Enterprise Security Initiative Roadmap

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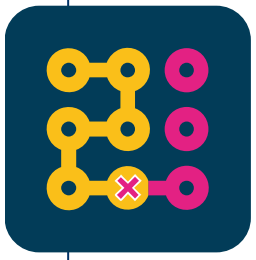
Two-Step Verification

What Does Two-Step Verification Provide?

Provides an extra layer of security to PJM's single sign on tools

Uses a password and additional information – a token

- Used by banks, government sites and some email providers



Prevents a breach even if a password is successfully compromised

Already in use with PJM's Account Manager application

How Does Two-Step Verification Work?

Triggered on logon from an unrecognized device

Uses a password and email token combination

- Validated email addresses become essential
- CAMs will be able to manage email domains (e.g., @pjm.com)

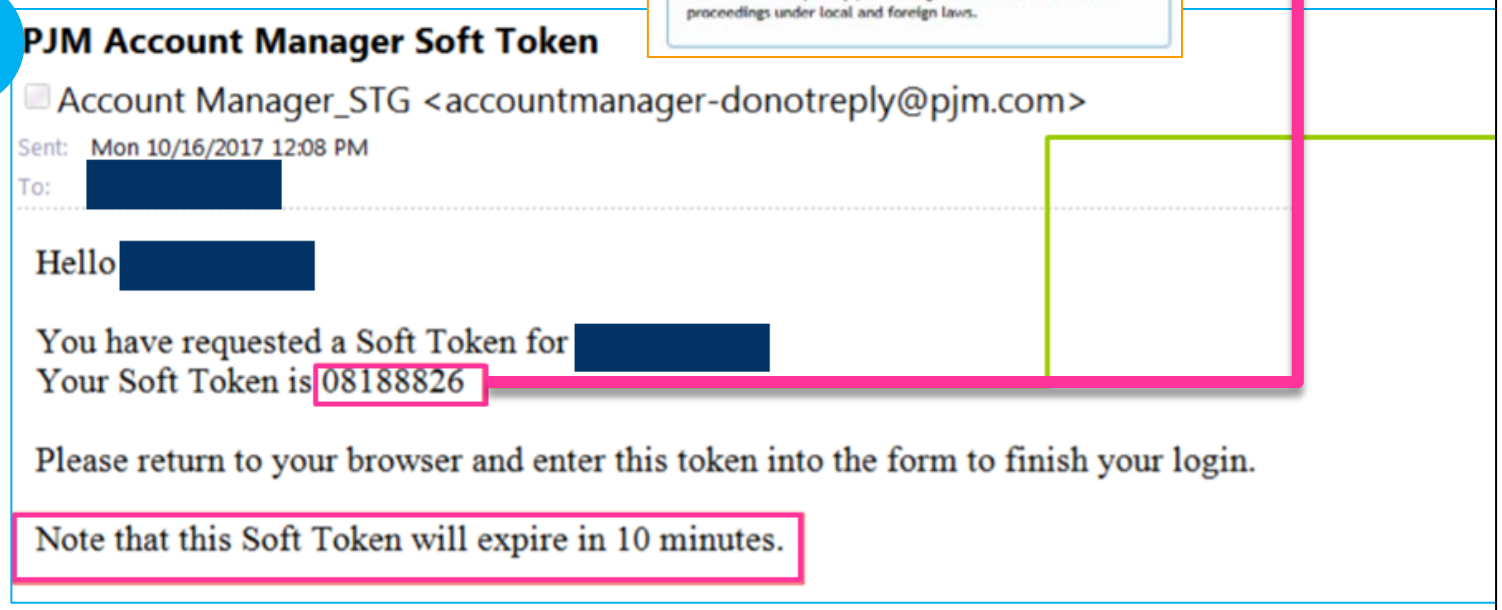
Leverages valid email addresses

- PJM will provide a means to manage email domains

Three Easy Steps

1

2



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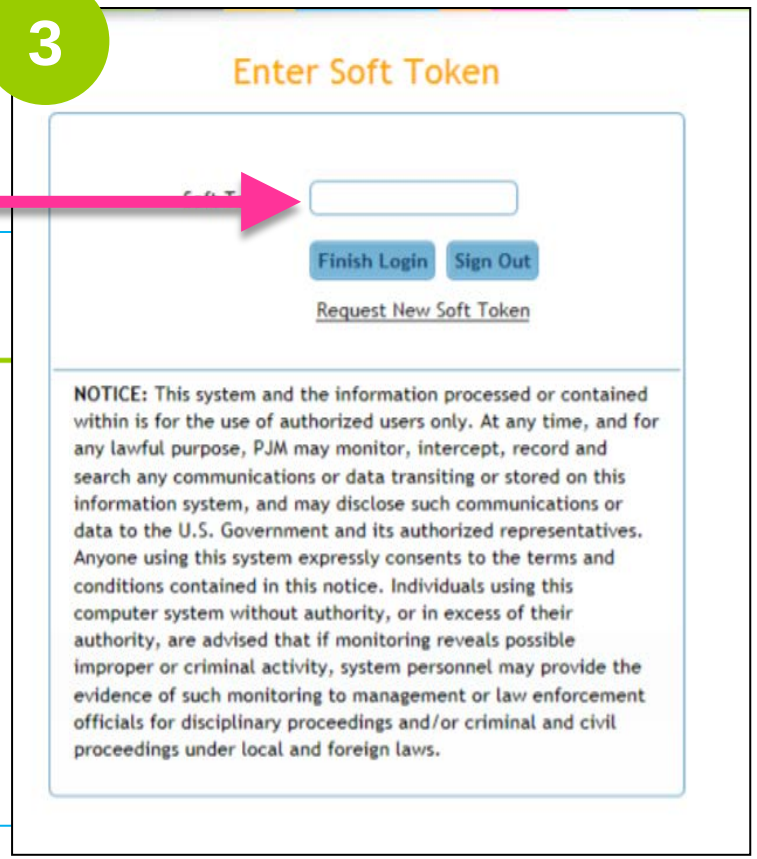


Post Implementation Updates

Key Stats:

- Logins since September 2018: 21000
- Logins with Two-step Verification: 6800
- Number of calls in first 2 days: 25*

Recurring themes

- Emails in junk folders
- Weren't expecting emails
- Too many accounts
- Details on impacts
- Too many emails

Next steps

- Redesign UI for clarity
- Continue working on SUMA

Recurring questions

When will the email get to me?

- It can take a few minutes
- An email is sent immediately you log in – no need to click on anything

Will I have to go through this again after a software upgrade?

- Yes. If the upgrade changes settings that are used to identify your browser including version, plugins etc.

More Details…

- There is an FAQ document on PJM.com

Appendix - Enterprise Security

Security Drivers

PJM's priority is to protect the accounts, data and information entrusted by our members

Critical infrastructure is a higher profile target

- Nation states are increasing their attacks.
- Password spraying has become an effective tool to compromise user accounts.

PJM recognizes member feedback must be incorporated into security approaches

PJM's Response to Cyber Threats

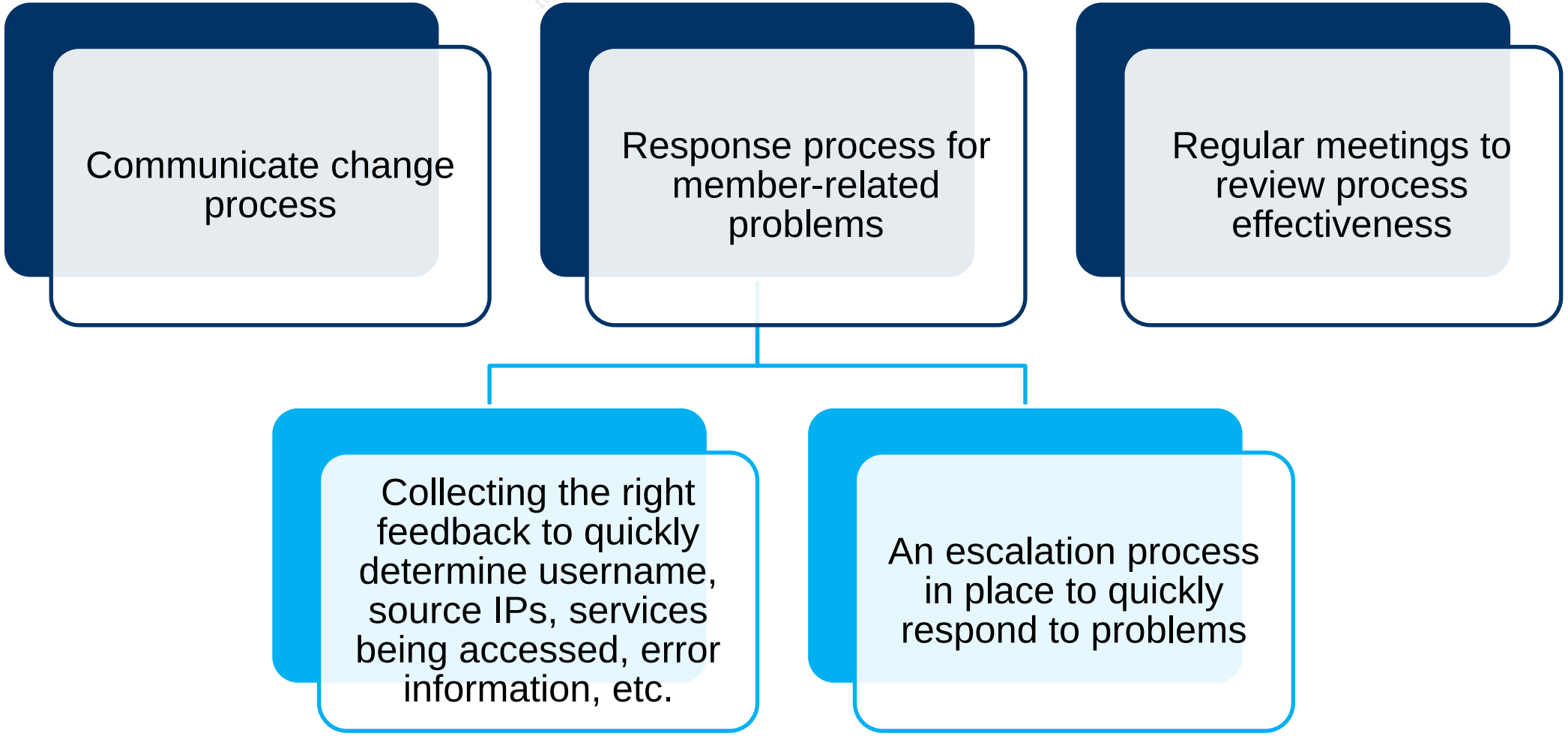
More restrictive cybersecurity controls

Block network traffic from outside the U.S. and Canada via Geo-IP blocking

PJM's Approach to Geo-IP Blocking

Analyze network traffic by country	Analyze the use of authenticated services by authorized user	Correlate service use against analysis of traffic by country
Build up whitelisting for valid, correlated network traffic	Monitor whitelisting	Successively block groups of countries based on risk/use

PJM's Support/Response Approach



What Has PJM Done to Date?

PJM has begun implementing Geo-IP blocking with:

- High risk countries
- Limited access to internet SCADA