014 will add more solution providers for advanced use cases
- Year 2 Pilots are High Value, Visible and May Enable Trust Frameworks
  - Strong federation value propositions for RPs will drive market adoption
  - Significant cross pilot collaboration
- Continued need for NSTIC and community support
  - More RPs and outreach to Communities of Interest

AXN - Enabling IT & Other Values

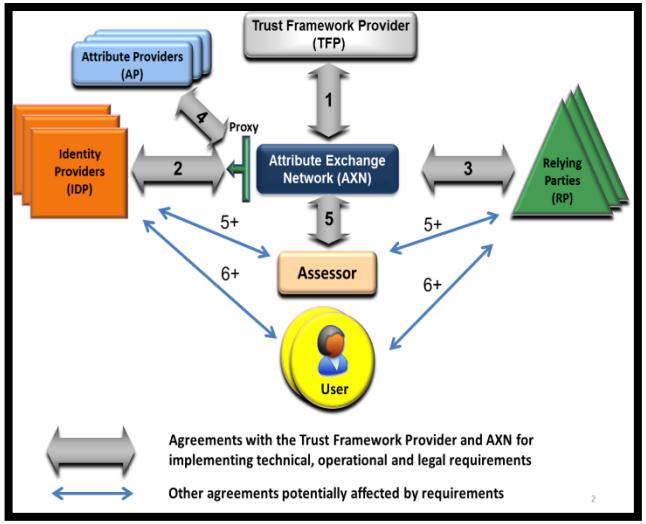
- Web SSO using a known login
  - ***Credential Federation –verified attributes are used to <u>create new or bind to existing</u> user accounts***
  - Reduces drop off, account creation and maintenance costs
- Federated IDaaS – cloud transaction hub
  - Real-time commercial & authoritative attribute verification
  - IdP credential authentication federation (LOA 1 – 4) plus contextual trust elevation methods for sensitive transactions
- ***Neutral*** credential and attribute marketplace
  - Efficient, open, competitive exchange – best of breed and value
  - Free to users; lowers RP costs; a new channel for IdPs and APs
- Contractual and policy management hub
  - One RP contract to access competitive AP and IdP services
  - Standard agreements with flow down terms from IdPs and APs
- Privacy by design
  - User opt-in, User Management Console, and data minimization
  - AXN is a transaction proxy with no central data store of Pii

<u>NSTIC Guiding Principles</u>

- Privacy-Enhancing and Voluntary
- Secure and Resilient
- Interoperable
- Cost-Effective and Easy To Use

<u>OIX AX Trust Framework</u>

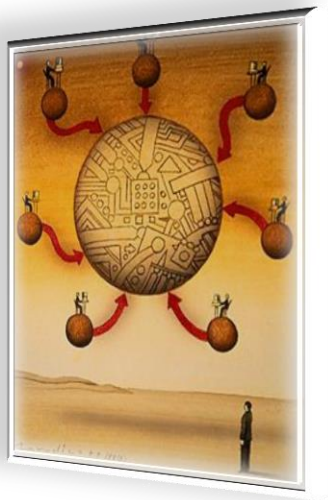
- Credential & Attribute Exchange
- Business, Legal, Technical, Privacy, Audit/Certification
- Industry Driven



Contractual & Policy Control Points

Federated Identity Use Cases

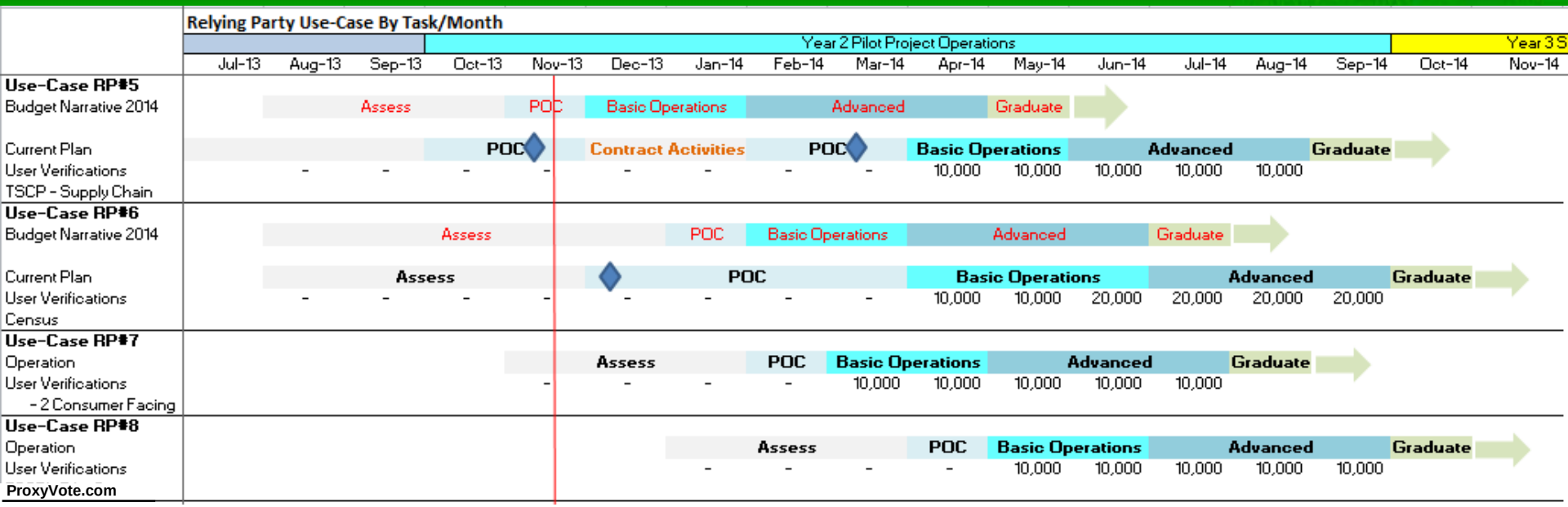
- **Federated User Login** - user credential of choice to create accounts (using verified, user-asserted attributes) and to enable SSO
- **Business Process Outsource Services** – community hubs for outsourced transaction services
- **Enterprise Attribute Based Attribute Control (ABAC)** – federated login using verified attributes for policy-controlled access to shared resources
  - Mitigate data leakage to control service, application and data level access
  - Managing content providers, content, and real-time distribution
- **Supply/Value Chain**– federated login (using many IdP credentials) to enterprise resources for employees, partners, and consumers
  - Rationalizing credentials for federated login
  - ABAC driven access to shared resources
- **New Federation Applications** – enhanced access, mobility, usability, and collaboration



The First Year NSTIC Use Cases

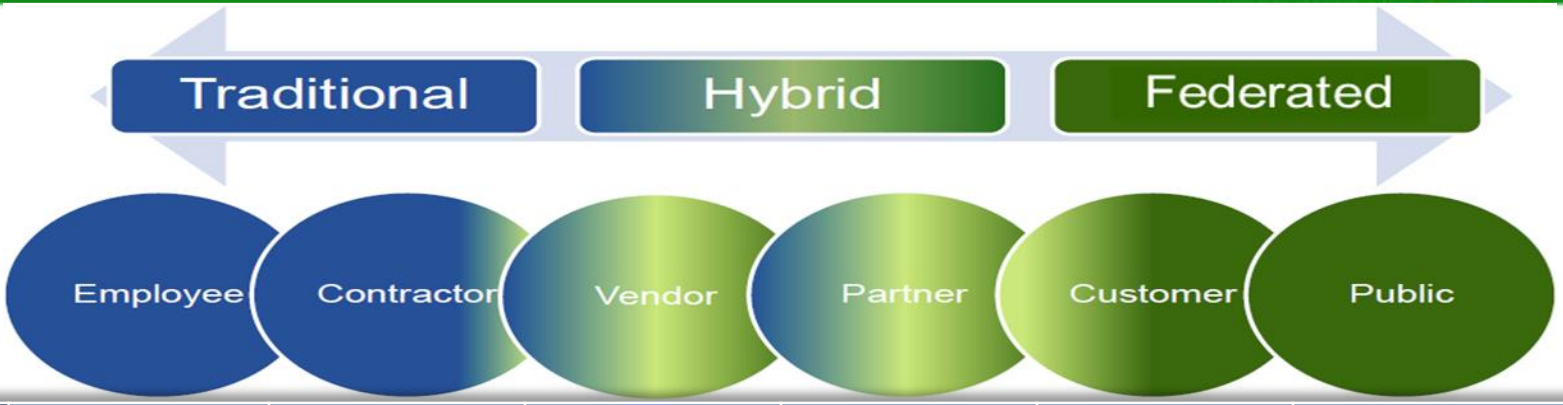
		Industry
	Broadridge Use Case	
		B to C
	RP Service: Fluent – Online Application Platform for Investor Communications	Investor Communications
	Industrial Enterprise Use Case (Pending Final Approval)	
		B to C, B to B
	RP Service: Various Service Sector Applications Corporate, Partner and Consumer Account Access	Multiple Market Verticals
	DHS/FEMA (MIT Lincoln Labs) First Responder Use Case	
		G to G, G to C
	RP Service: Account creation and login for the First USA disaster response collaboration portal	First Responders First USA Services
	eBay Use Case	
		B to C, C to C
	RP Service: Retail Seller and Buyer Account Creation and Login	Retail

Year 2 NSTIC Pilots



Relying Partner	Potential Use Cases
TSCP – Supply Chain	DFARS Case 2011-D039, *technical information* ***must have*** *"data labeling controls" and can only be accessed by approved credentials LOA 2 through LOA 4*.
Census	Q2/Q3 2014 Demographic Survey
Global Industrial Consumer Facing #2	Various Consumer-Facing Sites for Consumer Account Access
Broadridge #2	ProxyVote.com
Intl. Products & Services Co.	Supply Chain or Reseller Credential Federation
Health Information Exchange	Consumer account creation using federated IdP credentials with ABAC (backup)

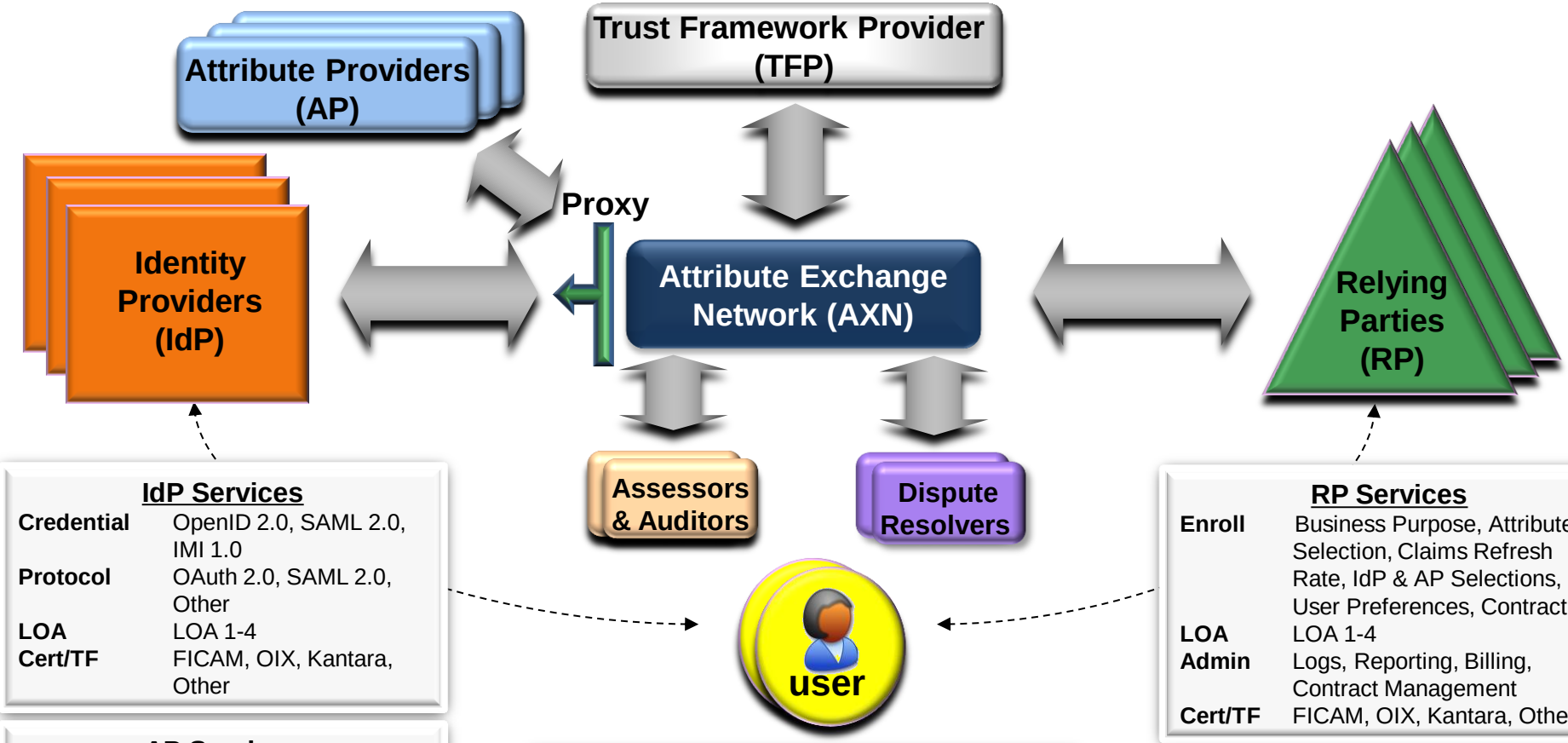
IdAM Constituency To Approach



Source:
Gartner Group

Life Cycle/ Constituency	Employee Services	Contractor Services	Vendor Services	Partner Services	Customer Services	Public Services
Purpose/Posture	Enable/Provide/ Manage/Collect	Enable/Provide/ Manage/ Collect	Enable/Manage/ Collect	Enable/Provide/ Support	Expose/Sell/ Service/Provide	Expose/Sell/ Service/Provide
Life Cycle Event / Options	Ent. Admin/ Change in Authoritative Source	Delegated Admin/Change in Authoritative **or Federated** Source	Delegated Admin/**Self-service/Federated Provisioning -SCIM**	Delegated Admin/**Self-service/Federated Provisioning -SCIM**	Self Service/**Social Identity (OpenID)/ Federated Provisioning -SCIM**	Self Service/**Social Identity (OpenID)/ Federated Provisioning -SCIM**
ID Store	Enterprise Directory	**Federated** Enterprise Directory	**Federated** Enterprise Directory/ **VDS**	**Federated** Enterprise Directory/ **VDS**	**Federated** Enterprise Directory/ **VDS**	**Federated** Enterprise Directory/ **VDS**
Authorization	Roles/Rules/**ABAC**	Sponsored Roles/Rules/**ABAC**	Roles/Rules/**ABAC /OAuth or SAML**	Roles/Rules/**ABAC /OAuth or SAML**	Roles/Rules/**ABAC /OAuth or SAML**	Roles/Rules/**ABAC /OAuth or SAML**
Authentication	Username/Pswd/ Strong Auth/ **Federate/ID Proofing**	Username/Pswd/ Strong Auth/ **Federate/ Adaptive Access/ID Proofing**	Username/Pswd/ Strong Auth/ **Federate/ Adaptive Access/ID Proofing**	Username/Pswd/ Strong Auth/ **Federate/ Adaptive Access/ID Proofing**	Username/Pswd/ Strong Auth/ **Federate/ Adaptive Access/ID Proofing**	Username/Pswd/ Strong Auth/ **Federate/ Adaptive Access/ID Proofing**
Audit	Access Cert./Reporting	Access Cert./Reporting	Access Cert./ Reporting/ Real-time Monitoring	Real-time Monitoring/ Fraud Detection	Real-time Monitoring/ Fraud Detection	Real-time Monitoring/ Fraud Detection

AXN Services Framework



IdP Services

Credential	OpenID 2.0, SAML 2.0, IMI 1.0
Protocol	OAuth 2.0, SAML 2.0, Other
LOA	LOA 1-4
Cert/TF	FICAM, OIX, Kantara, Other

RP Services

Enroll	Business Purpose, Attribute Selection, Claims Refresh Rate, IdP & AP Selections, User Preferences, Contract
LOA	LOA 1-4
Admin	Logs, Reporting, Billing, Contract Management
Cert/TF	FICAM, OIX, Kantara, Other

AP Services

Attributes	N, E, A, T, SS, DOB, Gender, Corp Verification
Quality	Refresh Rate, Coverage, Sources, Data Types
Physical	Device ID, BIO, Other
Pricing	Per Transaction, Per User Per Year, Annual License
Cert/TF	FICAM, OIX, Kantara, Other

AXN Services

Billing	Pricing and Analytics
Acct Management	Service Provisioning
Contracting	Policy Management
Marketing	Transaction Management
Registration	Operations and Security
Logs, Reporting	Administration
Audit	User Interface

User Services

Attributes	Not Stored In AXN, Self Asserted, Data Minimization
PDS	PII, Preferences, ABAC, Encrypted, External Store
MAX	User Only, Personal Control and Security, Acct Linking, Federated Access Via RP

AXN Providers and Roles as of 12/31/13

Role	Provider on the Exchange	Description of Service
Identity Providers	**LOA3+:** Lockheed Martin, Raytheon, Boeing, Verizon, Symantec* **LOA 1:** Google, AOL, Facebook, Linkedin*, Amazon*, Salesforce	Credential Authentication Services
Attribute Providers (PII Verification)	Experian, LexisNexis, Pacific East, Enterprise LDAP/Directories*, Equifax*, Thomson Reuters*	Traditional validation of user PII (Name Address, Telephone, BOD, and Social)
Device ID	Telesign, Wave, Payfone*	Identification of the access device via the PIN, TPM chip, software download, or other means
BIO metrics	Daon, CGI*	Service are capable of voice, face and other like recognitions at varying degrees of sophistication.
Signature/ Key Stroke Dynamics	Kaje, Autheware*	Alternative signature capture
Document Proofing	ID Checker*, Experian*	Confirms the government issued document is legitimate and matches the user PII

* We have not finalized testing the integration of this service.

AXN Trust Elevation Services

Device Attribute Verification Services

- Mobile Device Verification Services
  - Users log in using a trusted mobile device registered and managed on the AXN via MAX
  - Secure device ID service ensures user RP accounts can only be accessed using a trusted device
- Computer Verification Services
  - Over 600 million computers with Trusted Platform Modules (TPMs) can be managed via the AXN
  - Windows 8 requires TPMs on a wide range of devices from desktops to smart phones

Biometric Attribute Verification Services

- Cloud-based Voice, Retinal, Photo and Fingerprint Verification Services
  - Daon, CGI, and others
- Integration with Authoritative AP Services
  - e.g., driver license attributes and photos

ABAC Services

- Fine-grained Policy Authorization Services
- UMA Services to Dynamically Control Access to RP Data and Services

Verified Attribute Claim	AXN Trustmark Services			
	TMI	TM2	TM3	TM4
PII	Name+ Email+ Address+ Telephone (NEAT)	TMI + DOB	TM2 + SSN4	TM3 + SSN9
Device	PII+ SMS PIN + IPSEC	TMI + Device	TM2 + MDM	TM3 + GEO
Biometric	None	PII+ Device + Voice (Bio1)	TM2 + Bio2	TM3 + Bio3
PKI Credentials	None	None	PII+ Device + PKI	TM3 + Biometric

Low — Cost — Higher

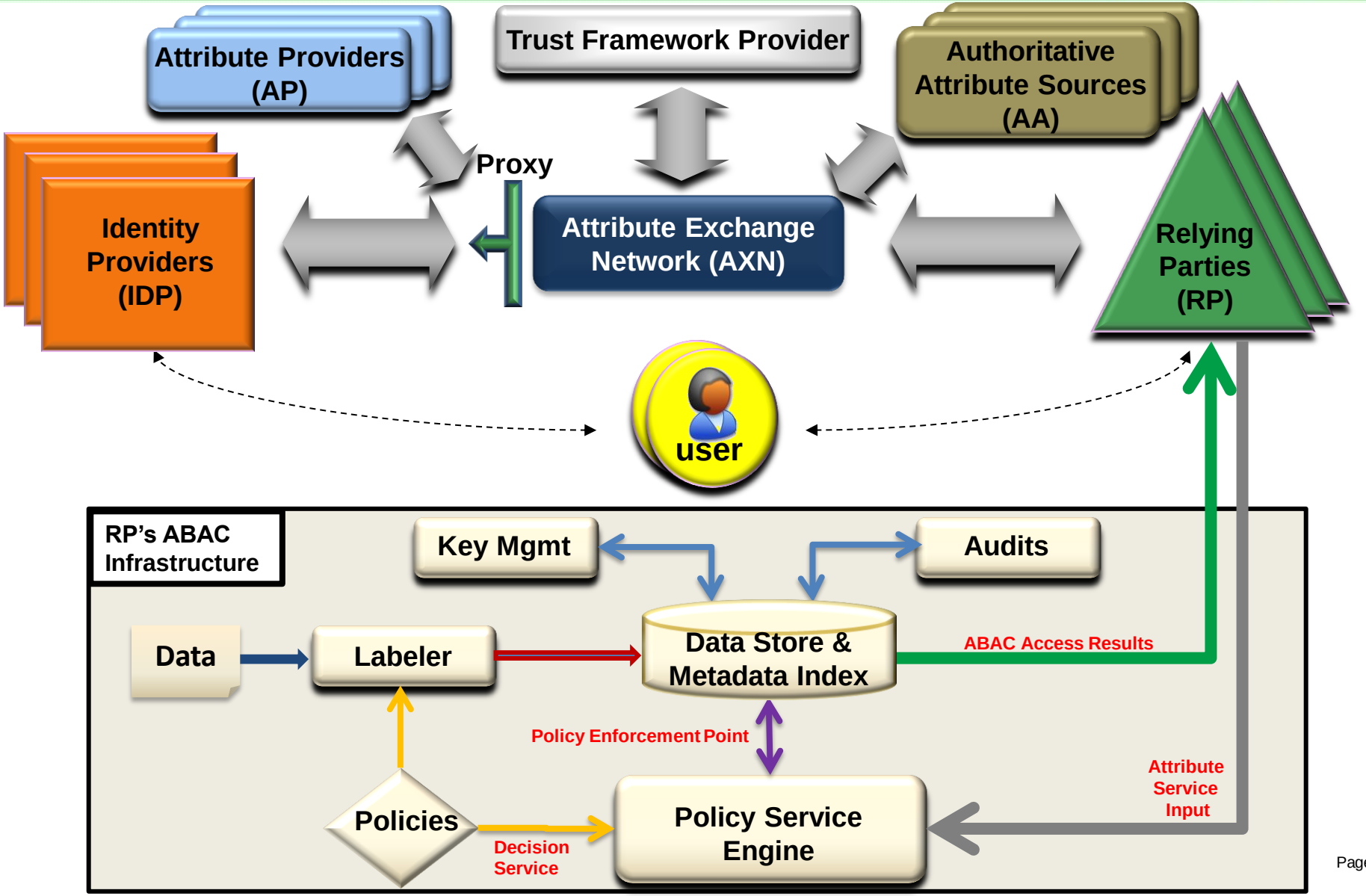
Low — Cost — Higher

Criterion-FCCX-03

AXN Business Services

- **Credential Transaction Management**
  - IDP authenticates user credentials as a service for RPs on the AXN
  - RP credential requirements for a given LOA (e.g., 1 – 4), type (e.g., SAML, OpenID, IDI), and trust framework
- **Attribute Verification and Claims Management**
  - RPs designate which attributes they required from users
  - User asserted, verified attributes and claims are shared with RPs with user permission
  - Device ID and biometric attributes are verified as required for RP authorization
- **Preference Management**
  - RPs designate preferences for users when interacting with the RP service
- **Attribute Based Access Control (ABAC)**
  - RP policy controls limit user access to resources based on verified, user-asserted attributes
- **User Managed Access (UMA)** http://invis.io/NYN0E4JZ
  - UMA services enable users (as resource owners) to control protected-resource access by requesting parties
  - Resource owners can manage and delegate resource sharing based on ABAC

AXN - ABAC Ecosystem



General Lessons Learned

- RPs are the customer, and will drive market requirements, adoption, and policy controls.
- Online retailers may not be early adopters of login with federated credentials due to concerns about user drop off rates; will likely be strong adopters as federation matures.
- Emerging Trust Frameworks are being driven by Communities of Interest (COI) who seek market operational efficiencies through business, legal, technical and policy interoperability.

- Credential federation requires policy changes to enable significant security, user experience (SSO and account creation), and business benefits.
- Current IdP and RP business practices do not always conform to FIPP's, and need to be managed.
- A rigorous Privacy Evaluation Methodology (PEM) implementation resulted in significant benefits
  - AXN technical and architectural enhancements
  - Privacy protective enhancements as core messaging in AXN marketing strategy
- RP risk mitigation strategies (for a required LOA) lack consistency
  - Emerging user-centric trust elevation technologies are scalable, cost effective and interoperable.
  - Trust Marks could be used to objectively promote confidence in various combinations of authentication methods, verified user attributes, and attribute claims from device identities, biometric technologies, etc.
  - It would be helpful to map these risk mitigation methods to NIST SP 800-63.

Contractual Lessons Learned

- Traditional AP compliance policies have been modified to support products that DO NOT provide PII back to the AXN. Items we have negotiated
  - Out of the AP contracts:
    - System security requirements for RPs
    - Auditing of RPs systems and records for PII usage
  - In the AP contracts:
    - Knowledge of the RPs is mandatory for the APs, however the user's relationship with the RP will be kept private

- Consolidating the terms of dozens of contracts and lawyer communities into a single agreement for the AXN has proven to be challenging
  - Consider an 80% solution where specific products used by the RP have their own unique addendums even if there are overlaps
  - Trust Framework providers will likely influence the contracting process

Summary

- 2013 - 2014 AX initiatives will demonstrate how to…
  - Improve User online experience, increase User trust and transaction volumes, and reduce related costs
  - Protect and extend customer relationships online
  - Manage organizational risks with cost effective solutions
  - Reduce online fraud and identity theft while enhancing brand
- Neutral market platform for identity credential federation and attribute exchange
- Online attribute monetization platform – unencumbered by legacy business models, regulations and technologies