



Canary User Conference

August 11- 14 State College, Pennsylvania



Canary Version 24, 25 and Beyond



Mark Rice



Version 24 – Eliminate Windows Dependencies

Ability to support running software on Linux

Eliminate Windows Dependencies

- **Move to .NET 8 Framework**
- **Stop relying on Windows User Accounts and Impersonation**
- **Use gRPC instead of WCF (Windows Communication Foundation)**



Version 24 – Code Modernization & Enhancements

Code modernization allows us to take advantage of advances in technology and meet the ever-changing needs of our customers

- **Move to .NET 8**
 - More performant than older .NET Framework
 - Support for Windows and Linux
- **Implement gRPC (Google Remote Procedure Calls) across all products**
 - Internal and Public APIs
 - High-performance, opensource RPC framework
 - Numerous language bindings for binary APIs
- **Use OpenID Connect / OAuth 2.0**
 - Federated Identity protocol for authentication

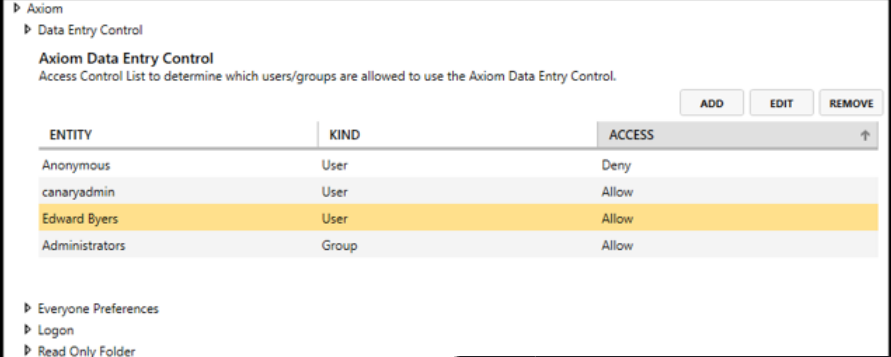


Version 24 – Enhanced Security

Support and enhance our customers security policies

Improve Security Through adoption of Best Practices

- Eliminate need to store user credentials
- Expanded API tokens
- Support Single Sign On (SSO) with organization defined login flow
- Eliminate Unencrypted Endpoints



Axiom Data Entry Control
Access Control List to determine which users/groups are allowed to use the Axiom Data Entry Control.

ENTITY	KIND	ACCESS
Anonymous	User	Deny
canaryadmin	User	Allow
Edward Byers	User	Allow
Administrators	Group	Allow

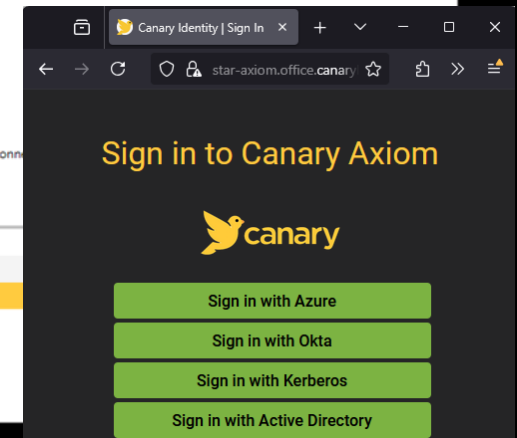
Buttons: ADD, EDIT, REMOVE






Navigation: Everyone Preferences, Logon, Read Only Folder, Report, Script, Calculations, Admin, Logon

Admin Logon
Access Control List to determine which users/groups are allowed to connect to the Axiom Admin console.

ENTITY	KIND
canaryadmin	User
Administrators	Group
Canary Admins	Group

Navigation: Historian, Identity, Views



API Tokens						ADD	EDIT	REMOVE	INFO
TOKEN	COPY	DESCRIPTION	EXPIRATION DATE	USER	STATE				
0221f183-7c70-4965-a143-6		Remote SaF Token	Never	Remote SaF	Allow				
11111111-2222-3333-4444-		API Token created for the Anonymous Canary User account.	Never	Anonymous	Allow				
55310382-5709-4528-a054-		Default token for the Installer's migration process.	Never	Installer Migration Service	Allow				
5c42caf6-b977-42c2-a05c-e		Power Bi	Never	canaryadmin	Allow				
e8e830a0-5ba9-4d69-8339-		Default token for Axiom Reporting.	Never	Axiom Report Service Acc	Allow				



Version 24 – Identity Service

Manage the authentication flow and security for all Canary services and clients

Authentication flow

- Interface between customer configured OpenID Connect provider(s) and Canary software

Authorization security

- Provide authorization security for Canary software



The image displays two screenshots of the Canary Administrator web interface. The top screenshot shows the 'Identity' section with tables for 'APPLICATIONS' and 'OPENID CONNECT PROVIDERS'. The bottom screenshot shows the 'Access Control Lists' section, specifically the 'Admin Logon' list.

APPLICATIONS

CLIENT ID	DISPLAY NAME	REDIRECT URIS
canary_admin	Canary Admin	http://127.0.0.1
canary_axiom	Canary Axiom	https://localhost https://star-axiom.office https://star-hq.office
canary_excel_add_in	Canary Excel Add-In	http://127.0.0.1

OPENID CONNECT PROVIDERS

CLIENT ID	CLIENT SECRET	GROUP ID CLAIM	ISSUER	PROVIDER NAME	USER ID CLAIM	USER NAME CLAIM
ea62920a-b135-49f9-b	*****	groups	https://login.microsoft	Azure	oid	name
00a0bcqkbbT09ekNj5d	*****	groups	https://dev-21688843.o	Okta	sub	name

EXTERNAL PROVIDER OPTIONS

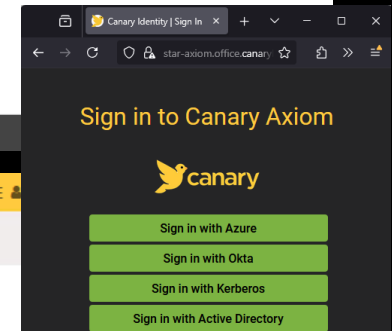
- ☒ Enable Anonymous
- ☒ Enable Kerberos
- ☒ Enable Active Directory

Access Control Lists

Admin Logon

Access Control List to determine which users and groups are allowed access to the Admin client and which are denied.

ENTITY	KIND	ACCESS
Josh Bridenbaugh	User	Deny
Matthew Deweese_1	User	Request
Mark Rice_1	User	Request
Local Test User	User	Request



Version 24 – OpenID Connect / OAuth 2.0

Enhanced authentication flows utilizing standard Identity providers

Use existing authentication system

- Familiar authentication workflow
- Utilize existing IT users and groups

Single Sign On (SSO)

- Enables seamless login across multiple applications in the browser

Flexible Identity Provider support

- Support of any OpenID Connect provider such as Microsoft Entra ID and Okta
- Built-in support for Windows AD and Kerberos

The image displays two overlapping screenshots. The top screenshot shows a web browser window titled 'Canary Identity | Sign In' with the URL 'star-axiom.office.canary'. The page features the 'Sign in to Canary Axiom' heading, the Canary logo, and four green buttons: 'Sign in with Azure', 'Sign in with Okta', 'Sign in with Kerberos', and 'Sign in with Active Directory'. The bottom screenshot shows the 'Canary Administrator' interface. The left sidebar has links for 'Home', 'Identity', 'Providers', 'Endpoints', and 'Settings'. The main content area is divided into two sections. The top section, 'APPLICATIONS', contains a table with columns for 'CLIENT ID', 'DISPLAY NAME', and 'REDIRECT URIS'. The bottom section, 'OPENID CONNECT PROVIDERS', contains a table with columns for 'CLIENT ID', 'CLIENT SECRET', 'GROUP ID CLAIM', 'ISSUER', 'PROVIDER NAME', 'USER ID CLAIM', and 'USER NAME CLAIM'. Below these tables are 'EXTERNAL PROVIDER OPTIONS' with checkboxes for 'Enable Anonymous', 'Enable Kerberos', and 'Enable Active Directory'.

CLIENT ID	DISPLAY NAME	REDIRECT URIS
canary_admin	Canary Admin	http://127.0.0.1
canary_axiom	Canary Axiom	https://localhost https://star-axiom.o/ https://star-hq.office
canary_excel_add_in	Canary Excel Add-In	http://127.0.0.1

CLIENT ID	CLIENT SECRET	GROUP ID CLAIM	ISSUER	PROVIDER NAME	USER ID CLAIM	USER NAME CLAIM
ea62920a-b135-49f9-b	*****	groups	https://login.microsoft Azure	oid	name	
00a0bcqhkbT09ekNj5d	*****	groups	https://dev-21688843.o Okta	sub	name	

EXTERNAL PROVIDER OPTIONS

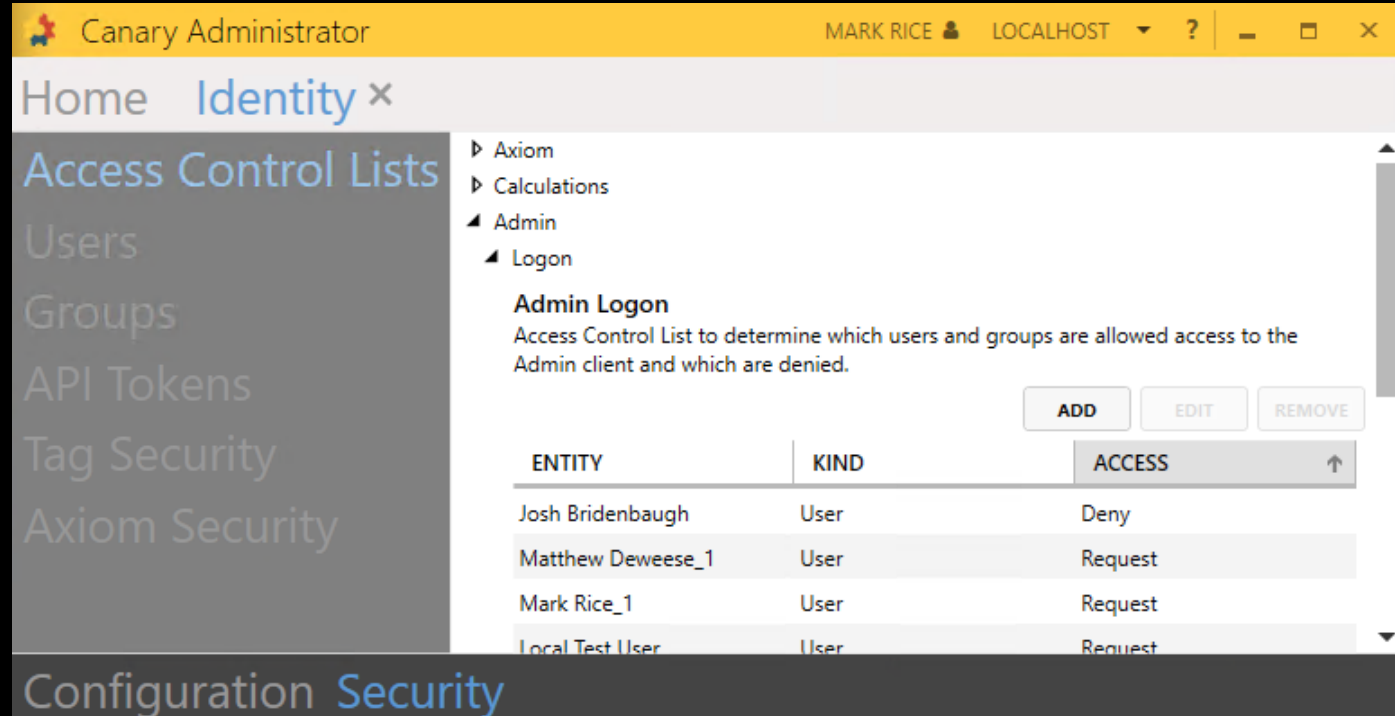
- ☒ Enable Anonymous
- ☒ Enable Kerberos
- ☒ Enable Active Directory



Version 24 – Centralized Identity Management

One place to manage all your Canary security across the network

- **Configure Identity Providers**
- **Access Control Lists**
- **Map external Users and Groups to Canary Users and Groups**
- **API Tokens**
 - Authentication mechanism in APIs
 - Tied to a specific user
 - Expiration date
- **Tag Security**



The screenshot shows the 'Canary Administrator' web interface. The top navigation bar is orange and contains the title 'Canary Administrator', the user 'MARK RICE', and the location 'LOCALHOST'. Below the navigation bar, the 'Identity' section is active, showing a sidebar with links to 'Access Control Lists', 'Users', 'Groups', 'API Tokens', 'Tag Security', and 'Axiom Security'. The main content area displays the 'Admin Logon' section, which includes a description: 'Access Control List to determine which users and groups are allowed access to the Admin client and which are denied.' Below this description are three buttons: 'ADD', 'EDIT', and 'REMOVE'. A table lists the current access control list entries:

ENTITY	KIND	ACCESS
Josh Bridenbaugh	User	Deny
Matthew Deweese_1	User	Request
Mark Rice_1	User	Request
Local Test User	User	Request

Version 24 – Store and Forward (SaF)

The Canary Store & Forward (SaF) Service is a data reliability and redundancy feature to ensure no data is lost during transmission between systems, especially in environments with unreliable networks or intermittent connectivity

- **Data Buffering:** If the connection to the destination (is lost, the SaF service automatically buffers data to local disk. Once the connection is restored, it backfills the data to the destination without user intervention
- **Reduced Complexity:** Merged Sender/Receiver functionality into single service
- **Secure Transmission:** Data in transit is encrypted using TLS and gRPC for communications
- **Advanced Session Management:** Ability to pause and un-pause sessions and see session dependencies
- **Proxy Capable:** In environments with DMZs the SaF service has robust support to proxy/forward data to the next destination including advanced tag data routing capabilities
- **Integrated with Collectors:** Each Canary Collector pairs with a SaF service to forward data to its next destination
- **Write API Support:** The SaF service includes a Write API (gRPC and HTTPS) for custom data ingestion



Version 25 – Calculations & Events

Calculations & Events gain significant enhancements

Steam Functions (V24)

- Support the calculation of thermodynamic properties of steam (like enthalpy, entropy, and specific volume) under various conditions, and to calculate energy transfer rates and heat transfer coefficients in systems using steam.

Advanced Event Capabilities

- Support for multi-level events (aka Batch events)
- Parent/Child relationships
- Parallel event processing

Improved UI workflow

- Calculation Folders
- Startup ordering



EVENT		EVENT PROPERTIES			
Id*	Default	Property Name	Property Value	Evaluation Time	Can Query
Parent*	Order	ORDER_ID	ORDER_ID	EventStart	<input checked="" type="checkbox"/>
Mode*	Parallel	BATCH_ID	BATCH_ID	EventStart	<input checked="" type="checkbox"/>
Start Trigger*	binOpened				
Stop Trigger	mixerFinished				
Abort Trigger	Select Expression				
Min Duration	0s				
Notify Email	team@company.com				
Email Message	EDIT				

STATUS	JOB NAME
	Batch
	Bakery
✓	Order
✓	Batch
✓	Dry Weighing
✓	Mixing
✓	Wet Weighing
	Prerequisites

STATUS	JOB NAME
	Batch
	Bakery
✓	Order
✓	Batch
✓	Dry Weighing
✓	Mixing
✓	Wet Weighing
	Prerequisites

Start

Stop

Delete

Backfill

Rename

Browse Events

Move To Folder

Set Startup Order

Export

Version 25 – Axiom

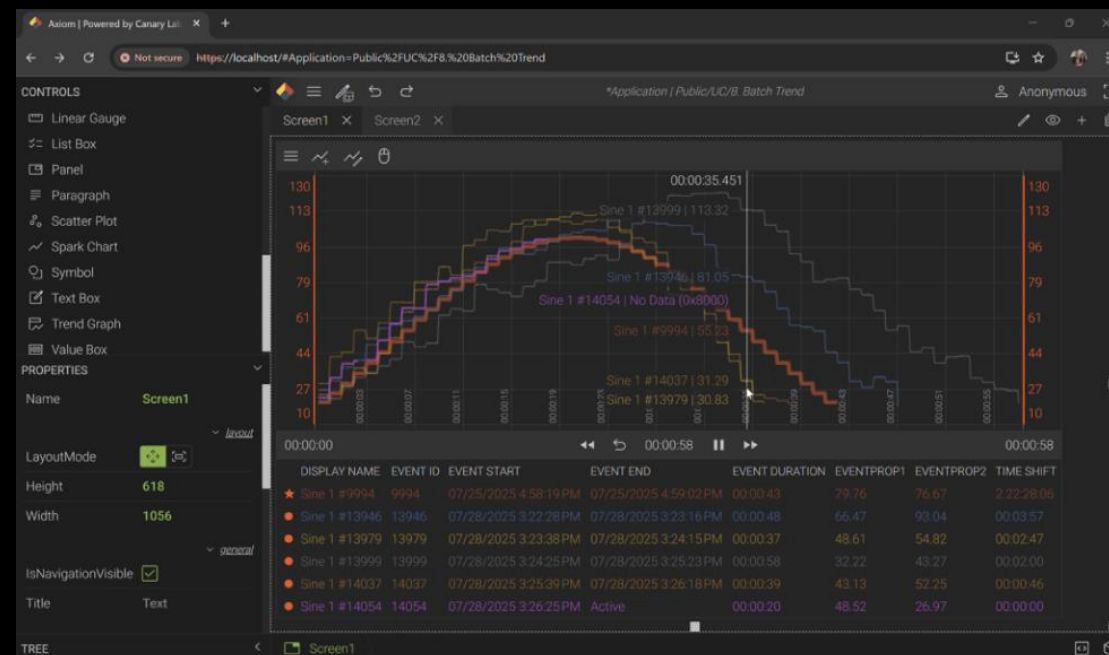
Batch oriented event visualization

New event features

- TrendGraph event mode
- EventTable control enhancements
- Event filtering

Application and Chart security

- Using Identity, set permissions for users or groups to have read/write, read, or no permissions on specific Applications, Charts, or Folders.



The screenshot displays the Axiom EventTable interface. On the left, the 'CONTROLS' panel is the same as in the previous screenshot. The 'PROPERTIES' panel for 'Screen1' shows settings for Name, LayoutMode, Height (1002), Width (1002), X (6), Y (6), Columns (Columns...), IsVisible (checked), and EventServer (localhost). The main area shows a 'Screen1' tab with an EventTable. The table lists event data with columns: Id, Type, Source, Start, End, and Duration.

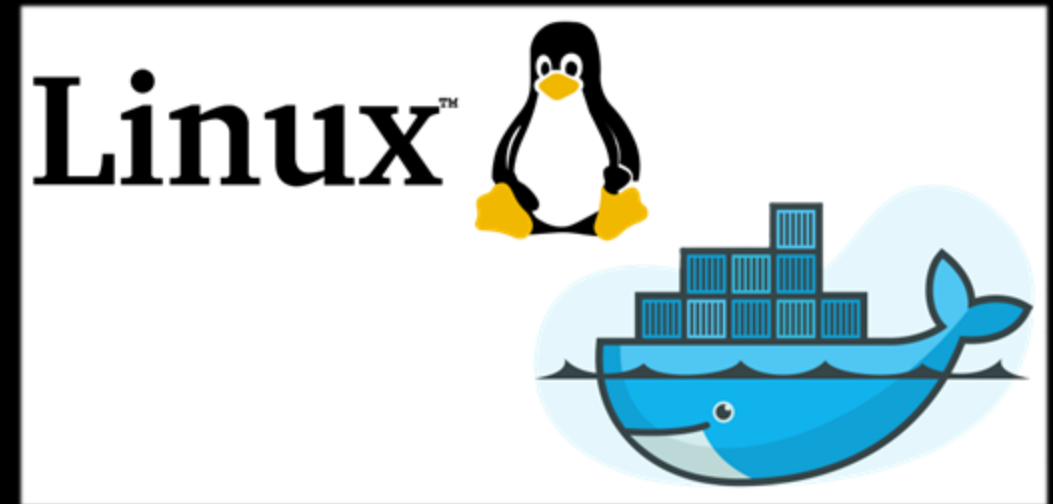
Id	Type	Source	Start	End	Duration
14342	UC Sine Asset	UC East.Machine 3	07/28/2025 3:36:36 PM		00:00:01
14343	UC Sine Asset	UC West.Machine 2	07/28/2025 3:36:36 PM		00:00:01
14341	UC Sine Asset	UC South.Machine 2	07/28/2025 3:36:35 PM		00:00:02
14337	UC Sine Asset	UC Central.Machine 1	07/28/2025 3:36:33 PM		00:00:04
14338	UC Sine Asset	UC East.Machine 4	07/28/2025 3:36:33 PM		00:00:04
14339	UC Sine Asset	UC South.Machine 1	07/28/2025 3:36:33 PM		00:00:04
14336	UC Sine Asset	UC East.Machine 1	07/28/2025 3:36:28 PM		00:00:09
14335	UC Sine Asset	UC East.Machine 2	07/28/2025 3:36:26 PM		00:00:11
14333	UC Sine Asset	UC North.Machine 3	07/28/2025 3:36:25 PM		00:00:12
14334	UC Sine Asset	UC West.Machine 1	07/28/2025 3:36:25 PM		00:00:12
14331	UC Sine Asset	UC North.Machine 4	07/28/2025 3:36:21 PM		00:00:16
14332	UC Sine Asset	UC North.Machine 5	07/28/2025 3:36:21 PM		00:00:16
14330	UC Sine Asset	UC Central.Machine 4	07/28/2025 3:36:20 PM		00:00:17
14327	UC Sine Asset	UC Central.Machine 2	07/28/2025 3:36:19 PM		00:00:18



Beyond Version 25 – Phased Linux support

Collector support for Linux utilizing containers

- **MQTT and OPC UA Collectors**
 - Store & Forward service
 - Administrator and Identity services as needed
- **Distributed via containers**
- **Alpha version of MQTT collector running in test environment**
 - Beta testers?



Beyond Version 25

Continued investment in modernizing code base

- Enhanced performance
- Scalability
- Robustness
- New features



Thankyou



Mark Rice

Questions