Enterprise Dynamic Access Control (EDAC)

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Outline

Access control background
Access control lists
Groups
NIST RBAC standard

SEAC RBAC
Customer furnished and maintained assets
How it works
Product overview
Interoperability

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User name or unique identifier associates access to resources

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Groups

User associated to a group and group associated to resources

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Essentials for resource access

Necessary requirement to access resources:

• Not a user name
• Not a unique identifier
• Not a group association
• List of user characteristics

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What are user characteristics

User characteristics (user profile)

• Where client works: organization
• What security credentials: clearance
• What pay category: pay grade
• What branch: service
• What vocation: job function
• etc
Examples of User Profiles

- User profile is a unique list of user characteristics.
- A client may have more than one user profile.
- User attributes should be compiled from an authoritative data source(s) on a real-time basis.

<table>
<thead>
<tr>
<th>Categories</th>
<th>COMPACFLT</th>
<th>USNR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization:</td>
<td>CPF N65</td>
<td>Naval Intel</td>
</tr>
<tr>
<td>Clearance:</td>
<td>Secret</td>
<td>Top Secret</td>
</tr>
<tr>
<td>Paygrade:</td>
<td>DP3 02</td>
<td></td>
</tr>
<tr>
<td>Service:</td>
<td>DoD DoNR</td>
<td></td>
</tr>
<tr>
<td>Function:</td>
<td>Program Manager</td>
<td>Intelligence</td>
</tr>
</tbody>
</table>

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Impact on resource access

The following can affect resource access:

• Transfer to another organization
• Loss of security clearance
• Change in job title
• Job promotion

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Problems with ACLs and Groups

Maintaining an updated ACL or group is time consuming.

Situation worsens when:

• Number of users increase
• Number of resources increase

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NIST RBAC compliance

Because of ACL and group limitations:

The National Institute of Standards and Technology (NIST) RBAC is an American National Standard - ANSI INCITS 359-2004 (approved 19 Feb 04)

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Definitions:

**Users and Roles:** “…access decisions are based on the roles that individual users have as part of an organization.

"Access rights are grouped by role name…"

**Role hierarchies:** "Under RBAC, roles can have overlapping responsibilities and privileges;

**Roles and Operations:** "Organizations can establish the rules for the association of operations with roles."
Access control comparison

How access control solutions can simultaneously evaluate user characteristics.

<table>
<thead>
<tr>
<th></th>
<th>Simultaneous evaluation of multiple object characteristics &amp; environmental hierarchies</th>
<th>Simultaneous evaluation of multiple object characteristic &amp; environmental hierarchies</th>
<th>Real-time detection of object characteristic changes, thus affecting resource access</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACLs</td>
<td>0</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Groups</td>
<td>1</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>EDAC</td>
<td>Unlimited</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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Customer meta-database background

Relational database data duplicated on a directory service.

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Customer meta-database specifications

- Customer meta-database
- LDAP v 3/DSML directory
- X500 class objects
  - organization
  - organizationalUnit
- Scalable
  - unlimited entries
  - modifications allowed
- Structure designation
  - domain
  - reference category
  - values
- Structure
  - flat
  - hierarchal
- Maintained
  - local commands
  - regional commands

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Customer meta-database domain

Domain consist of global and regional directories.

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User Profile Manager

User selects a profile to determine resource access.
Mgmt constraints on user profile selections

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How the EDAC works

Step 1:
Resource manager establishes a set of conditions to access a resource.

These set of conditions represent a resource profile.

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How the EDAC works

Step 2: An effective RBAC requires real-time creation of user profile(s) from authoritative data source(s).

Customer Meta-Database

Customer User Profile Manager Interface

Structure Format Service

Customer Personnel Database

Reference Categories – Attributes
assignedCommand  N65
clearance        Secret
paygrade         GS3

User Profile
ou=N65, ou=N6, ou=CPF, ou=assignedCommand, o=CPF
ou=secret, ou=confidential, ou=fouo, ou=clearance, o=Enterprise
ou=GS3, ou=GS2, ou=GS1, ou=Paygrade, o=Enterprise

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How the EDAC works

Step 3:
The RBAC Rules Engine compares User and Resource Profiles to determine resource access.

User Profile
ou=N65, ou=N6, ou=CPF, ou=assignedCommand, o=CPF
ou=secret, ou=confidential, ou=fouo, ou=clearance, o=Enterprise
ou=GS3, ou=GS2, ou=GS1, ou=Paygrade, o=Enterprise

Customer Resource Database
- Project Tracker (resource)
- HR Service (resource)
- Payroll Application (resource)

Access token for Project Tracker

Repository Service

Project Tracker Resource Profile
ou=N65, ou=N6, ou=CPF, ou=assignedCommand, o=CPF
ou=secret, ou=confidential, ou=fouo, ou=clearance, o=Enterprise

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EDAC – Resource profiles

<table>
<thead>
<tr>
<th>Resource Roles for Project Tracker</th>
<th>Resource Profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest</td>
<td>CPF Guest</td>
</tr>
<tr>
<td></td>
<td>✓ COMPACFLT</td>
</tr>
<tr>
<td></td>
<td>✓ COMSUBPAC</td>
</tr>
<tr>
<td></td>
<td>✓ DoD</td>
</tr>
<tr>
<td></td>
<td>✓ COMNAVREG</td>
</tr>
<tr>
<td></td>
<td>Tuesdays 1700-2300</td>
</tr>
<tr>
<td>User</td>
<td>CPF N6 Users</td>
</tr>
<tr>
<td></td>
<td>✓ CPF N6</td>
</tr>
<tr>
<td></td>
<td>✓ GS12</td>
</tr>
<tr>
<td></td>
<td>Mon &amp; Thurs 0800-1300</td>
</tr>
<tr>
<td></td>
<td>Deny Contr Users</td>
</tr>
<tr>
<td></td>
<td>✓ CPF N6</td>
</tr>
<tr>
<td></td>
<td>✓ Secret</td>
</tr>
<tr>
<td></td>
<td>✓ CONTR</td>
</tr>
<tr>
<td>Administrator</td>
<td>CPF Admin</td>
</tr>
<tr>
<td></td>
<td>✓ CPF N65</td>
</tr>
<tr>
<td></td>
<td>✓ TS</td>
</tr>
<tr>
<td></td>
<td>Mon &amp; Thurs 0800-1300</td>
</tr>
<tr>
<td></td>
<td>Deny CPF N65 Admin</td>
</tr>
<tr>
<td></td>
<td>✓ CPF N65</td>
</tr>
<tr>
<td></td>
<td>✓ CONTR</td>
</tr>
</tbody>
</table>

- Resource roles
- Allow & Deny profiles
- Exact and subtree conditions
- Time constraints

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During INFOCON B

• Pre-configure conditions under each security level.
• RBAC Rules Engine evaluates only conditions for prevailing security level.

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EDAC – Model

EDAC standard initiative:

• Interchangeable modular access control components
• Minimum salient features
• Protocol between components
• Standard tie-ins between customer assets and access control system

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EDAC - Model

Customer furnished and maintained assets

Enterprise Dynamic Access Control (EDAC)

EDAC Process
(A) Administrative Service - establishes resource containers, CMD referrals, RM accounts.

Repository Service

A1

Administrative Service

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EDAC - Model

Customer furnished and maintained assets
- Customer Personnel Database
- Object Profile Manager Service
- Customer Meta-Database (CMD)
- Environmental Interface(s)

Enterprise Dynamic Access Control (EDAC)
- Structure Format Service
- Rules Engine Service
- Condition Deprecator Service
- Condition Manager Service
- Repository Service
- Administrative Service

EDAC Process
(E) Customer Object profile manager Service
- object characteristic
- compilation, selection
- and formatting.

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EDAC Process
(F) Rules Engine Service - evaluates object and conditions to determine object resource access.
EDAC – Interoperability

EDAC interoperable among regions:

• Set conditional access for remote users
• Domain customer meta-databases
EDAC - Interoperability

Pearl Harbor: resource profile created for local resource access.

Resource Profile CPF
CPF N651
Top Secret
GS12

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EDAC - Interoperability

Pearl Harbor: local user profile is generated to access a local resource.

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Pearl Harbor: user and resource profiles are evaluated by rules engine to determine local resource access.

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EDAC - Interoperability

Pearl Harbor: A resource profile to allow remote users access to local resources.

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EDAC - Interoperability

San Diego: user profile generated.

Resource Profile SD
SD N651
Top Secret
GS12

Condition Manager Interface

Enterprise customer metadata

San Diego customer metadata

SD User Profile
SD N651
Top Secret
GS12
Developer

Pearl Harbor

DoD

San Diego

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EDAC - Interoperability

Pearl Harbor: San Diego user evaluated for Pearl Harbor resource access.

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San Diego: same user evaluated for San Diego resource access.

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