

## **Title: FEMA Declared Disasters and their Mitigation**

### **Team Information:**

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### **Type of Project:** LOGD Project

## **1. Introduction**

Semantic web is a web of data to be shared and reused across application, enterprise, and community boundaries. This data can be linked together to develop interesting applications and generate interesting facts and information. We are using semantic web technologies like logd, fuseki and gruff to mash up 2 datasets, query them together to generate and show results that can be of help to anyone wishing to know or analyze FEMA declared disasters since 1964 and compare state wise allocation of funds and other details. RDF provides the foundation for publishing and linking the data. We have taken our data as files containing triples in turtle form from the US government's data.gov website, a web portal managed and hosted by the U.S. General Services Administration, Office of Citizen Services and Innovative Technologies and have used SPARQL to query on the mashed up datasets. This gives us the result set as per the requirements marked by the user with the Disaster names and other details.

## **2. Target Audience**

This project has been developed for people who wish to know or analyze FEMA disasters which were declared in "Hazard Mitigation program" and compare state wise allocation of funds with details like Incident begin date, Incident end date, Title (for example severe winter storms), Grant amount, mitigation program description and status of the program and then graphically see the fund amount received by various states across united states.

This can help users and citizens to know which states have suffered more in severe disasters and how much money each state has received for the same. User can use this facility by entering the year and he will know the disasters in that particular year which were FEMA declared in category "Hazard Mitigation program", funds allocated to them, state or region receiving those funds and their status. User can check which programs are still running, which are approved, which ones are closed and which ones are withdrawn. This will empower citizens, NGO's or local bodies with information and knowledge to check what FEMA or government has done for sever disasters, how much fund is allocated and which states were most affected. With this information they can analyze on their own the effects of the program (suppose they were in the zone where disaster occurred).

For example, the user can be a victim of a particular disaster or lives in a state where disasters are frequent or may be a reporter, he can enter the year of disaster and he can see state wise FEMA declared disasters and collect information like status of the program, funds granted for the same, program title, program description and if the particular disaster they are searching is not in the list, they can conclude that it is not declared by FEMA or is not in the category of “Hazard Mitigation program”. Likewise, various other information for analysis purpose can be gathered.

This application can also be useful for those who wish to study disaster pattern state wise or those who want to follow FEMA activities or NGO’s gathering information about disaster occurrences, their states, project description and their status. They can find and analyze if any particular state lacks some facility or is more dependent on FEMA or if a particular state receives more funds or suffer more loss (may be due to more people and infrastructure).

### 3. Description of Data Sources:

The data has been taken from the data.gov, a US government’s web portal managed and hosted by the U.S. General Services Administration, Office of Citizen Services and Innovative Technologies. We have taken 2 datasets from this portal and used SPARQL to mash them up and query on it. The datasets have been downloaded as n-triples in turtle format (.nt files) and SPARQL is used to query on these datasets. The data sets are as follows:

a.) **Dataset 1491-** FEMA Disaster Declarations summary.

Publisher: Department of Homeland Security

Dataset 1491: [http://data-gov.tw.rpi.edu/vocab/Dataset\\_1491](http://data-gov.tw.rpi.edu/vocab/Dataset_1491)

RDF Dump: <http://data-gov.tw.rpi.edu/raw/1491/data-1491.nt.gz>

This data set is about FEMA disaster summary and has below important points

- a. All federally declared disasters (fire management records are partial and county not available before 1964)
- b. All three disaster declaration types - major, emergency, fire management.
- c. Declared recovery program and geographic areas.

- Number of triples: 538, 433
- Number of entries: 37,059

b.) **Dataset 1493:** FEMA Hazard Mitigation Program Summary

Publisher: Department of Homeland Security

Dataset 1493: [http://data-gov.tw.rpi.edu/vocab/Dataset\\_1493](http://data-gov.tw.rpi.edu/vocab/Dataset_1493)

RDF Dump: <http://data-gov.tw.rpi.edu/raw/1493/data-1493.nt.gz>

This data set about FEMA hazard mitigation program summary and has some below important points

- a. Grants to states and local govt. to implement long term hazard mitigation measures after a major disaster declaration.
  - b. To reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during immediate recovery from a disaster
  - c. HMGP - hazard mitigation grant program.
  - d. HMGP projects stored in the national emergency management information system.
- Number of triples: 280,055
  - Number of entries: 16,783

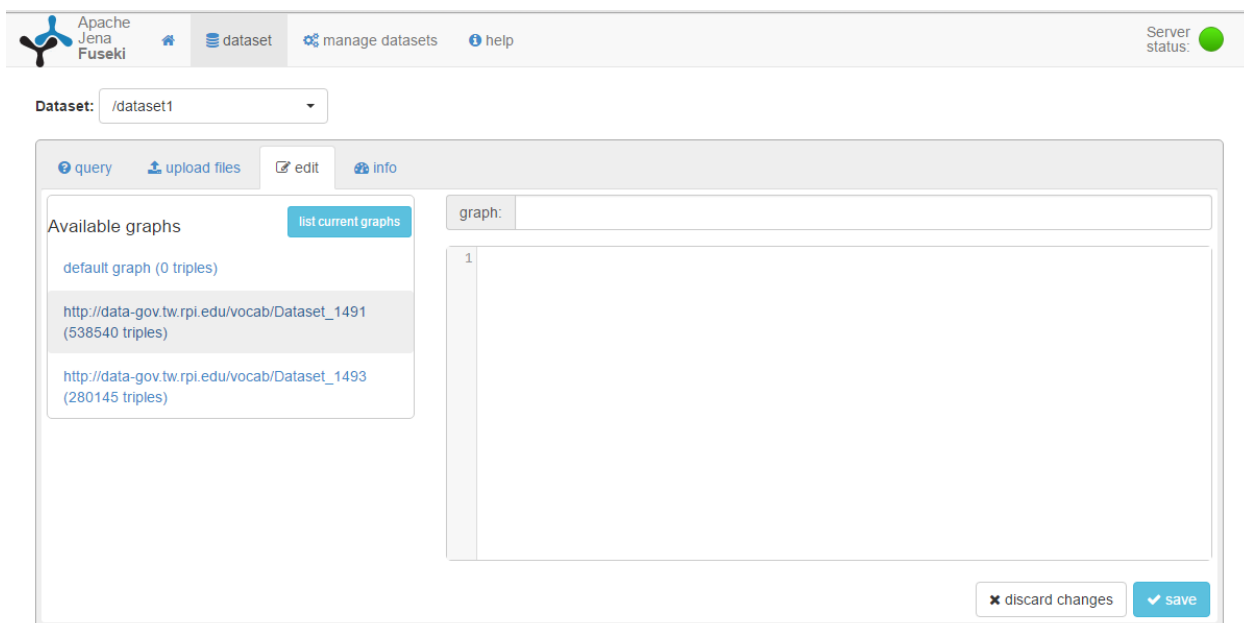


Fig 1: Dataset 1491 & 1493

## 4. Data Integration

Both the datasets have a common attribute facility name with URI *<http://data-gov.tw.rpi.edu/vocab/p/1493disaster\_number>*. This has been used to mash up the two datasets.

Dataset 1491 is used to query if the following is available or not: disaster number, incident start date and incident end date

Dataset 1493 is used to query for the following: title, state, funds granted (project\_amount), mitigation program description (project\_description) and status

Also, each dataset has common attribute state with URI [http://data-gov.tw.rpi.edu/vocab/p/1491/disaster\\_number](http://data-gov.tw.rpi.edu/vocab/p/1491/disaster_number) in 1491 dataset and [http://data-gov.tw.rpi.edu/vocab/p/1493/disaster\\_number](http://data-gov.tw.rpi.edu/vocab/p/1493/disaster_number) in 1493 dataset. This attribute has also been used for mashing up the two datasets and the output can be populated for individual states and mitigation programs.

For example, both the datasets have a title name as “SEVERE WINTER ICE STORM” with disaster\_number “1671”. This disaster number is used to query the dataset 1491 about incident start date and incident begin date and dataset 1493 about project description (mitigation program description), title, funds granted, status and state (region).

Since, all the attributes are matched for this disaster number; the disaster details are shown in the result set.

## **5. Data product results**

The user is provided with links (HTML files) where they can see the pie charts and tables to visualize the FEMA mitigation programs details along with state wise allocated funds.

SPARQL is used to query the two datasets present in n-triple format (.nt file). Queries for both pie chart (sum of allocated funds for a particular state) and table (FEMA program details) are used and checked on Fuseki.

The following fig 2 shows the pie chart where user can see the funds allocation state wise.

Fig3 shows how user can hover over the pie chart to see the allocated funds (in USD) for a particular state.

Fig4 shows the table where user can find any FEMA program and its mitigation and other details.

# FEMA Mitigation Programs

## State vs Funds Allocated

Funds in USD(Can be seen by hovering)

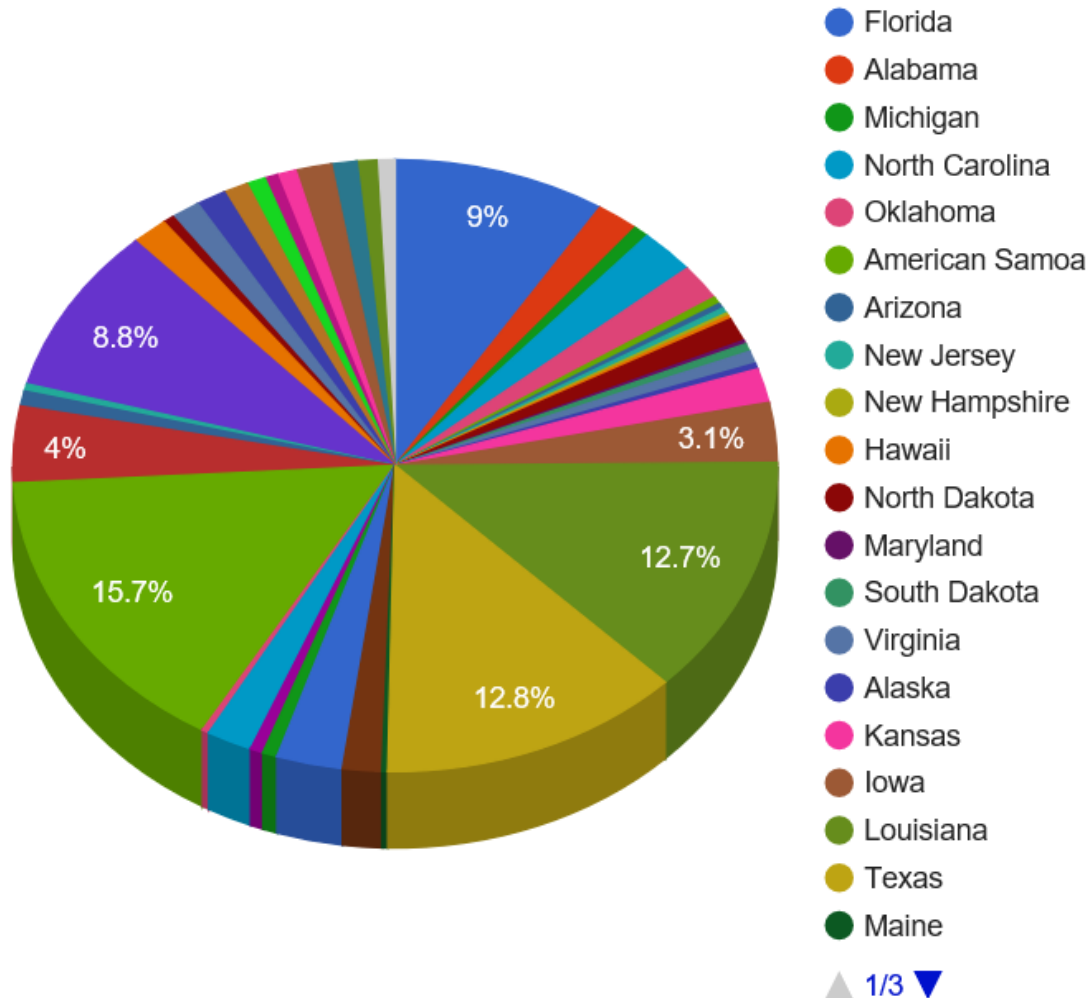


Fig 2: Pie chart (State vs allocated funds)

## State vs Funds Allocated

Funds in USD(Can be seen by hovering)

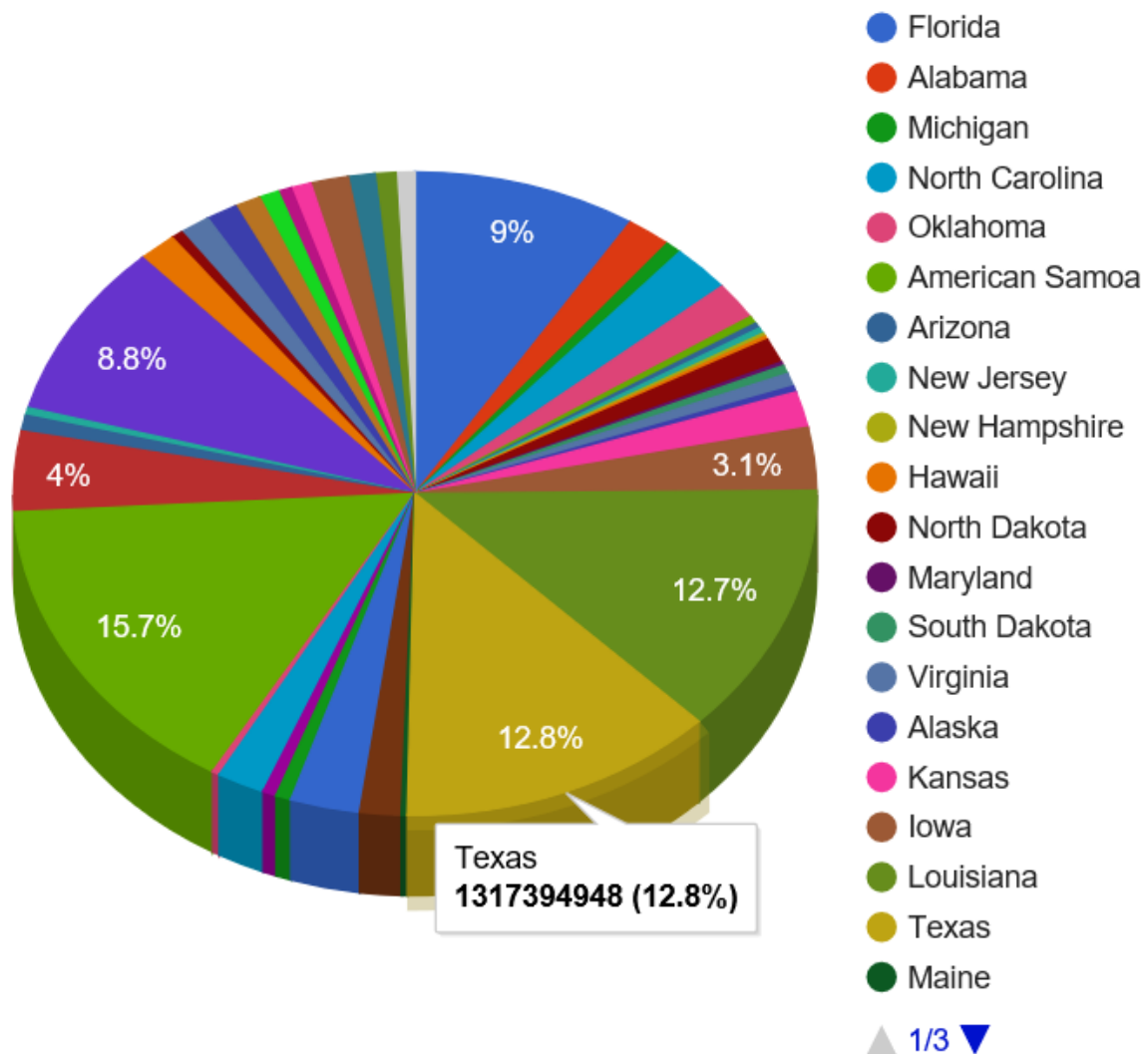


Fig 3: pie chart after hovering on a particular state

## FEMA Mitigation Programs

### State vs Funds Allocated

Title	Disaster_Number	Incident_Begin_Date	Incident_End_Date	Region	Funds_Allocated	Status	Program_Description
UAKH COUNTY ELEVATION	1240	20-AUG-98	01-SEP-98	North Carolina	747816	Closed	HILSHIWAY 12, HISSCU, NICK LOUIS M, HUPPE, TELS, W, KILLEY HAWK, NICK FLOYD BASNIGHT, 5413 MASHPOKE ROAD, MANN'S HARBOR, NC10, BOYD BASNIGHT 95 THE LANE, WANCHESE, NC11, CARL BEACHAM 4289 MILLS LANDING ROAD, WANCHESE, NC12, EDITH F. DANIELS 4283 MILLS LANDING ROAD, WANCHESE, NC13, EDNA E. DANIELS 4331 MILLS LANDING ROAD, WANCHESE, NC14, MICKEY T. DANIELS 4292 MILLS LANDING ROAD, WANCHESE, NC15, MILAH DOUGH 4332 MILLS LANDING ROAD, WANCHESE, NC16, NOAH FORBES (HEIRS) 4324 MILLS LANDING ROAD, WANCHESE, NC17, JOHN&JANET MCCASKILL 252 THE LANE, WANCHESE, NC18, KEITH C. THOMPSON 127 THE LANE, WANCHESE, NC19, MYRTLE TILLET 170 THE LANE, WANCHESE, NC20, RHONDA TILLET 321 THE LANE, WANCHESE, NC21, MARGARET WALKER 112 THE LANE, WANCHESE, NC
TROPICAL STORM CHARLEY	1239	22-AUG-98	31-AUG-98	Texas	39910	Approved	SMC-KHAND-08/03/1999 20:52 GMT
Management Cost for State personnel	1239	22-AUG-98	31-AUG-98	Texas	39910	Approved	SMC-KHAND-08/03/1999 20:52 GMT
OK, TORNADOES 5/3/99	1272	03-MAY-99	04-MAY-99	Oklahoma	16797867	Approved	The intent of this initiative is to provide an incentive for the construction of safe rooms-MSMITH3-07/09/2003 20:29 GMT
State of Oklahoma Safe Room Initiative	1272	03-MAY-99	04-MAY-99	Oklahoma	16797867	Approved	The intent of this initiative is to provide an incentive for the construction of safe rooms-MSMITH3-07/09/2003 20:29 GMT
OK, TORNADOES 5/3/99	1272	03-MAY-99	04-MAY-99	Oklahoma	373359	Approved	State Management Costs for period May 3, 1999 - December 31, 2000-KREIMER-02/11/2002 22:30 GMT
State Management Costs	1272	03-MAY-99	04-MAY-99	Oklahoma	373359	Approved	State Management Costs for period May 3, 1999 - December 31, 2000-KREIMER-02/11/2002 22:30 GMT
TX-FLOODING 10/18/98	1257	17-OCT-98	15-NOV-98	Texas	1466126	Approved	Acquisition of 27 substantially damaged projects in Hays County-MPRICE-10/22/2001 18:59 GMT
Hays County Acquisition Project	1257	17-OCT-98	15-NOV-98	Texas	1466126	Approved	Acquisition of 27 substantially damaged projects in Hays County-MPRICE-10/22/2001 18:59 GMT
TROPICAL STORM CHARLEY	1239	22-AUG-98	31-AUG-98	Texas	39910	Approved	SMC-KHAND-08/03/1999 20:52 GMT
Management Cost for State personnel	1239	22-AUG-98	31-AUG-98	Texas	39910	Approved	SMC-KHAND-08/03/1999 20:52 GMT
HURRICANE GEORGES	1249	25-SEP-98	07-OCT-98	Florida	247482	Closed	THIS PROJECT INVOLVES REPLACING EXISTING TELEMETRY TOWERS WITH NEW ONES RATED FOR 155 MPH WINDS. THE HMGP PORTION OF THE PROJECT WILL FUND THE UPGRADE FROM 110 TO 155 MPH. THE PROJECT WILL ALSO STRENGTHEN THE ROOF WHICH WILL STABILIZE THE TOWER INTERFACE.
S. FL. WATER MANAGEMENT DISTRICT TELEMETRY TOWER RETROFIT	1249	25-SEP-98	07-OCT-98	Florida	247482	Closed	THIS PROJECT INVOLVES REPLACING EXISTING TELEMETRY TOWERS WITH NEW ONES RATED FOR 155 MPH WINDS. THE HMGP PORTION OF THE PROJECT WILL FUND THE UPGRADE FROM 110 TO 155 MPH. THE PROJECT WILL ALSO STRENGTHEN THE ROOF WHICH WILL STABILIZE THE TOWER INTERFACE.
HURRICANE GEORGES	1249	25-SEP-98	07-OCT-98	Florida	339100	Closed	THE PROJECT INVOLVES: PHASE I: 1. DRAFTING, ENGINEERING AND PERMITTING PHASE II: 1. REPLACE EXISTING 18" & 36" DIAMETER RCP CROSSING BROOKRIDGE TRACE WITH ALUMINUM BOX CULVERT 2. REPLACE EXISTING 18" & 36" DIAMETER CMP, SOUTH OF WAREHOUSE AND CROSSING ODDFELLOW STREET WITH ALUMINUM BOX CULVERT #9-B. 3. INSTALL ALUMINUM BOX CULVERT #16-C FROM CULVERT CROSSING ODDFELLOW STREET TO EXISTING BOX CULVERT NORTH OF LEWIS TURNER BOULEVARD 4. REPLACE 2 JUNCTION BOXES 5. REPLACE INLETS AND EXISTING 18" & 24" DIAMETER CMP ALONG ODDFELLOW STREET 6. MOBILIZATION/DEMOLITION
NORTHERN PINE DRAINAGE PROJECT	1249	25-SEP-98	07-OCT-98	Florida	339100	Closed	THE PROJECT INVOLVES: PHASE I: 1. DRAFTING, ENGINEERING AND PERMITTING PHASE II: 1. REPLACE EXISTING 18" & 36" DIAMETER RCP CROSSING BROOKRIDGE TRACE WITH ALUMINUM BOX CULVERT 2. REPLACE EXISTING 18" & 36" DIAMETER CMP, SOUTH OF WAREHOUSE AND CROSSING ODDFELLOW STREET WITH ALUMINUM BOX CULVERT #9-B. 3. INSTALL ALUMINUM BOX CULVERT #16-C FROM CULVERT CROSSING ODDFELLOW STREET TO EXISTING BOX CULVERT NORTH OF LEWIS TURNER BOULEVARD 4. REPLACE 2 JUNCTION BOXES 5. REPLACE INLETS AND EXISTING 18" & 24" DIAMETER CMP ALONG ODDFELLOW STREET 6. MOBILIZATION/DEMOLITION
HURRICANE GEORGES	1249	25-SEP-98	07-OCT-98	Florida	0	Withdrawn	THE PROJECT INVOLVES PHASE I: 1. ENGINEERING, DESIGN, AND PERMITTING PHASE II: 1. THE RETROFITTING OF THE ROOF BEAM CONNECTIONS TO THE BEARING WALLS, AND THE REINFORCEMENT OF THE EXTERIOR, LOW ROOF WALLS 2. THE INSTALLATION OF FASCIA TRIM AND/OR BRICK TO CONCEAL THE REINFORCING WORK ESTIMATED BUDGET: TOTAL PHASE I PHASE II TOTAL COSTS \$180,000 \$10,000 \$90,000 FEDERAL SHARE (75%) \$135,000 \$7,500 \$67,500 STATE SHARE \$12,500 \$1,250 \$1,250 LOCAL MATCH \$12,500 \$1,250 \$1,250 WORK SCHEDULE - APPLICANT ESTIMATES WORK WILL BE COMPLETED 24 MONTHS FROM THE DATE OF EXECUTION ALTERNATIVES: 1. NO ACTION -

Fig 4: Table for FEMA program details

## 6. Summary

This project uses 2 datasets taken from data.gov web portal to mash them on a common attribute “disaster\_number” and sorted by “states”. SPARQL is then used to query on these data to present a user friendly, easy and readable visualized table and chart. User collect and analyze the information he gets from these chart and tables. This project can be of use to the reporters, common citizens gathering information, NGO’s working for disaster management and mitigation and local bodies to gather and analyze FEMA disaster mitigation programs. In future this project can be extended to make an API where user enters a state or year and for that year and state disasters along with FEMA initiated program are displayed with their information on the server (having current chart and tables) thus using the extensive capabilities of semantic web technology.