# RT-RMOD: Real-time Resiliency Monitoring and Operational Decision Support Tool

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## Software Dependency

* PostgreSQL 12 (pgAdmin 4 is included)
* Python 3.8 or later and related libraries required to build RT-RPIA
  + click==7.1.1
  + cycler==0.10.0
  + decorator==4.4.2
  + Flask==1.1.1
  + Flask-JWT==0.3.2
  + flask-marshmallow==0.11.0
  + Flask-SQLAlchemy==2.4.1
  + itsdangerous==1.1.0
  + Jinja2==3.0.1
  + kiwisolver==1.3.1
  + lml==0.0.9
  + MarkupSafe==2.0.0
  + marshmallow==3.5.1
  + marshmallow-sqlalchemy==0.22.3
  + matplotlib==3.3.3
  + networkx==2.5
  + numpy==1.19.1
  + pandas==0.25.3
  + Pillow==8.1.0
  + psycopg2==2.8.4
  + pyexcel-io==0.5.20
  + pyexcel-xls==0.5.8
  + PyJWT==1.4.2
  + pyparsing==2.4.7
  + python-dateutil==2.8.1
  + pytz==2020.1
  + scipy==1.5.4
  + six==1.14.0
  + SQLAlchemy==1.3.15
  + Werkzeug==1.0.0
  + xlrd==1.2.0
  + xlwt==1.3.0
* Create Database: “radiencedb”

Graphical user interface, text, application

Description automatically generated

* Dump data into Database:
  1. Right-click on the new database “radiencedb” and then click on “Restore”
  2. In filename, browse to location “..\RT\_RMOD\Project\_Radiance\_CEC\RadianceProject”
  3. Select “rmoddb.sql”
  4. Click “Restore”

Graphical user interface, text, application, email

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#### Step 5: Locate to the directory “..\RT\_RMOD\Project\_Radiance\_CEC\RadianceProject\”. Run the RT-RMOD application to check if the required softwares are installed successfully.

python ssebackend.py

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#### Step 6: Go to “http://127.0.0.1:5000/”, you should be able to see the following webpage.

Graphical user interface, application

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RT-RMOD:

Power system resiliency has become a key priority for multiple stakeholders, given an observed increase in severe weather events in recent years and impact on the power distribution grid.

Distribution network operators need to access and analyse the resiliency of the system through carefully designed visualization driven by data and model-based analytics. Operators require real-time data visualization of system states and resiliency indicators to make correct operational decisions and to control actions to minimize system impact.

RT-RMOD: Realtime-resiliency monitoring, and operational decision support is a resilience-driven visualization tool, the Real-time resiliency Management system tool, developed to assist the operators in decision making and resiliency assessment. The RT-RMOD tool utilizes multi-dimensional resilience metrics, geospatial visualization, and data monitors assessing resilience indicators and other key data points.

The importance of the present tool, especially in geographically isolated communities, where resiliency is valued more than economic operation. The web-based application with large amounts of data is analyzed by implementing a three-layered architecture and the backend run on RESTful APIs.

Features:

System information: This helps the planner and operator to overlook and observe the system conditions from the control room.

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Graphical user interface

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Resiliency monitoring: This tab contains the metrics that are being monitored and it’s visualization is displayed using charts and a time series curve. This helps the operator to identify any failures or alerts.

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Graphical user interface, website

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Table

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Alert and Service Area outages: This tab consists of Alert information, Alert field crew and customer alert. All the alert information is present here which is used by the operator in case of power outage. Also, a live map displaying the info related to power outage is displayed here.

Graphical user interface, website

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Graphical user interface, application, website

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Decision Support: This tab consists of information about expected event details, expected outage summary, Reserve availability, Suggested proactive action, inventory availability and resiliency score chart. All the info on this tab helps the operator in making a decision by estimating the risk management.

Graphical user interface

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Graphical user interface, website

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