

Communities across the United States are adopting benchmarking and Building Performance Standards to reduce carbon emissions and energy use in the U.S. building stock.

Image from Engel Ching, Pond5.com

SEED Platform for Building Performance Standards Implementation Guide

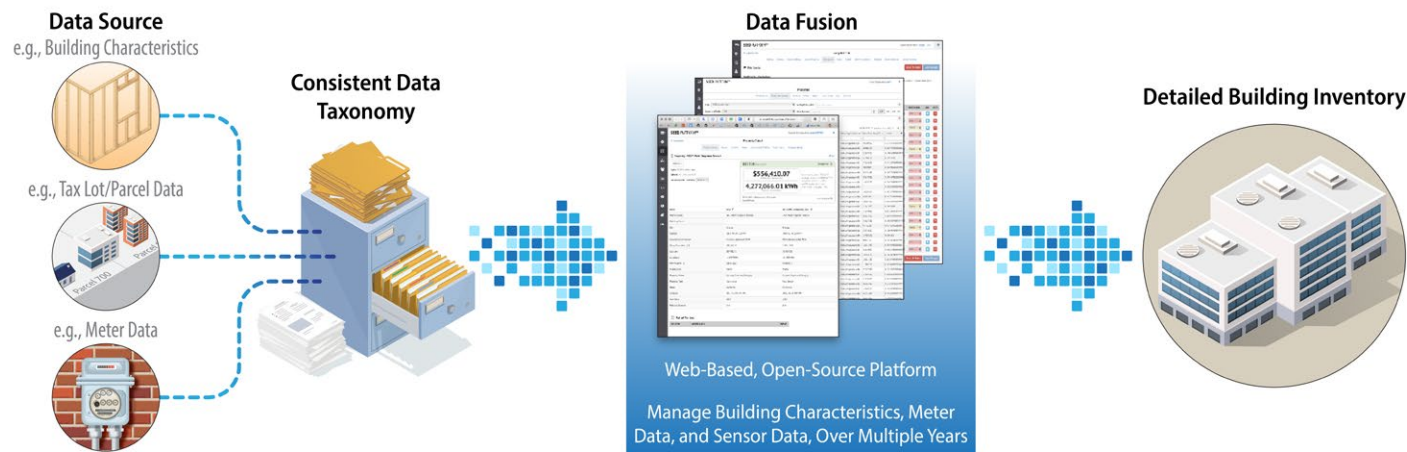
This guide provides an overview of the Standard Energy Efficiency Data (SEED) Platform™. The SEED Platform developed by the U.S. Department of Energy (DOE) to provide a low-cost, user-friendly tool for jurisdictions to launch and manage energy benchmarking and Building Performance Standard (BPS) programs. While some jurisdictions use SEED to manage their BPS end to end, others integrate additional software solutions to organize data and communicate with stakeholders. For a comprehensive guide on selecting BPS software, please see the [Software Procurement Guide for BPS](#).

Data management is at the heart of a BPS and benchmarking program. In general, these policies require many building owners to submit building and energy data to the jurisdiction each year, which must be verified to determine compliance. SEED reduces the number of staff required to track and oversee building compliance programs. Lessening the administrative burden through strategic software practices frees up staff to focus their limited bandwidth on the critical program and policy substance of decarbonizing and improving the performance of their building stock.

The SEED Workflow

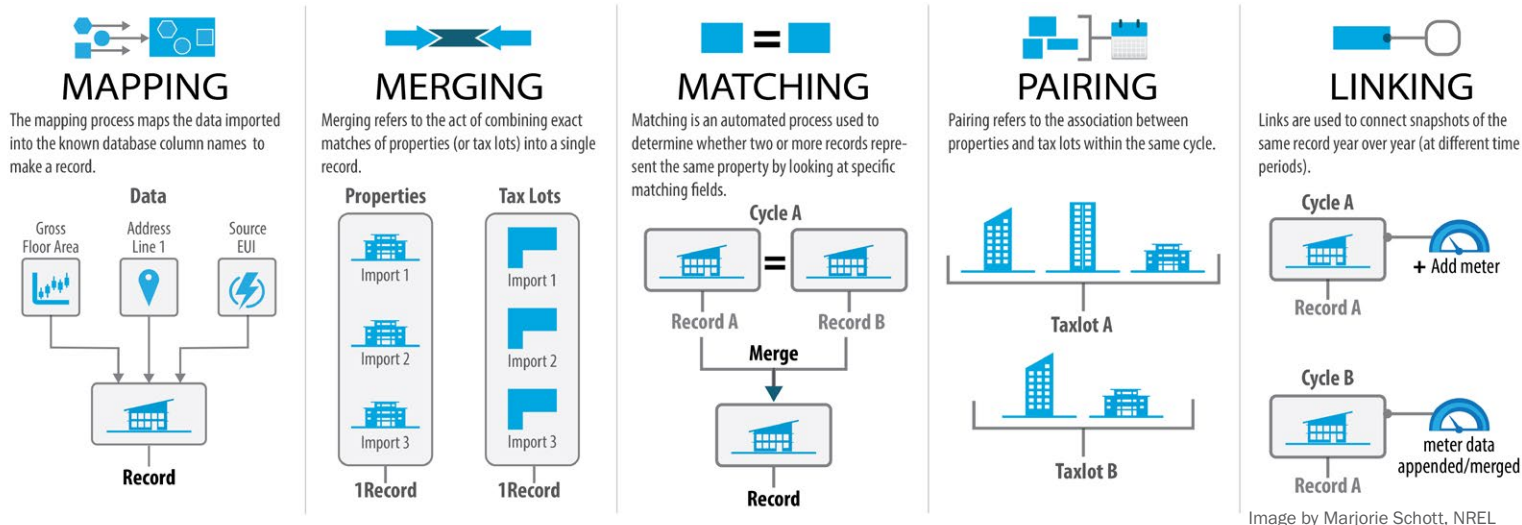
Step 1: Import Your Data

When building owners submit their building data to cities, it is imported directly into the SEED Platform. SEED supports several import formats (such as spreadsheets, BuildingSync XML, Home Performance XML, Green Button, or a direct import from the ENERGY STAR® Portfolio Manager) and can accept single-building or batch imports. When the data are imported, SEED performs the following steps automatically.



The SEED Platform enables stakeholders to move from print documents and files to one organized digital file with the ability to track and analyze data.

Image by Besiki Kazaishvili, NREL.



Mapping: One of the biggest challenges for energy and emissions programs is creating an accurate list of parcels, buildings that sit on those parcels (i.e., tax lots), and corresponding energy data for each building. This requires data from multiple sources:

- Tax lots (from cities)
- Individual buildings located on tax lots (from building owners)
- Energy data (from utilities, often through the ENERGY STAR Portfolio Manager).

SEED can import data from these three sources and marry them together using its mapping function. During this process, data are mapped to a consistent taxonomy so they can be easily organized and analyzed. For example, SEED automatically converts data into specified units

(such as square feet or kilowatt-hours) to ensure data are consistent across buildings, cycles, and suborganizations.

Merging: SEED merges records that are identical to prevent duplicate records, duplicate records, which can happen with automated imports from other data sources.

Matching: SEED searches to find any existing records that match user-specified criteria.

Pairing: SEED runs an algorithm to pair properties with the corresponding tax lots based on fields that match in both property and tax lot records. Users are able to update the automated pairings using a drag-and-drop interface as needed.

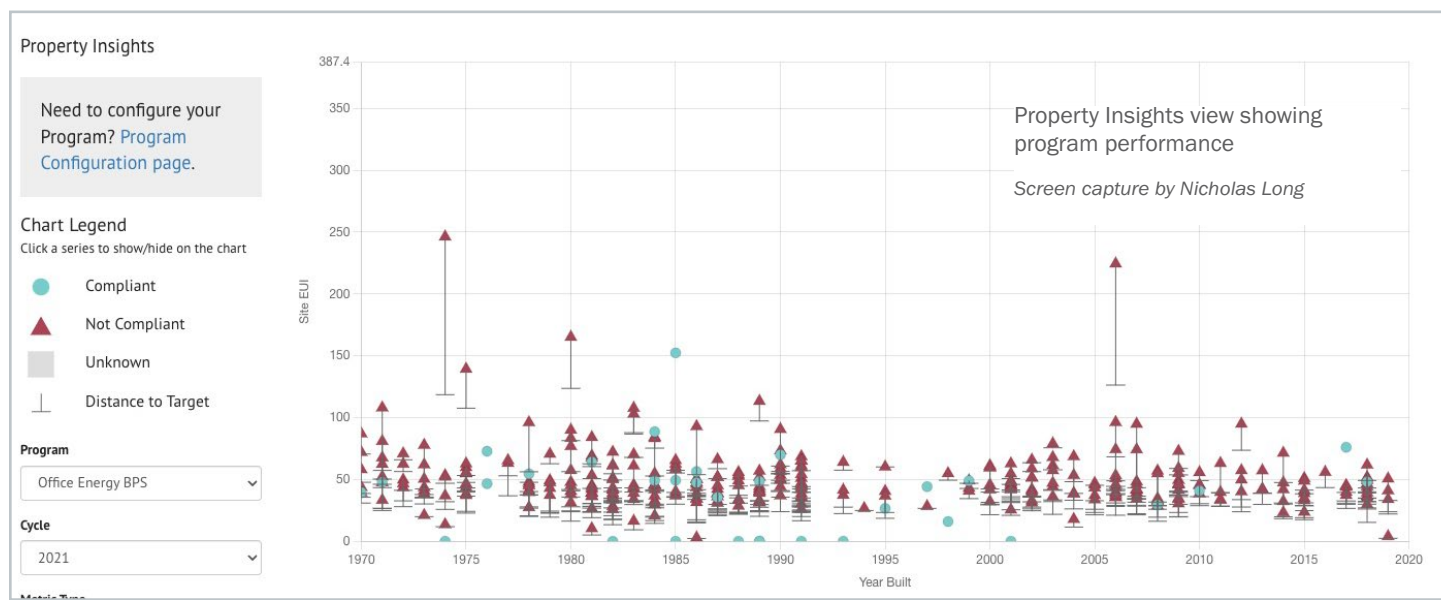
Linking: The last step is an algorithm that determines whether the property or tax lot is already part of another reporting

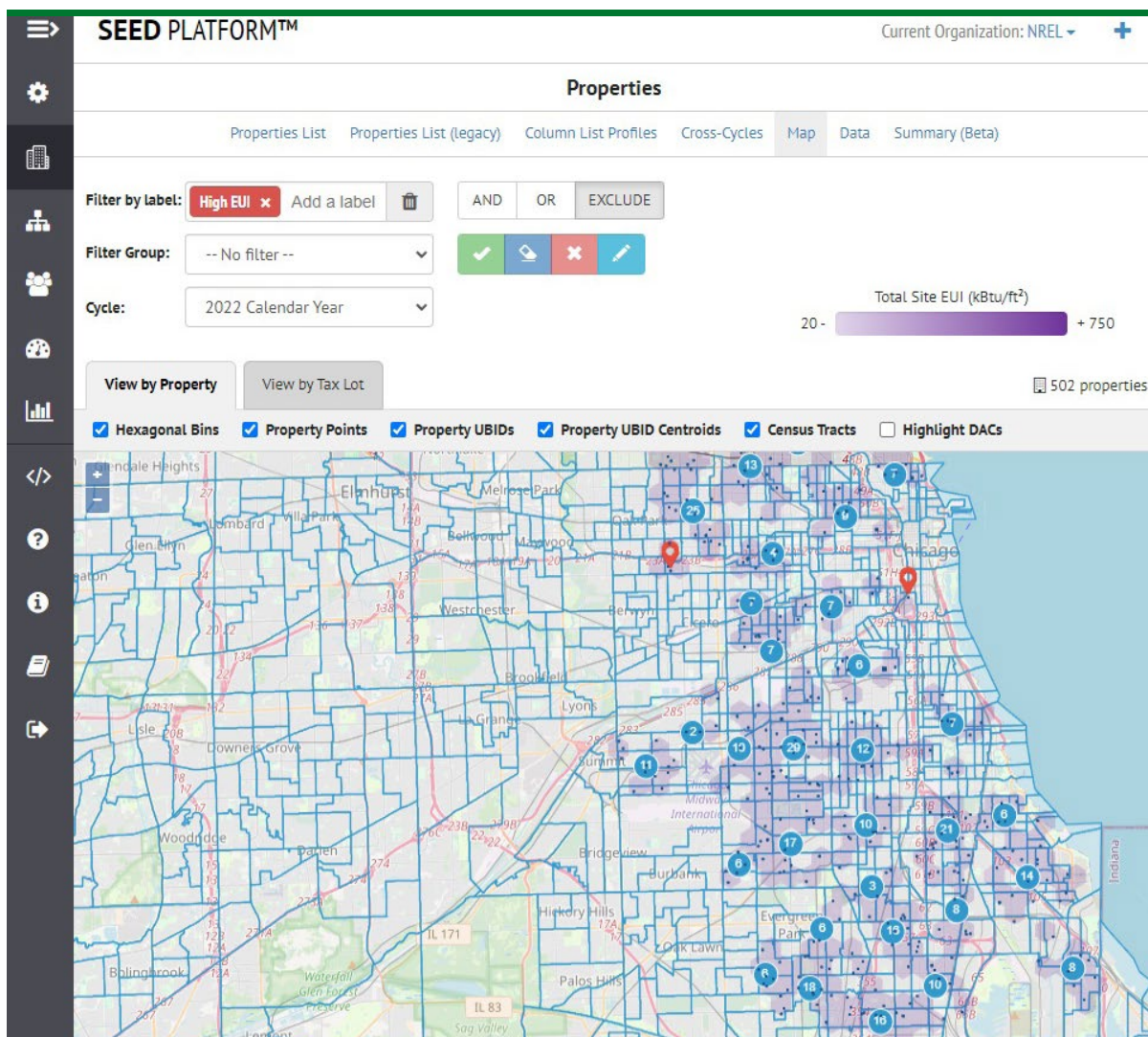
period. If so, the new data are linked to the earlier time period to create a timeline for each property.

Step 2: Validate Your Data

SEED cleans data to ensure a city's greenhouse gas emission reduction efforts are built on accurate information.

"SEED's ability to update data and track resubmittals saved us so much time in San Francisco. These automations allow us to flag issues and errors, and help decrease staff time."
—Ammon Reagan, Sustainability Coordinator, City of Berkeley





Map view showing properties in organization

Screen capture by Nicholas Long

Run Data Quality Checks: Because SEED is built on top of a consistent taxonomy, the platform can run quality assurance/quality control on each field of data. Users define the parameters that separate “good” data from “suspect” or erroneous data. Data quality checks are run on each data import but can be run at any time and are automatically run during data ingestion.

Label Data: Labels can be used to create any type of categorization desired. For example, users can label suspect data, allowing them to quickly filter their entire building inventory to investigate problems and correct issues. Labels can be custom-made or set up automatically to catch fields that are out of bounds, based on limits set by the user in the data quality checks in the Data Quality configuration.

View Current Data Against Historical Trends: SEED maintains an audit history

of all changes that have ever happened to a property. Changes to individual buildings are identified in yellow so users can quickly scan the fields for improvements or problems. For example:

- **Size Changes:** If the square footage of a building changes from 80,000 to 70,000 square feet, city staff could contact the building owner to confirm whether or not the size of the building has been reduced.
- **Energy Use Changes:** City managers can quickly spot when a building has reduced its energy use to gauge which buildings are implementing energy efficiency or clean energy measures.

Catch Errors: Because SEED remembers building history, it automatically flags potential errors. This is an important feature because it is very common for energy meters, building sensors, and data pipelines to fail, resulting in corrupt data.

Step 3: Use Your Data

SEED provides a simple interface that enables users to view data from different angles, identify trends, and craft policy to improve the building stock.

Group Properties: Users can group properties together for a variety of purposes. For example, a user can create groups to:

- Display all buildings that are in compliance
- Create and visualize one or multiple programs (for example, benchmarking and BPS) with unique metrics for each
- Create and visualize cohorts of buildings for tracking through filter groups. Filter groups can be created to quickly recall a set of buildings that have specific labels or constrained to specific column values.

Filter Data: SEED displays data in a variety of ways to enable easy decision-making. For example, users can:

- View a map of all their buildings
- Compare the energy use of public and private-sector buildings
- Identify the most energy-intensive buildings in the city.

Analyze Data: Designed specifically with buildings in mind, SEED is optimized to provide insights into the building stock. For example, jurisdictions with benchmarking programs use SEED to:

- Run annual reports of building stock performance
- Calculate direct and indirect greenhouse gas emissions in alignment with EPA/ESPM of a property based on the meter data and location.

- Compare energy consumption by size/age/type of building
- Create lists of buildings or tax lots that did not comply with requirements.

Incorporate Third-Party Applications:

SEED incorporates third-party tools to go beyond basic data management and provide users with extra analysis and services. For example, National Renewable Energy Laboratory (NREL) developers have linked SEED to popular software such as:

• **Building Efficiency Targeting Tool for Energy Retrofits (BETTER):**

This tool analyzes the energy use of various buildings and recommends cost-effective energy retrofits. Linking SEED to BETTER allows jurisdictions to give building owners actionable steps to save on operating costs and reduce carbon emissions, all within the SEED interface.

- **Audit Template:** Building energy auditors can submit a detailed energy audit (e.g., ASHRAE Standards 211 Level 2) Audit Template into SEED to view both building data sets alongside one another. For more information on how to use Audit Template for BPS go to <https://help.buildingenergyscore.com/support/solutions/8000051362>.

Governments use the SEED Platform to manage building data as part of implementing benchmarking programs and BPSs. SEED-generated reports can identify energy and equity priorities among buildings and neighborhoods so that program managers can target them with energy efficiency and clean energy incentives.

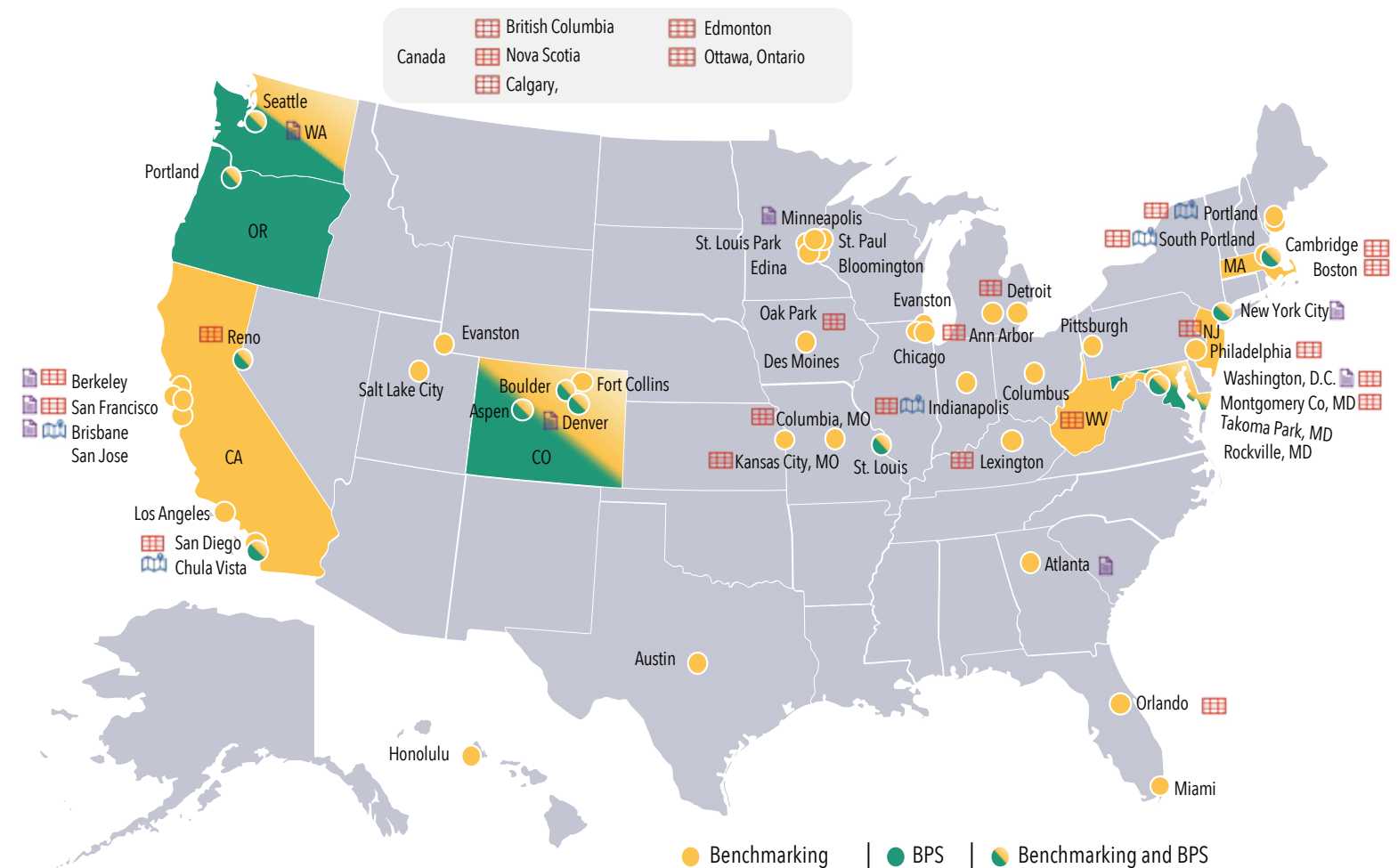


Image of all jurisdictions using SEED

Credit: <https://www.energycodes.gov/BPS/Implementation>



Boston is using SEED for benchmarking and BPS.

Credit: Giovanni Gagliardi, Pond5.com

- **Customer Relationship Management (CRM):** One can send emails to building owners straight from SEED, but in some cases, a jurisdiction may want a more comprehensive CRM tool. For example, a user can use SEED's built-in Salesforce connection to exchange data on a nightly interval. This can be used to send automated emails to building owners about their compliance status.

"In a program that deals so much in data, having a competent data software program is crucial. SEED was the missing link we needed."

— Andrew Held,
Department of Energy and
Environment, Washington, D.C.

Additional Information

Costs and Implementation Users: Users may take advantage of SEED via three options:

1. Self-hosting using local or already procured cloud-based IT resources,
2. Self-hosting with new cloud-based resources
3. Using third-party hosting software providers (such as Earth Advantage or the national labs).

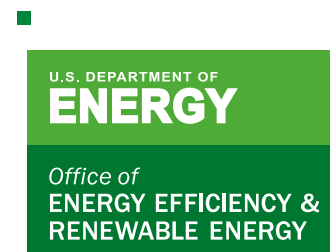
Other platforms for managing BPS and benchmarking data often charge a yearly per-building fee to manage. Because the SEED Platform is open source, the cost of implementing SEED is computer time and staff time to manage the instance. A city can host an instance of SEED using basic cloud hosting infrastructure inexpensively.

Data Security and Privacy: SEED is built with modern, web-based technologies that are maintained and undergo continuous security screening. In

addition, SEED requires secure sockets layer (SSL) protocols and multiple forms of authentication options based on IT requirements.

The data that is stored within SEED does not belong to SEED. The proprietary data within SEED shall remain protected until the user decides to terminate their account.

Test accounts are available for free, if desired. Fill out a request via the SEED Interest Form on DOE's SEED web page (<https://www.energy.gov/eere/buildings/standard-energy-efficiency-data-seed-platform>).



For more information, visit:
energycodes.gov/BPS

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