Green Button Alliance
GridWise Architecture Council

12 July 2023

NAESB REQ.21 ESPI ("Green Button®") standard

Green Button® standard

NAESB REQ.21 ESPI (aka "Green Button")
North American Energy Standards Board,
Retail Electric Quadrant, book 21,
Energy Services Provider Interface

- Green Button provides two methods for data transfer…

  - ***Connect My Data®***

    - A way for a customer to authorize a Third Party to obtain Utility data for them.

  - ***Download My Data®***

    - A way for a customer to login and download their data from a Utility.

What do CMD and DMD do for us?

CMD allows a third-party company to _analyze continual (daily) data_ on behalf of a **_mutual customer_** of the utility and the third-party company **without the customer needing to manually and continually obtain the data**.

With **DMD**, the utility customer must login, download data, and then upload (to a third party) or otherwise handle the data for analysis. It's great for _one-off or occasional data acquisition_ (for sizing a solar array or determining historical usage).
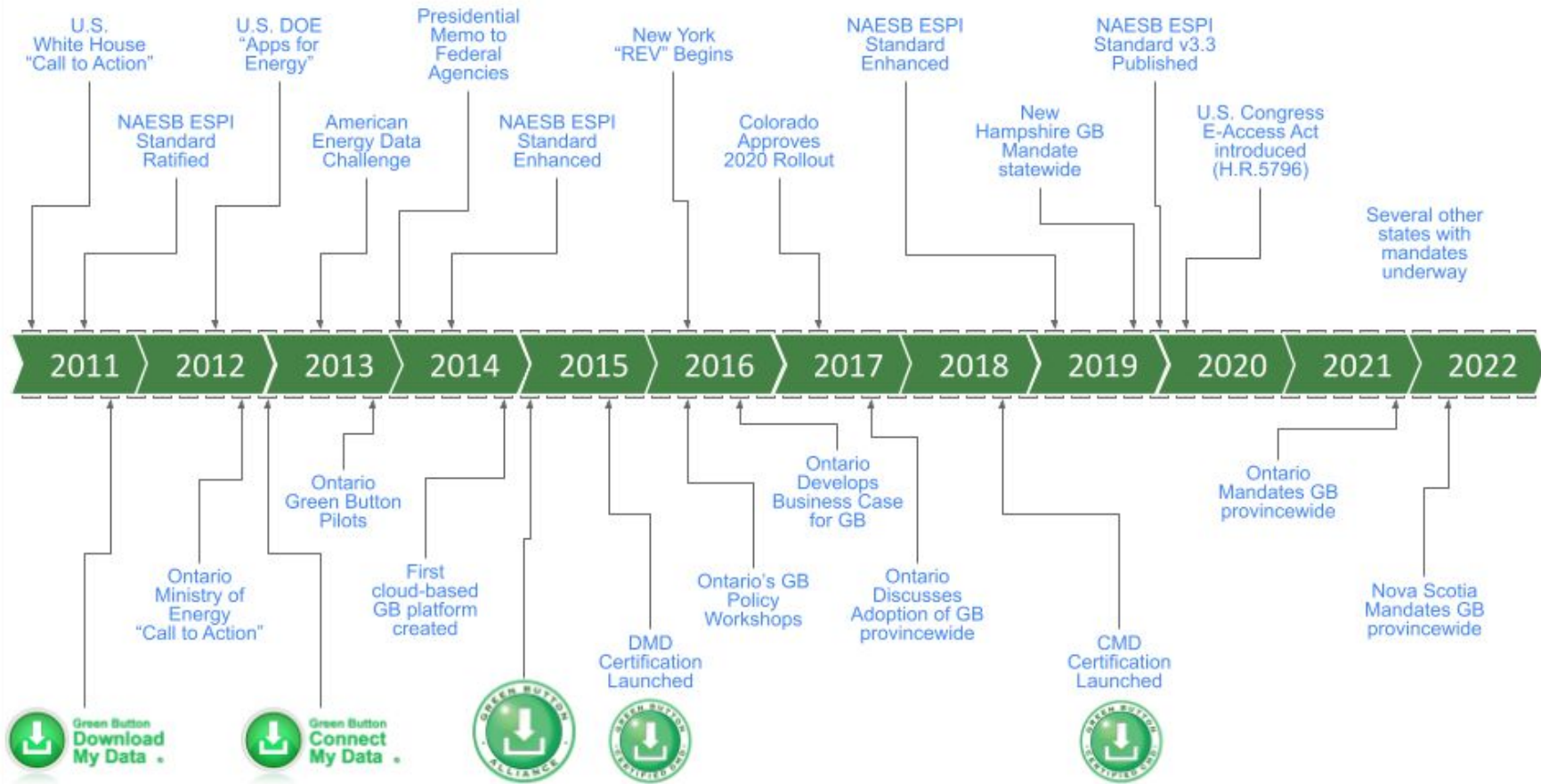
Green Button® standard

The North American Energy Standards Board (NAESB)

ratified enhancements to the ESPI standard on April 8th, 2019…

- Replaced OAuth 1.0 with **OAuth 2.0** for "Confidential Clients"
- Updated security requirements to **TLS 1.2** as a minimum
- Revised the **Energy Usage Information (EUI) data structure and definitions**
- **Created the Retail Customer (PII) data structure and definitions**
- **Deprecated original Use Cases** that do not meet OAuth 2.0 data security req's
- **Added Use Case for *Download My Data* (DMD)**
- **Simplified Use Case 2**: "Customer Authorization process"
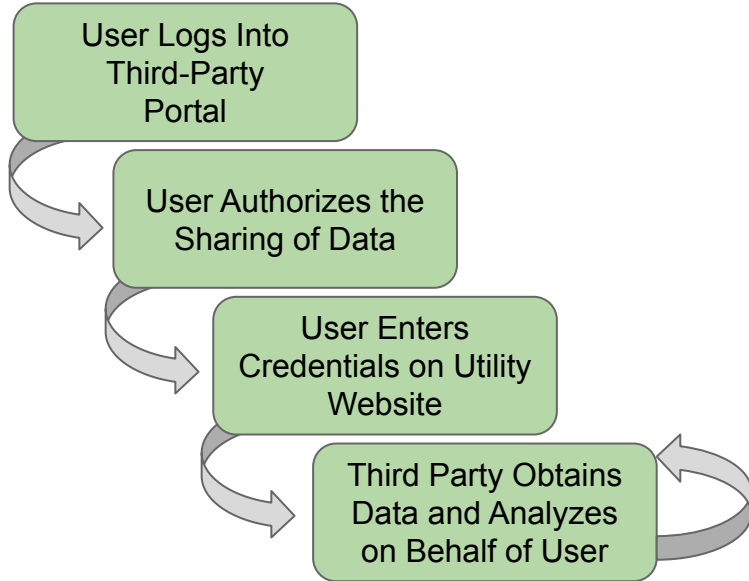- **Documented Standard ESPI Application Program Interface (API) formats**
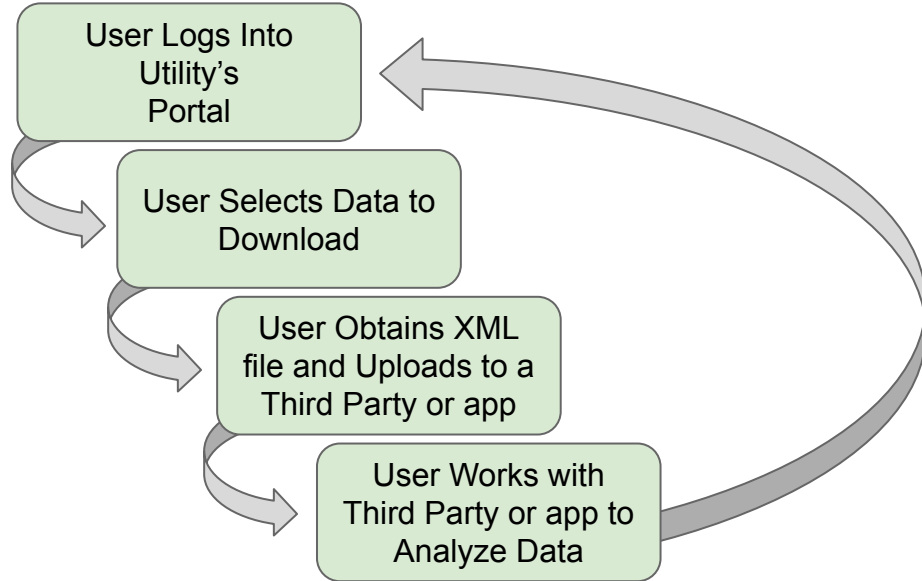
Green Button Timeline

Above the timeline:

- U.S. White House "Call to Action"
- NAESB ESPI Standard Ratified
- U.S. DOE "Apps for Energy"
- American Energy Data Challenge
- Presidential Memo to Federal Agencies
- NAESB ESPI Standard Enhanced
- New York "REV" Begins
- Colorado Approves 2020 Rollout
- NAESB ESPI Standard Enhanced
- New Hampshire GB Mandate statewide
- NAESB ESPI Standard v3.3 Published
- U.S. Congress E-Access Act introduced (H.R.5796)
- Several other states with mandates underway

Timeline years: 2011 · 2012 · 2013 · 2014 · 2015 · 2016 · 2017 · 2018 · 2019 · 2020 · 2021 · 2022

Below the timeline:

- Ontario Ministry of Energy "Call to Action"
- Ontario Green Button Pilots
- First cloud-based GB platform created
- DMD Certification Launched
- Ontario's GB Policy Workshops
- Ontario Develops Business Case for GB
- Ontario Discusses Adoption of GB provincewide
- CMD Certification Launched
- Ontario Mandates GB provincewide
- Nova Scotia Mandates GB provincewide

Green Button badges:

- Green Button Download My Data
- Green Button Connect My Data
- GREEN BUTTON ALLIANCE
- GREEN BUTTON CERTIFIED DMD
- GREEN BUTTON CERTIFIED CMD

Green Button Workflow

GB CMD (GBC)

User Logs Into Third-Party Portal

User Authorizes the Sharing of Data

User Enters Credentials on Utility Website

Third Party Obtains Data and Analyzes on Behalf of User

GB DMD (GBD)

User Logs Into Utility's Portal

User Selects Data to Download

User Obtains XML file and Uploads to a Third Party or app

User Works with Third Party or app to Analyze Data

Personally Identifiable Information (PII)

What Constitutes PII?
...*examples*

- Account Name (*ABC LTD. or PAT JONES*)
- Account Address (*PO BOX 123...*)
- Account Identifier (*4x-xxxx-xxxx...*)
- Outage Group/Block (*OG-12345*)
- Service Identifier (*5x-xxxx-xxxx...*)
- Service Address (*100 MAIN ST #321...*)
- Planned Changes to Service Status
- Status of Service Address
- Service Start Date
- Service Meter Number
- Meter Type
- Duration of Historical Interval Default

- Demand Response (DR) Program Name
- DR Termination Date w/o penalty
- DR Termination Date with-or-w/o penalty
- DR Program Status
- DR Program Enrollment Date
- DR Program De-Enrollment Date
- Local Time Parameters (DST details)*

* both PII and non-PII (Arizona or Indiana; border states served by an EDU; etc.)

How to handle PII securely:

combined format

XYZ

100101101101
001001101001
100110010100
100101
010110110100
100100101101
101001001101
0011001100

011010011001
100101
101001001001
001101001100
11011

split format

Usage
Data

9182746547
100101101101
011001100101
00100101

4572648394
011011001100
100100110011
00101

Customer
Info

9182746547
010110110100
110100100110
10011001100

4572648394
100110100110
001100110010
11011

By placing **Usage Data** & **Customer Info** into *separate streams*, both sets are delivered with greater security and privacy. The data are **mapped** by the Third Party through the unique identifiers in the separate streams/files.

E.g., **Customers can share just Usage Data, if they desire.**

Flow of Data...
use of Identifiers

"PII at rest (DC)"   "Transmission of PII"   "PII at rest (Third Party)"

Data Custodian (utilities)

9182746547
Customer Info

9182746547
Usage Data

9182746547
010110110100110100100110100110100011001100

9182746547
110100010110101010100110100010011001

Third Party (services)

9182746547
Combined Data

REPORT
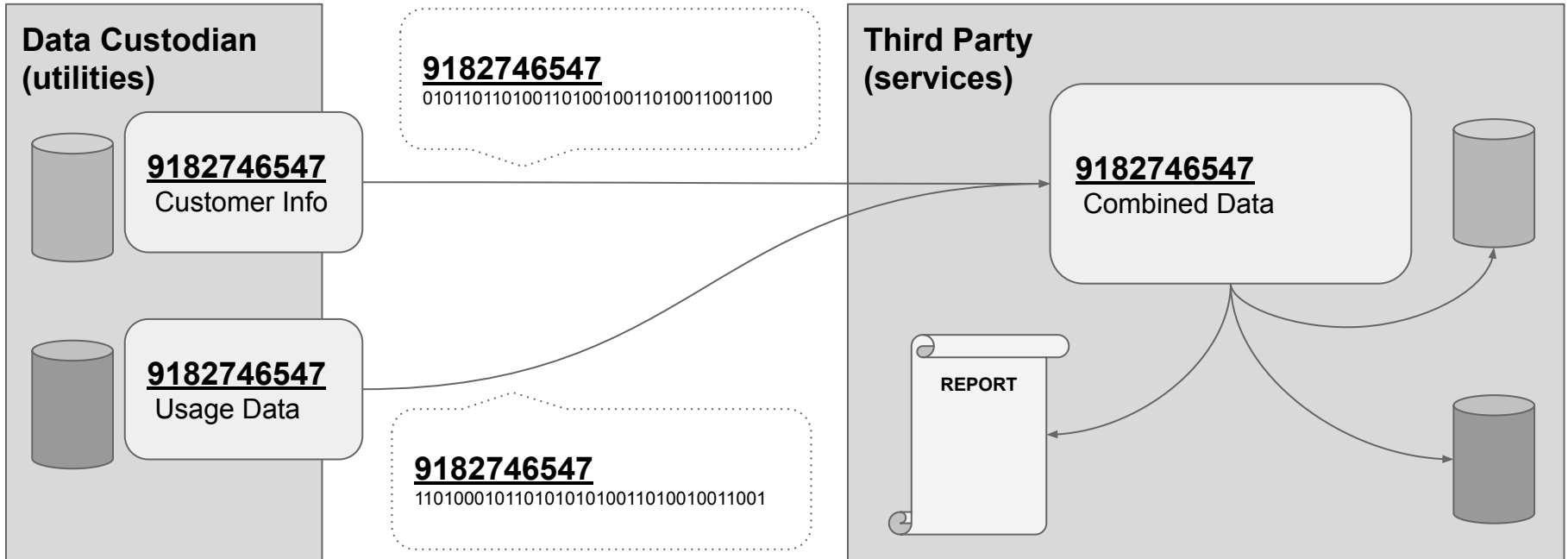
Flow of Data...
relationship & requests

"PII at rest (DC)" "Transmission of PII" "PII at rest (Third Party)"

Data Custodian (utilities)

Customer Info - to share

Usage Data - to share
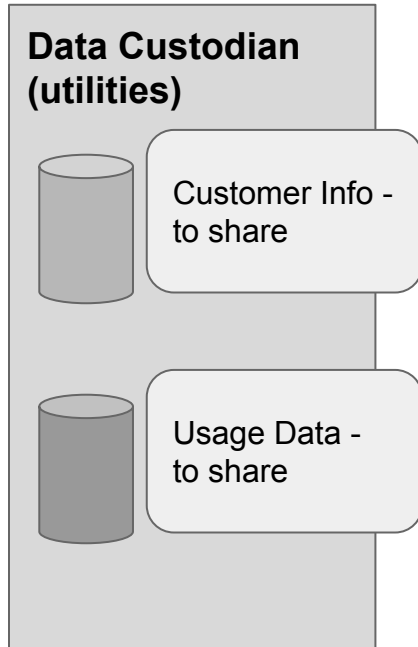
One-Time
"**Establishment of relationship**"
Between the EDU
and the 3P to define
parameters and requirements

Subsequent (and numerous)
"**Request for sharing
of information**"
transactions to create a unique
'key' for the sharing of data for
a given, mutual customer

Third Party (services)

Received Data

REPORT
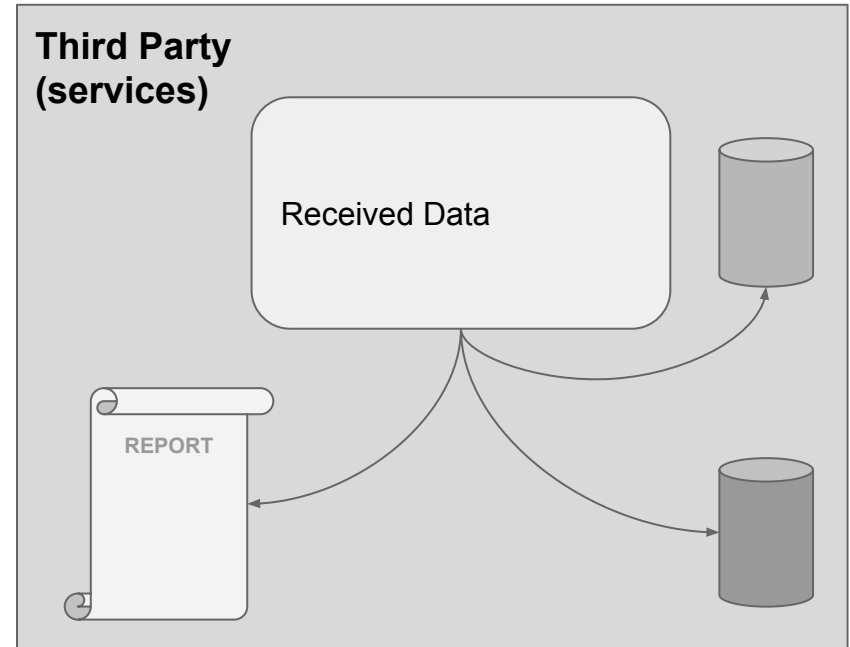
Data in Transit

Transfer of Data

Transfer of data should be **required to be *encrypted*** to meet TLS 1.2 or higher cybersecurity standards while data are in transit; with NIST -approved, FIPS 140-2, L1 cybersecurity suites.

https://gbc.utility.com/

Utilities must have **strong public key, HTTPS certificates** from Certificate Authorities that have been successfully audited according to the criteria of ETSI or WebTrust (no self-signed SSL certificates).

Keeping it 'safe' in transit:

Between Utilities and Third Parties - data should be secured in transit by:

- **Use of the industry-standard OAuth 2.0 authorization…**
  However *Implicit* and *Resource Owner* methods of creating OAuth tokens are insecure:
  - No use of **Implicit**, *which has enabled several cybersecurity breaches.*
  - No use of **Resource Owner**, *which allows the use of User ID and*
    Password for authorization of tokens.

- **Use of Transport Layer Security (TLS) 1.2+ end-to-end encryption…**
  Enforce modern security suites, ciphers, libraries, and algorithms (FIPS 140-2, W3C, *etc.*).

- **HTTPS Web Certificates…**
  Audited by WebTrust or ETSI, certificates need strong (e.g., 2048-bit) keys and be public.
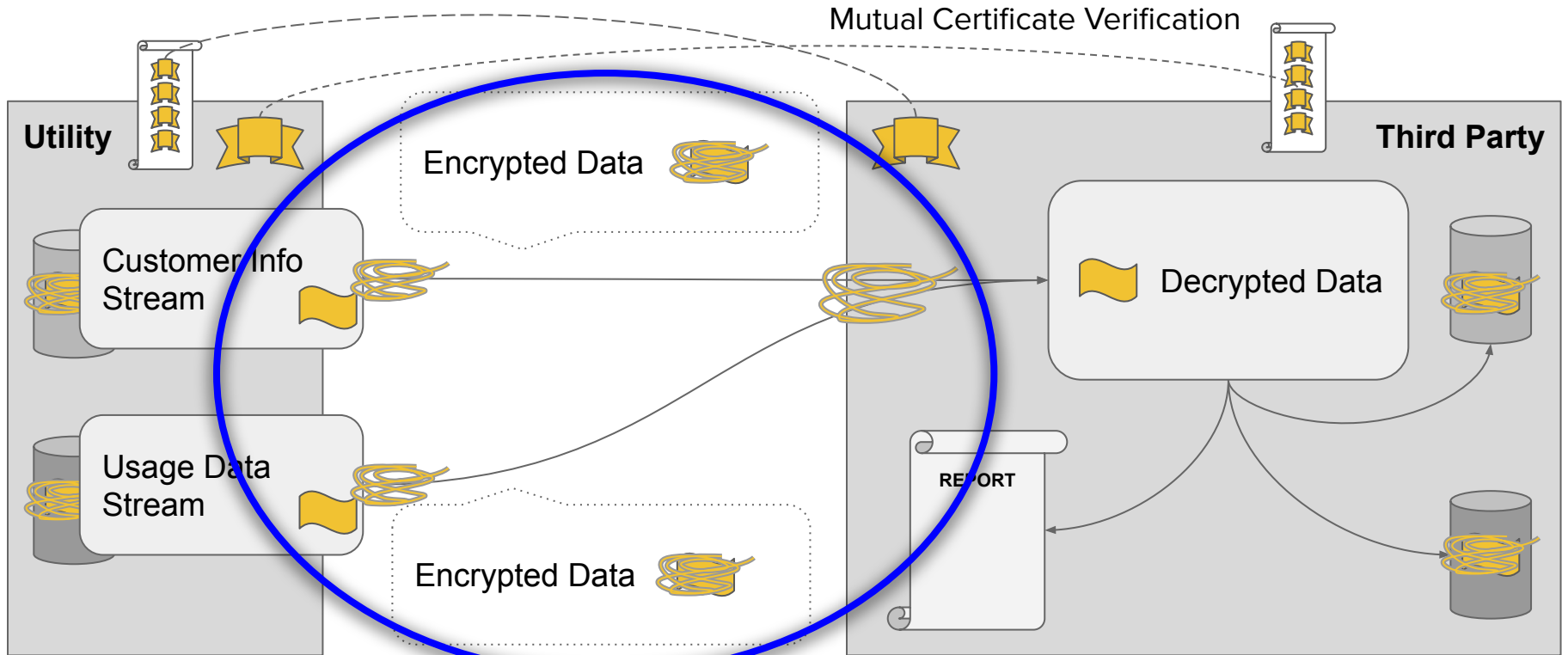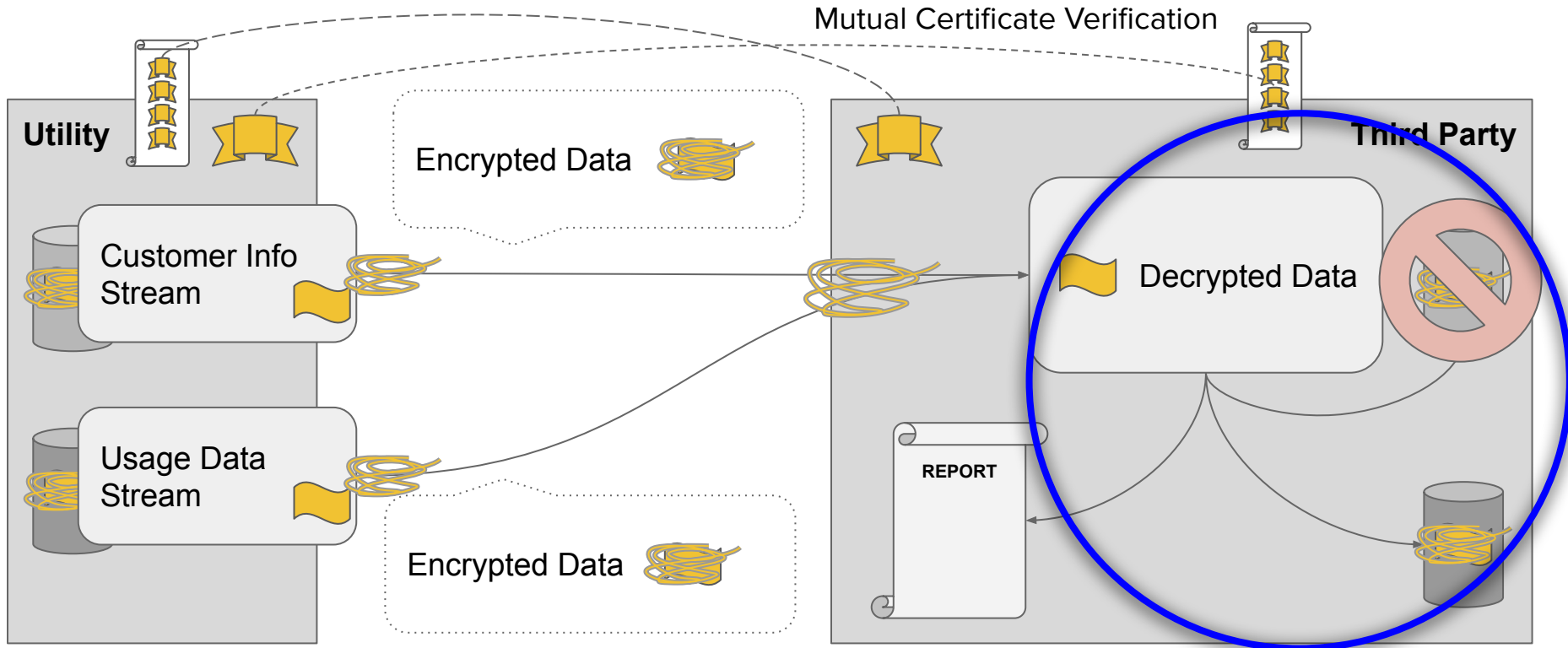
Flow of Data... security
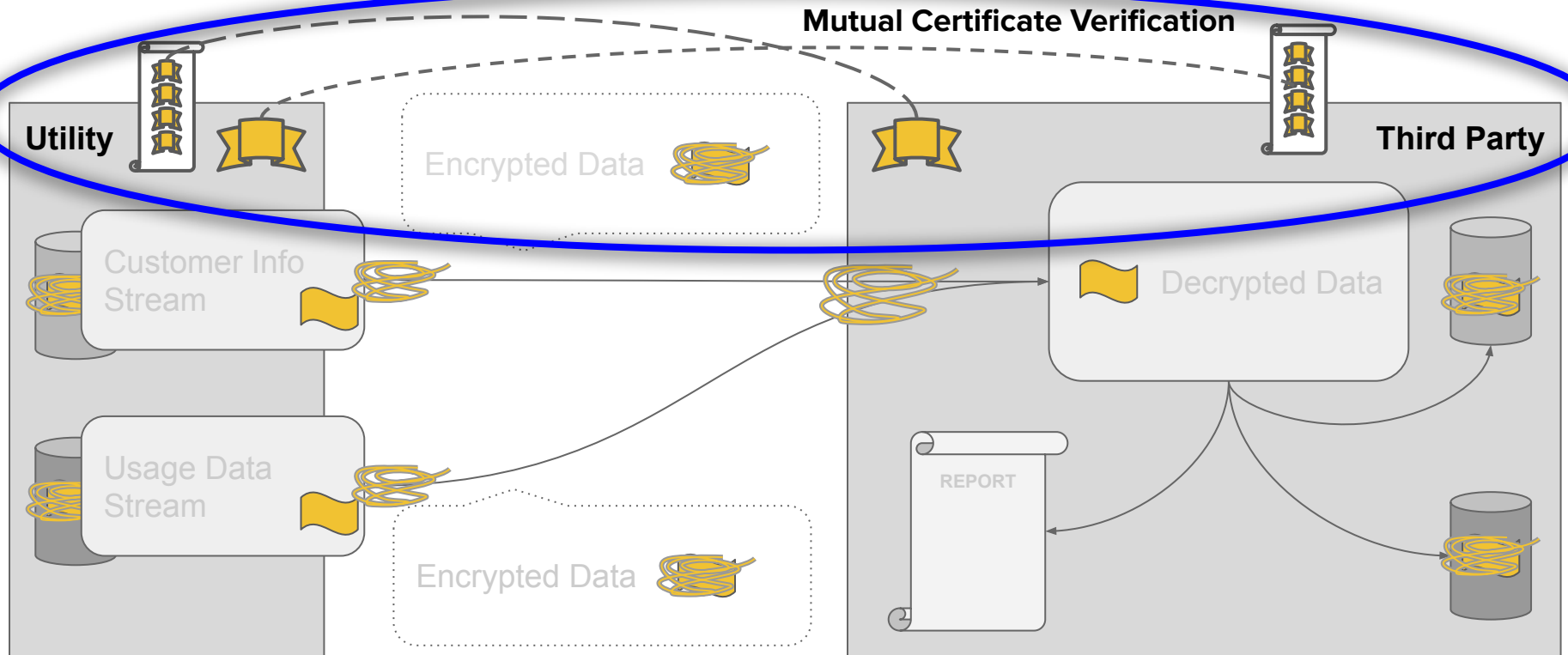
Flow of Data... security

Flow of Data... security

Deployment & Policy

Green Button Certified™ Milestone

Over 75 Implementations Certified to the Green Button standard

Green Button Certified™ implementations:
- Support Regulators' grid-modernization efforts;
- Are key to Utilities' digital-transformation strategies;
- Meet customers' demands for digital access to utility data;
- Mark the broadening availability of true Green Button solutions

GBA will be making the list of the Certified utilities available on our website this summer.

Senate Bill Proposal

A BILL

To promote competition in the area of digital energy management tools, enhance consumer access to electric energy and natural gas information, allow for the development and adoption of innovative products and services to help consumers, organizations, and governments manage their energy usage, reduce greenhouse gas emissions, and improve electric grid reliability, and for other purposes.

Senate Bill Proposal

A BILL

To promote competition in the area of digital energy manage-

… "guidelines specifying that electric utilities and gas utilities shall provide certification of adherence to the latest Green Button Connect My Data standard by an independent body on a periodic interval, as recommended by the Secretary"

energy usage, reduce gree

prove electric grid reliability, and for other purposes.

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#GreenButton   #ConnectMyData   #EnergyData   #DataAccess   #DataSharing

GWAC
Online Meeting
2023-07-12

Thank you

Jeremy J. Roberts, *Executive Director*

Green Button Alliance
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