Anticipatory Knowledge Delivery

PoC: Dr. Donna L. Cuomo
Associate Director,
Knowledge, Information & Collaboration Solutions

September, 2017
Themes for This Meeting

Knowledge Driven Enterprise - 2015

- KM in the Workflow
- Enable the Extended Enterprise
- Actionable Knowledge Intelligence & Resource Exploration
- Enhanced Products and Outcomes

Collaborative and Neighborhood Spaces

Anticipatory Knowledge Delivery: “Intelligent Digital Assistants”

Human-Machine Teaming: Calibrated Trust
Background: Three Year Strategy
Knowledge Driven Enterprise
People, Portfolio, Project, Organization Pages
MyMII – Customized Information, Resources at Your Fingertips

Easy access to well-stewarded high value knowledge assets
Retrieval Capabilities in Faceted Search, Query Refinement

Future: Customers  Ent Reqs  Web Sites ...
Most of the Work is Done for You

Integration across 13 of our business and knowledge systems
Grouping tools, guidance, and training by business process phase

FJ: MITRETools
Realization: Staff Need On-going Assistance with Knowledge and Business Processes

- Staff are not aware of all the capabilities
- 100s of applications, tools, features, processes, knowledge bases, techniques, actions, collaboration opportunities
- Consistent role-based onboarding was lacking
- 600 – 700 new employees per year
- It’s always evolving
- Staff are focused on doing and managing the work

Need Anticipatory Support: “Knowledge and Business Process Digital Assistants”!

https://plus.google.com/+Transformsolution
Past: “Navigate Work Program Processes and Onboarding” on Your Own
Past: Navigate Process Content and Knowledge Bases on Your Own

- Content overload
- Don’t know what exists
- 100s of pages of out-of-date project guidance
- Lack of “quick start” guides
- User experience not coordinated across the enterprise
- Inconsistent practices and processes
Anticipatory Knowledge Delivery

‘Anticipate’ your needs and deliver knowledge to help you

What are the possibilities for automating support to employees? Anticipating their knowledge and process needs? “Right information to the right person at the right time”
"Anticipatory Assistance" for Staff

Welcome to your new PL role! Here is how to be a PL at MITRE!

You have unfilled positions on your staff plan. Here is how to find staff!

Here is your Project Workbook! It informs you on previous relevant work.

Project team: It’s time to do the STC survey …

You are scheduled for 3 PL training sessions …

Goal: onboarding training < 8 hrs

ASSIST the staff throughout critical business processes and role onboarding

It’s time to capture your lessons learned! Here’s how …

Targeted and timely prompts

Pipeline Projects  Initiation  Initial Planning  Execution  Closeout
Anticipatory Knowledge Delivery (AKD) Concept

External Sources
- Sponsor budgets
- Legislation
- FFRDC-related

Internal Sources
- Databases
- Documents
- Applications
- Reports, Metrics
- Guidance

Sensor Layer

User profile: Role, status, topic/tags, activities, org, sponsor …

Congress just …

The status is …

Here is how you …

Recommended for you …

It’s time to …

Anticipatory action fires and pushes:
- Recommendations
- Action alerts …
- Process guidance
- Technical content
- Reminders

For enhanced insights

Business Logic

Trigger Event

Sponsor budgets
Legislation
FFRDC-related

Databases
Documents
Applications
Reports, Metrics
Guidance

Congress just …

Recommended for you …

It’s time to …

For enhanced insights
Anticipatory Knowledge Delivery (AKD) Use Cases Deployed in FY16 and FY17

- Business Process, Role-based Use Cases
  - New Employee
  - New Project Leader
  - New Staffing Need (PL)
  - New Portfolio Leader
  - Operational Portfolio notifications
  - Operational Project notifications
  - Operational HR notifications

- Anticipatory MII search pilot
  - Provide an additional panel of useful service information which matches your search term

- External alerts to MITRE senior managers
  - Sponsor budget changes/drift
  - Legislation that affects MITRE or other FFRDCs

The House passed the bill late last night. Below the article's text are highlights from a similar article from CQ:

The Hill
July 8, 2015

The House late Thursday passed a financial services spending bill that cuts funding for the Internal Revenue Service and the Securities and Exchange Commission. The measure was approved by a largely party-line vote of 239 to 185. In total, the bill provides $21.7 billion for various agencies and programs in fiscal year 2017, $1.5 billion less than this year's enacted level. IRS funding would be cut by $236 million and SEC funding would be cut by $50 million. The bill would cut FCC funding by $69 million and curbs the agency's ability to take action on its proposed set-top box rule until a study is finished.
AKD Concept Overview

Define the “trigger event” – anticipate staff has a need

“The Way We Work” Notifications Delivered over Time

“Bite size information”

“Show me all”

Event messaging system detects, acts upon, and persists the events

- Bite-size statement of “why” and “how to” quick start
- One per notification

- List of all notifications with “the why”, “the action”, and pointer to “how to”

Define the notifications, their timing and sequencing

New Employee
- Tag Yourself
- Declare your Tech Stature
- Find People Like You
- Join Communities

© 2017 The MITRE Corporation. All rights reserved. Approved for Public Release 17-3385
The AKD User Experience

The Way We Work

For New Project Leaders

Create Quality Outcomes

For a project to succeed, it is crucial to first understand the outcome the sponsor is trying to achieve. MITRE’s work for government sponsors should be designed to have significant positive impacts in helping achieve the sponsor’s mission or high-priority goals. The “SMART” formula below will help you get started in specifying the outcome(s) for your project.

- Check out the slide deck from the Outcome Writing Workshop
- Read the Project Leadership Guide section on “Framing Sponsor Outcomes”
- Watch the “Framing Outcomes” (1 hour) training video
- Ensure Alignment with your Portfolio Strategy

What is an Outcome?

Definition: A measurable and explicit achievement relevant to how the sponsor measures success. The outcome focuses on what the sponsor values, not on internal MITRE goals.

© 2017 The MITRE Corporation. All rights reserved. Approved for Public Release 17-3385

FJ: thewaywework
Use Case: Modernizing the New Employee Onboarding Experience
New Employee Onboarding Experience
pre-January 2016

▪ New Employees
  – Received approximately ~54 forms and 84 pieces of documents between the time they accept the position & the first day
  – Went through a ½ day orientation and released to their department
  – Computers were delivered to the office
  – Had 10-12 emails from Corporate level in their inbox on the first day (in addition to about 25 others)
  – Some centers had their own ½ to full day orientation

▪ Findings
  – ½ day wasn’t enough time
  – Weren’t using industry best practices
  – Sites had separate and inconsistent programs
  – Help Desk calls spiked with new employees every Monday
  – Dated website
New Employee AKD Use Case

Detect New Employees

Deliver Notifications over a Period of Time

Provide Enterprise Guidance in a New Format

Goal: Create a welcoming experience and provide a foundation for new hires to begin their career at MITRE

“The Way We Work” notifications

Event Messaging System
Detect, act upon, and persist system events

Week 1
- Tags
- Tech Stature

Week 2
- People Search
- About Me
- Project Search

Week 3
- Communities
- Handshake
- Discover
New Website for New Employees (Employee View and Manager View)

Enforces the notion that onboarding is a process that occurs over time
New Employee Experience – 2016 - Present

How does it look at a high level today

Applicant Response

1st Day Welcome

New Employee Orientation

2nd Day Welcome Team

First Week Integration

Integration Occurs 30 Days thru 180 Days…

Integration Occurs 180 days thru Year…

Staff “journey” at the heart, utilizes a combination of techniques

© 2017 The MITRE Corporation. All rights reserved. Approved for Public Release 17-3385
New Employee Feedback: What’s Been Working Well

- **High level survey results**
  - Feel welcomed on the first day
  - Very satisfied with orientation
  - Felt engaged during their first 30 days with their department, work programs & organization

- **Orientation**
  - Computer
  - MII / FastJump

- **First Few Weeks**
  - Ambassador emails
  - AKD Notifications
  - New Employee site

- **Over the course of the year**
  - People
  - MII & FastJump
  - Managers put in a lot of effort into onboarding

New Employee Help Desk Calls Down

New Employee Onboarding Satisfaction Up

HR Surveys: August 2016 to February 2017
New Hire Notifications

Total New Hires with Notifications Sent

As of 8/14/17

- Click rate is good (not all items would apply to all staff)
- Those that haven’t clicked yet also are not dismissing
- User can “read ahead” once on the guidance page
- Design: users didn’t always realize these were “actions”
- Design: we didn’t always have feedback on whether activity was completed
Use Case: Modernizing the Project Leader Experience
New Project Leader (PL) AKD Use Case

Detect New Project Leaders

Deliver Notifications over a period of time

Provide actionable & referential resources

• Initial assignment as PL in O*F
• 8 digit direct projects only
• Not previously named as a PL in the past 3 years, AND/OR
• Is new to MITRE within the past two years
• Later added additional PLs manually

“The Way We Work” notifications

- Understand MITRE’s FFRDCs and the MITRE Way
  Week One, Day 2
- Project Pages and Quality Outcomes
  Week One, Day 4
- Staff Your Project
  Week Two, Day 8
- Connect and Stay Informed
  Week Two, Day 10
- Highlights of the MITRE Way for Project Leaders
  Week Three, Day 15
- Strengthening the Core (STC)
  Week Three, Day 17
- Leadership Resources
  Week Four, Day 22
- Next Steps
  Week Four, Day 24
Drove a Project Leader Process Materials Update and Consolidation

New PL@M Site and Guide
Impact of New PL AKDs

- 180 PL participants received notifications as of July 2017
  - In May 2017, added 48 PL participants manually at MITRE < 3 years
- September 2016 emailed all PLs (604) and their managers (327) to introduce the pilot
- 336 hits/month on average to the New PL AKD page!
- Same pattern of use as new employees
  - Some drop off in notification clicks over the sequence
  - But they were not dismissing them
  - Less certainty on our part of whether these actions are needed by all participants, if it is the appropriate time of year, if it is part of their role
  - We need feedback for better targeting

- STC Operations notification
  - 40% responded to notification
### Phase 1 Feedback

**Initial survey, small sample size (4), 5/17**

<table>
<thead>
<tr>
<th>1. Did you find the New Project Leader program helpful?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td><strong>No</strong></td>
</tr>
<tr>
<td><strong>Did Not See the Notifications</strong></td>
</tr>
<tr>
<td><strong>Total: 4</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Is “My Actions” the best way for you to be provided this information? If not, why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>I prefer “My Actions”</td>
</tr>
<tr>
<td>that spot is good but an email or something to announce it would be helpful</td>
</tr>
<tr>
<td><strong>Total: 4</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Is there any content you would recommend adding that would help you be a better Project Leader? Please describe.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am glad those links are there and I really will get to them someday. The important thing to me is that I don’t have to go digging for this information. I won’t dig, you putting it on my MII page means it will get read and followed. I wouldn’t want you to take them away.</td>
</tr>
<tr>
<td>Not to my knowledge. Having any content at all pushed to me was very unexpected and helpful.</td>
</tr>
<tr>
<td><strong>Total: 2</strong></td>
</tr>
</tbody>
</table>

“I am very pleased with the content and availability thus far”

“My project was over by the time I realized this was there… I think most of the content would be great for new employees, no matter what the level”

“important thing to me is that I don’t have to go digging for this information. I won’t dig … I wouldn’t want you to take them away”

“having any content at all pushed to me was very unexpected and helpful”
New PL AKD User Feedback Summary

Phone interviews (3)
- Did they notice the “MyActions” – split responses
  - One respondent cited poor connectivity from sponsor site, rarely checks MII
- Content helpful? – all responded the content was useful
  - Content recommended for all staff
  - Suggestion to identify and include ‘soon to be’ PLs
- Delivery mechanism – all preferred MyActions, with one request for initial email
  - Several respondents stated they did not dismiss the notification as they retained content as reference material
- Overall comments and feedback
  - Let people know the content is there
  - Would prefer the material all at once rather than over four weeks
  - Would like to see guidelines for resource consumption for specific activities

Email responses from those who never clicked (13)
- Six PLs: ‘too busy’ but almost all felt the pilot was worthwhile and would get to materials eventually
- Four PL did not notice the MyActions, two use CAASD hub as home page
AKD for Project Staffing
Just-in-Time Guidance on Finding Staff

- Finding right staff is a challenge
  - 3000+ staff in 10 Tech Centers, 3400+ in Program Divisions
  - 1500+ Projects
  - >20% staff charge 3-6 projects
  - 800+ new hires in CY2016
  - Special clearances
  - 10+ PL considerations: skills, experience, clearances, team fit, soft skills, domain knowledge, interest/passion, cost, location, timing,
  - 5+ Staff considerations – interest/passion, location, team fit, travel, career, …
  - .. and come in on target (budget)
“Project Staffing” AKD Operational Use Case

**Trigger**
“TBDs” in the next fiscal month in Clarity Projects Staff Plans

**Action**
PL will have notification in the “The Way We Work”

**Actions, Guidance, and Resources**

66% of recipients clicked on this (just in time) staffing notification
Initial Overall AKD Findings

▪ “MyActions”, while the preferred notification method, needs augmentation to ensure staff are aware of the materials
  – MyActions not always noticed
  – Staff may not have MII as home page (e.g., CAASD hub)
  – Staff at sponsor sites may have connectivity issues to campus limiting access to the MII
▪ Staff who clicked on content all felt it was valuable
  – However, the click rate dropped off for later notifications in the sequence
  – We don’t know if they read ahead or not
▪ Staff who self-reported they were too busy to utilize material thought it was valuable and planned to get to it eventually
  – Several reported content would be useful if requested their Associate PLs be manually added
▪ Several participants plan to retain the material on their MII home page (i.e., to never dismiss) so its present when needed
  – This could cause “noise” on the My Actions channel

Take Aways from User Feedback

• Send an introductory email to introduce staff and their managers to the campaigns
• Prompt users to do the activities by introducing some urgency via due dates
• Design a feedback mechanism into the notifications so we know if action completed, or why not
• Provide easy access to the materials for future reference so users are comfortable dismissing the notifications
• Continue to fine-tune audience targeting
Piloting a Revised Concept

- Try a “Act, Why, Help” format
- Collect real-time user feedback on whether they completed the actions
- Deploy a “PL Reference Shelf” gadget for persistent access to the materials

**Action-oriented language with due dates**

**Real-time feedback on whether they completed action, or why not**
“Subscribe to Employee Newsletters” New Employee Notification, Using the New Format

- 65 new employees received “Subscribe to Employee Newsletters” notifications so far, with the new UI
- 21 Responded to date (32%) – good response rate
  - 14 people signed up for newsletters
  - 4 said “No”
  - 3 said “Remind me later”
- We are assured they have awareness of the capability
  - With “find it yourself” technique, traditionally could take from months to never
- Practically “free” to acquire these users
- Gives us feedback on the interest, the targeting accuracy, the “why not”
Elements of the AKD Campaigns

**Determining the audience**
- Via algorithm, specificity
- Manual list creation
- Combo

**Create the notifications**
- Level of granularity
- Actionable action vs guidance/learning activity
- Design the content and the referenced content
- De-dup across campaigns

**Feedback mechanism**
- Can we track the action from the back-end system?
- Feedback from the user on what they actually did

**Event push stream**
- Automatic sequencing vs one time push
- The timing of the sequencing
- The timing of the initiation
- Delivery channel
- Deadline?
- Expiration?
- Escalation?

**Knowledge provisioning reports**
- Track over time who has been exposed to which knowledge
- Report to managers

**Tracking the metrics**
- Metrics of the notification clicks  
  (enhanced with a user response)
- Metric of the action (whether the action was taken, which may be reading something)
- Could read ahead (ambiguity)

May be part of other training/onboarding or business process support activities
Event Bus Architecture and Planned Updates

New data warehouse design for AKD – organizing our data for efficiency (esp history which is key to this)

Explore Bluemix and others; alignment and opportunities to move to cloud

App/splunk events to event db
Audience Targeting – New PL Example

EDW Project history table
Has PL field changed or a new project added?
Is project a direct project
PL in past 3 years?

<table>
<thead>
<tr>
<th>PL</th>
<th>Start date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>01AOH621</td>
<td>12345</td>
<td>9/1/13</td>
</tr>
</tbody>
</table>

ODS People table
- Full time employee?

<table>
<thead>
<tr>
<th>Emp id</th>
<th>Emp Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>12345</td>
<td>Full Time</td>
</tr>
</tbody>
</table>

SWP Portfolio table
Is not a Portfolio Leader?

<table>
<thead>
<tr>
<th>Port ID</th>
<th>PfL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWP-0252</td>
<td>12377</td>
</tr>
</tbody>
</table>

Python script

<table>
<thead>
<tr>
<th>Emp id</th>
</tr>
</thead>
<tbody>
<tr>
<td>12345</td>
</tr>
<tr>
<td>12346</td>
</tr>
<tr>
<td>12347</td>
</tr>
<tr>
<td>12348</td>
</tr>
<tr>
<td>12349</td>
</tr>
</tbody>
</table>
Architecture Updates

- Goals
  - Ability to handle very custom notifications. Not easily automated
  - Reduce effort required to add new campaigns
AKD Administration

**AKD Admin Tool**

- **Publish Event**
  - Event type: Person - AKD
  - Routing key: event
  - Quantity: 1
  - Publish

- **Run Job**
  - Current Hire Anniversary Event
    - Date: YYYY-MM-DD
    - Run
  - New Project Leader Event
    - Start Sequence #: 0
    - End Sequence #: 0
    - Run
  - Staffing Plan
    - Date: YYYY-MM-DD
    - Run
  - New Portfolio Leader Event
    - Date: YYYY-MM-DD
    - Run

- **Manual Notifications**
  - User: Create

- **Notification Date Manipulation**
  - Notification Offset
    - Adding: Add an offset in days to the display date in order to retrieve future notifications.
  - Notification Timeout Date Override
    - Adding: Specify the date to a date in the future for notification timeout calculation.

- **Create Notification Tracking Report**
  - Report format: Excel
  - From notification date: YYYY-MM-DD
  - To notification date: YYYY-MM-DD
  - Download

**AKD Manage Notification Content**

- **Select Campaign**
  - Campaign: NewPortfolioLeader
  - Replace existing campaign: Yes

- **Notifications for NewPortfolioLeader Campaign**
  - Field 1:
    - Title: Your Portfolio Page
    - Description: Your Portfolio Page is a centralized location to share your Portfolio's Mission, Vision, Goals, Outcomes, and other high level Portfolio Information.
    - Delivery Delay: 0
  - Field 2:
    - Title: Useful tips and links to help you in your new Portfolio Director or Manager role.
    - Description: Useful tips and links to help you in your new Portfolio Director or Manager role.
    - Delivery Delay: 0

- **Set Properties for Campaign**
  - Should notification recipients be able to see this content a second time?
    - Yes
  - How long should notification recipients wait to see the content again?
    - 365 Day(s)
Future Steps

- Evolve toward intelligent “business and knowledge process assistants”
- Continue working with other groups across the company to continue to refine the overall experience of these ‘journey maps’
  - AKD is usually just one component
  - F-2-F training, guidance materials, process materials, tools, delivery mechanisms, etc
- Refining the design of the notification campaigns
  - Circle back and integrate the older “My Actions” into one comprehensive system with governance
- Adding other roles, new personalized triggers
  - Triggers based on what a user has not used, for example
- Piloting machine learning capabilities to automate or semi-automate content, other types of recommenders, audience definition
- There is a “trust” component
- Just-in-time training based on user actions
- Knowledge provisioning reports for managers
- Incentivize or reward staff for effective behaviors
Reflections

- **You can get the critical information to employees ‘just in time’ using today’s technologies**
  - It does involve putting structure on information, using information already available about employees, process status, and using “push techniques”
  - Can even be manual, initially

- **Identify some critical business processes or activities fundamental to your company’s success to get started**
  - Are they well-defined and well-supported at the enterprise level?
  - What do you know already about the critical knowledge objects and process states, from existing systems and data? Build on this.
  - Start small, be agile, don’t tackle every role/process, start with the high-value ones

- **Spend time thinking about what it is important for staff to know, what you want them to do, and when**
  - If you can’t concisely state this for key roles and key business processes, then your users can’t either
  - Talk to staff who have been in a new role for a year or two and ask them what they wished they knew initially
  - Talk to managers and ask them what questions they get the most for various roles and activities
  - How can you determine that staff are in a particular process state?
Questions?
Started by “Massaging” Existing Content

- **Jump Start**
  - FFRDC Whiteboard Explainer Video
    - (FJ: Difference, About FFRDCs tab)
  - Explore MITRE’s 7 FFRDCs & 4 Capabilities
    - (FJ: Difference, our unique value tab)
  - MW Principles and Norms

- **Outcomes & Project Pages**
  - Quality Outcomes Examples
  - Framing Outcomes Video
  - Project Pages Lite
  - Update Project Page (FJ: Project Pages)

- **The MITRE Way**
  - MW Preamble
  - MW Position Descriptions
  - MW for Project Leaders Video
  - MITRE Product Libraries – centers
  - MITRE Way Tools Site (FJ: mwtools)

- **Strengthening the Core**
  - STC Overview (FJ: STC)
  - STC Project Assessment Guide (FJ: STC)

- **Staffing**
  - Clarity Role Page
  - Tech Center Site
  - Organization Primer
  - Finding Resources

- **Leadership**
  - Project Leader Skills Inventory (FJ: PLSI)
  - Systems Engineering Process Office (FJ: SEPO)
  - Systems Engineering Guide (FJ: SEG)

- **Connect & Stay informed**
  - Discover Search (FJ: projectsearch)
  - Handshake (FJ: handshake)
  - Mailing Lists (FJ: lists overview)