

Migrating to PostgreSQL



THE CPUC



Our Mission

The California Public Utilities Commission serves the public interest by protecting consumers and ensuring the provision of safe, reliable utility service and infrastructure at just and reasonable rates, with a commitment to environmental enhancement and a healthy California economy. We regulate utility services, stimulate innovation, and promote competitive markets, where possible, in the communications, energy, transportation, and water industries.

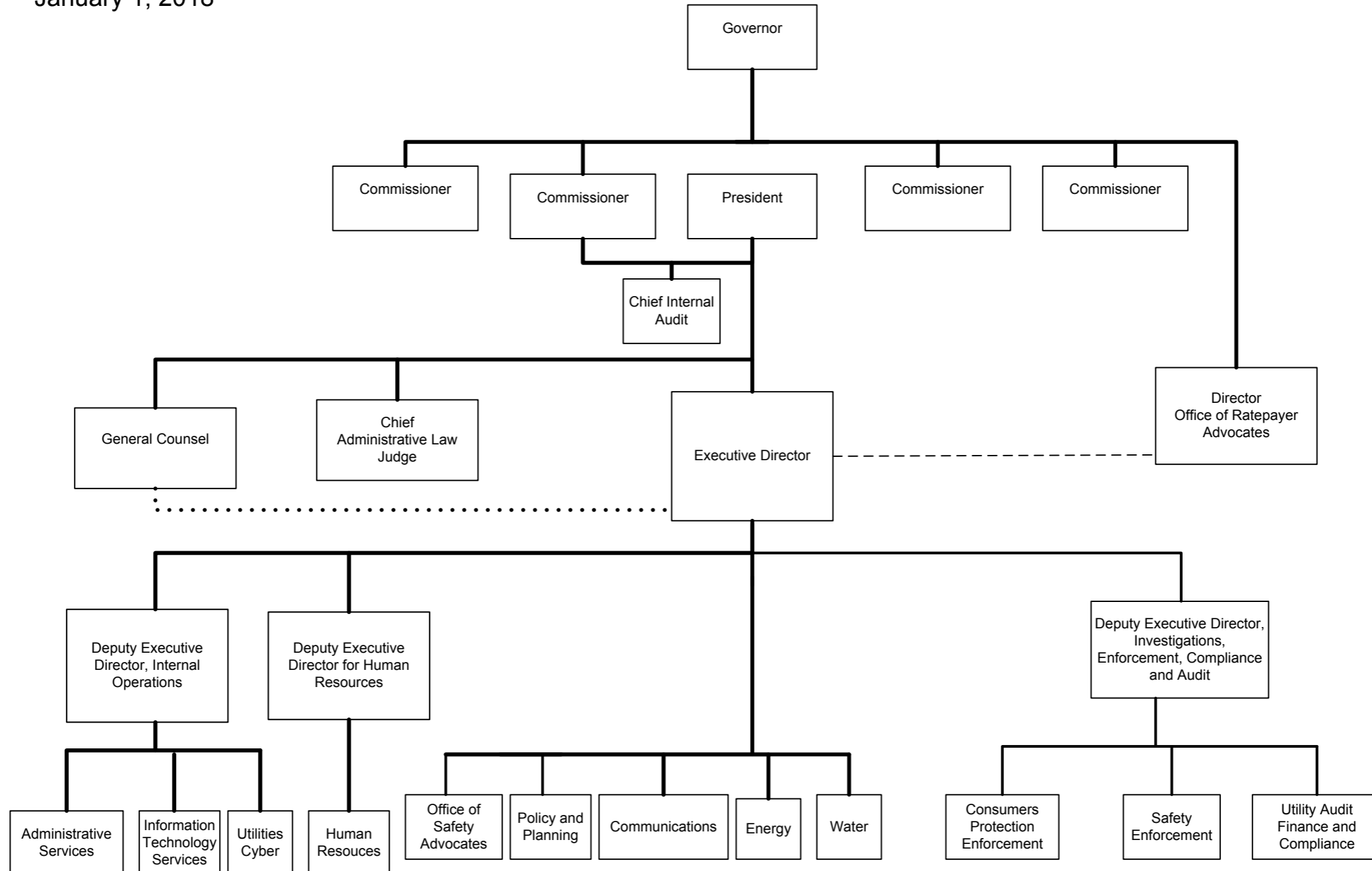
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THE CPUC



California Public Utilities Commission

January 1, 2018

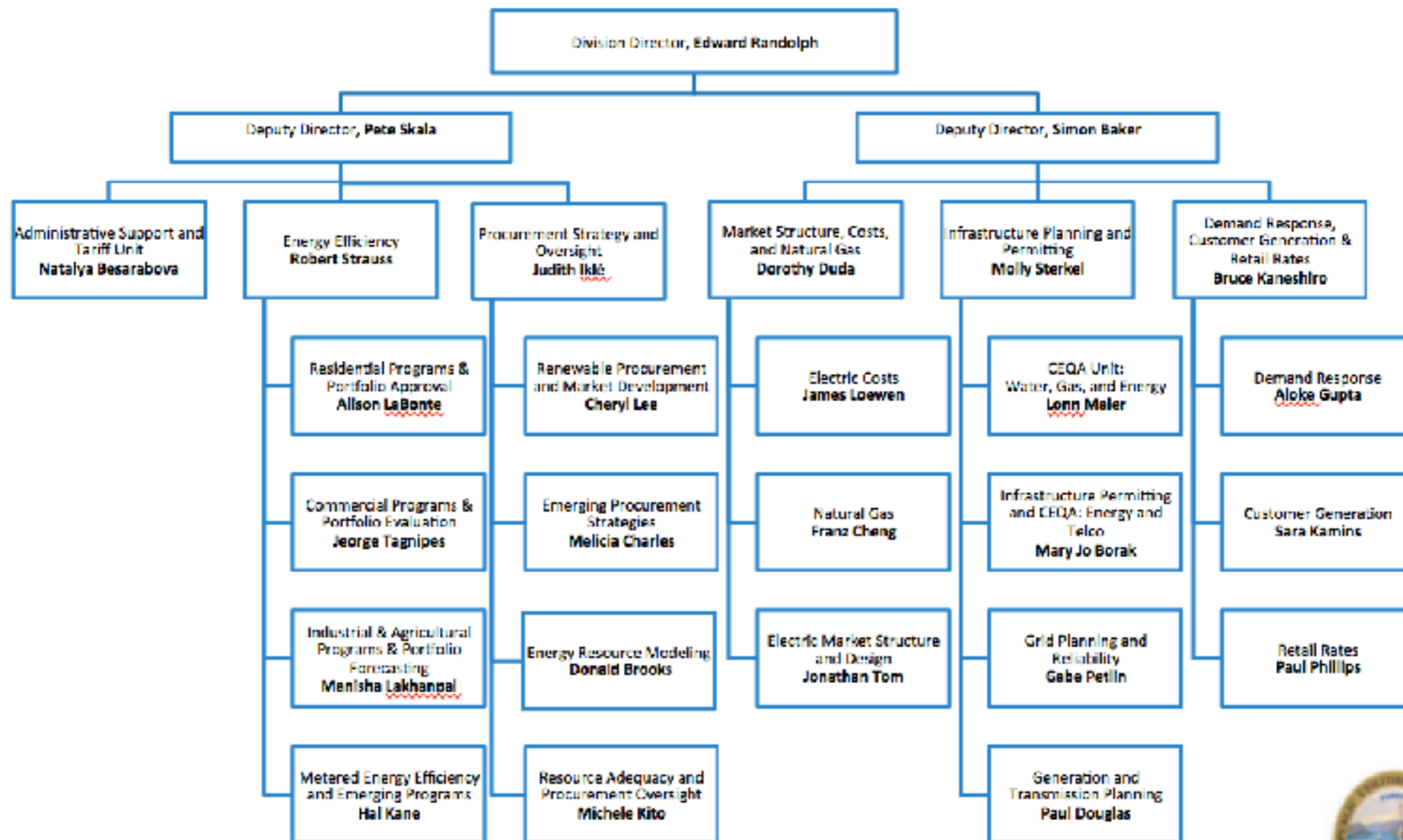


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THE CPUC



Energy Division Organization



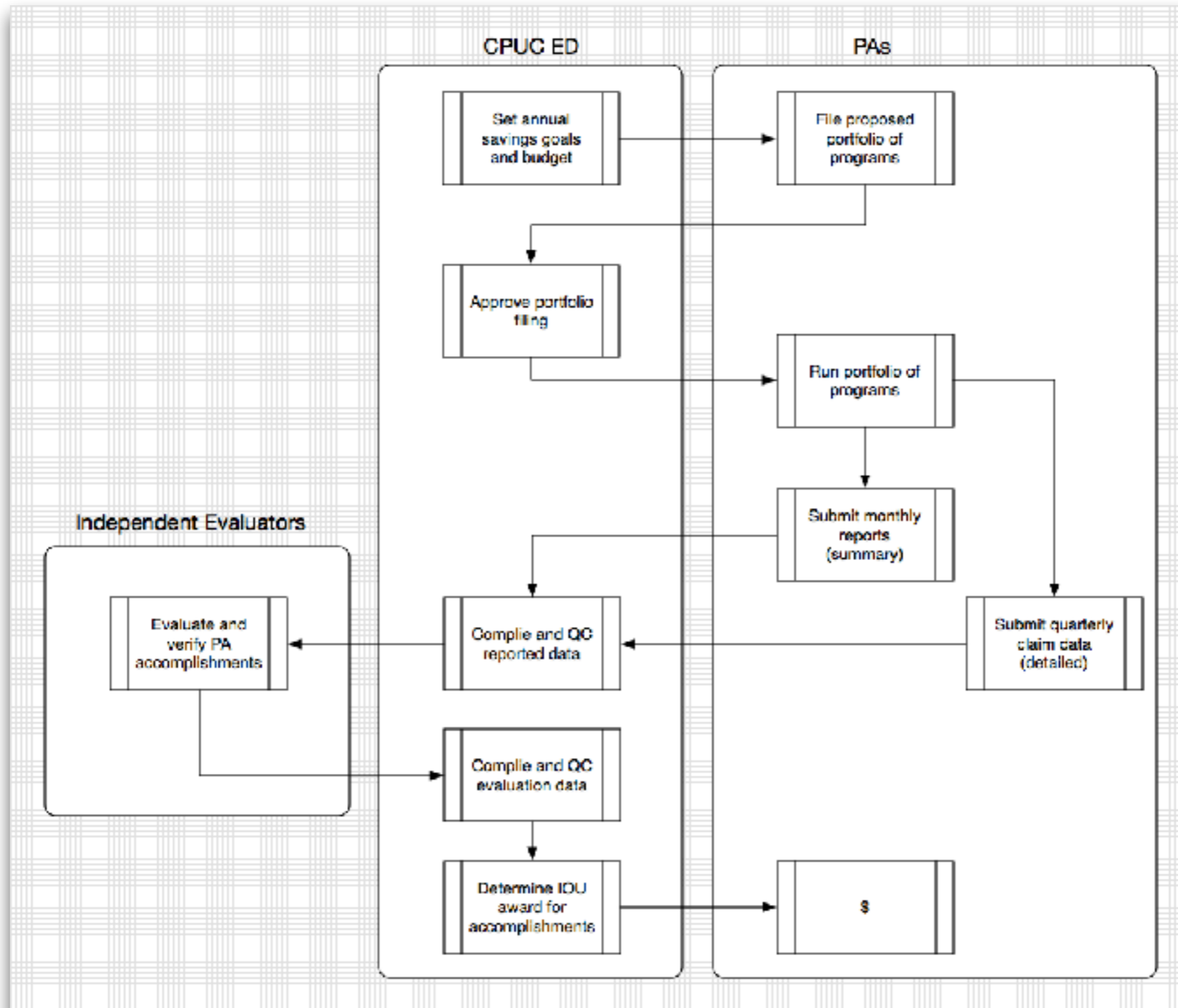
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WORK SCOPE



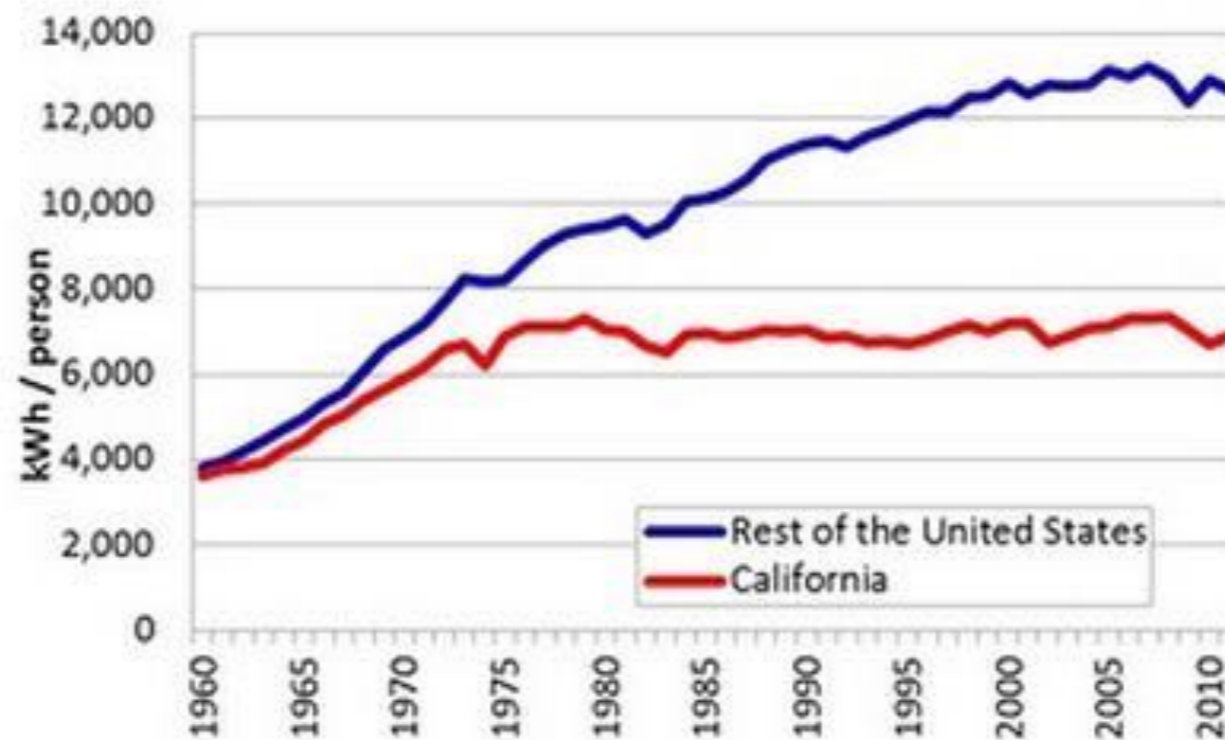
PostgreSQL



EFFICIENCY



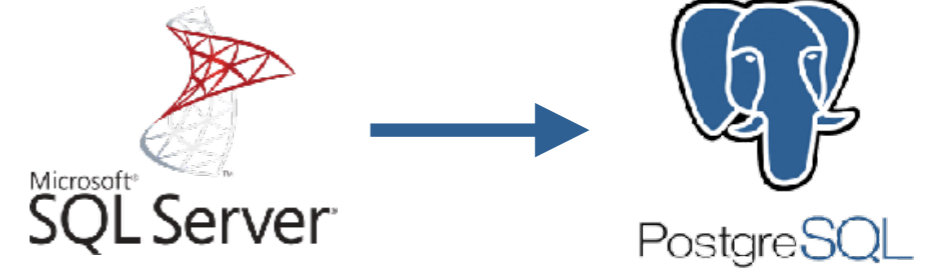
Per Capita Electricity Consumption: California vs. Rest of Nation



Source: U.S. Energy Information Administration

“Imagine where the country could be if it were as efficient as California.”
- F. Noel Perry, venture capitalist, founder of Next 10

AT THE START



When I joined the team in 2009

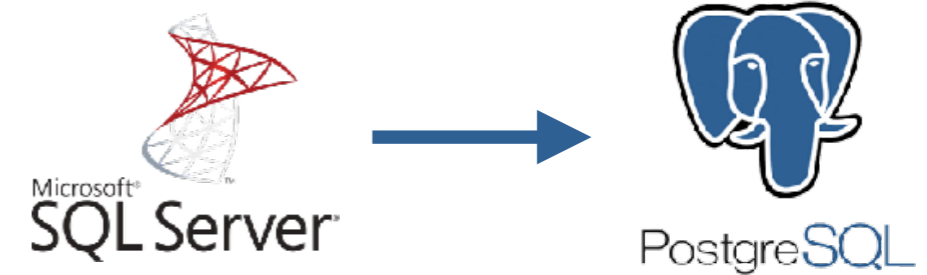
- They were preparing to spin up their first database server.
- They had three years of data in hand, with more data arriving 5x / year.
- The evaluation team needed the data to do their work.
- ETL and QC work were to be done on the new server.
- The evaluation team needed to be able to post and retrieve data from the server.
- Most folks only worked in MS.
- Data exchange with Program Administrators was via MS Access.

The team had recently decided

- To go with MS SQL Server*.
- To also use the database server for SFTP.

*ED purchased a SQL Server 2012 license.

KEY DECISIONS



Where will the database server be hosted?

- In the commercial cloud, the project is flying under IT radar

How many consultants will have access the server?

- 50

How are consultants going to access the server?

- RDP
- ODBC
- SFTP

How will Energy Division access the server?

- Call / email Jeorge who call / emails Jenn

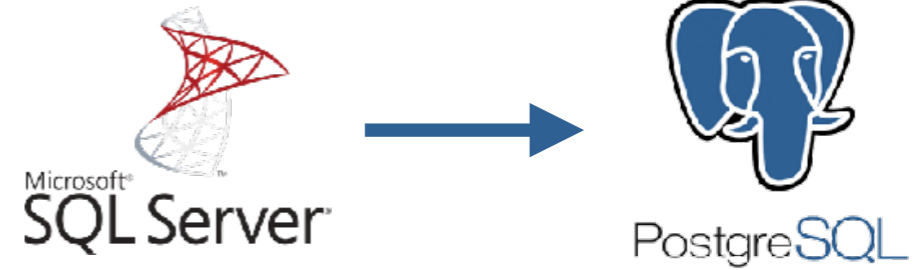
How will PAs access data outputs?

- Suite of public data files posted to website annually

How will PAs submit data inputs?

- SFTP

DATA WORK



The database server is used to:

- Compile and QC PA data submissions 5x per year
- Compile and QC evaluation data
- Automate ETL and processing from source data submissions to final products

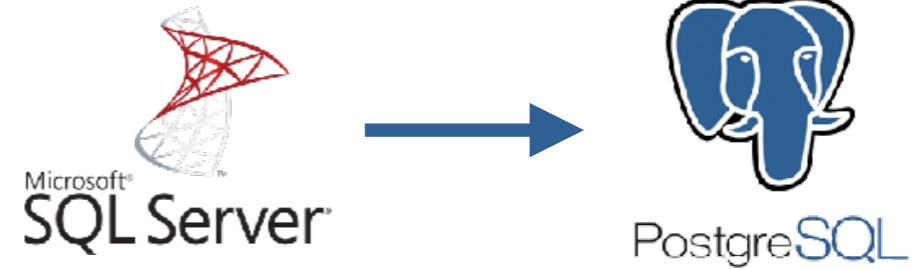
Run calculation engine

- Run submitted data through a custom cost effectiveness calculator

Summary data reporting

- Automate database outputs

INTEGRATIONS



Database of Energy Efficiency Resources (DEER)

- Source data PA submission are reconciled against.

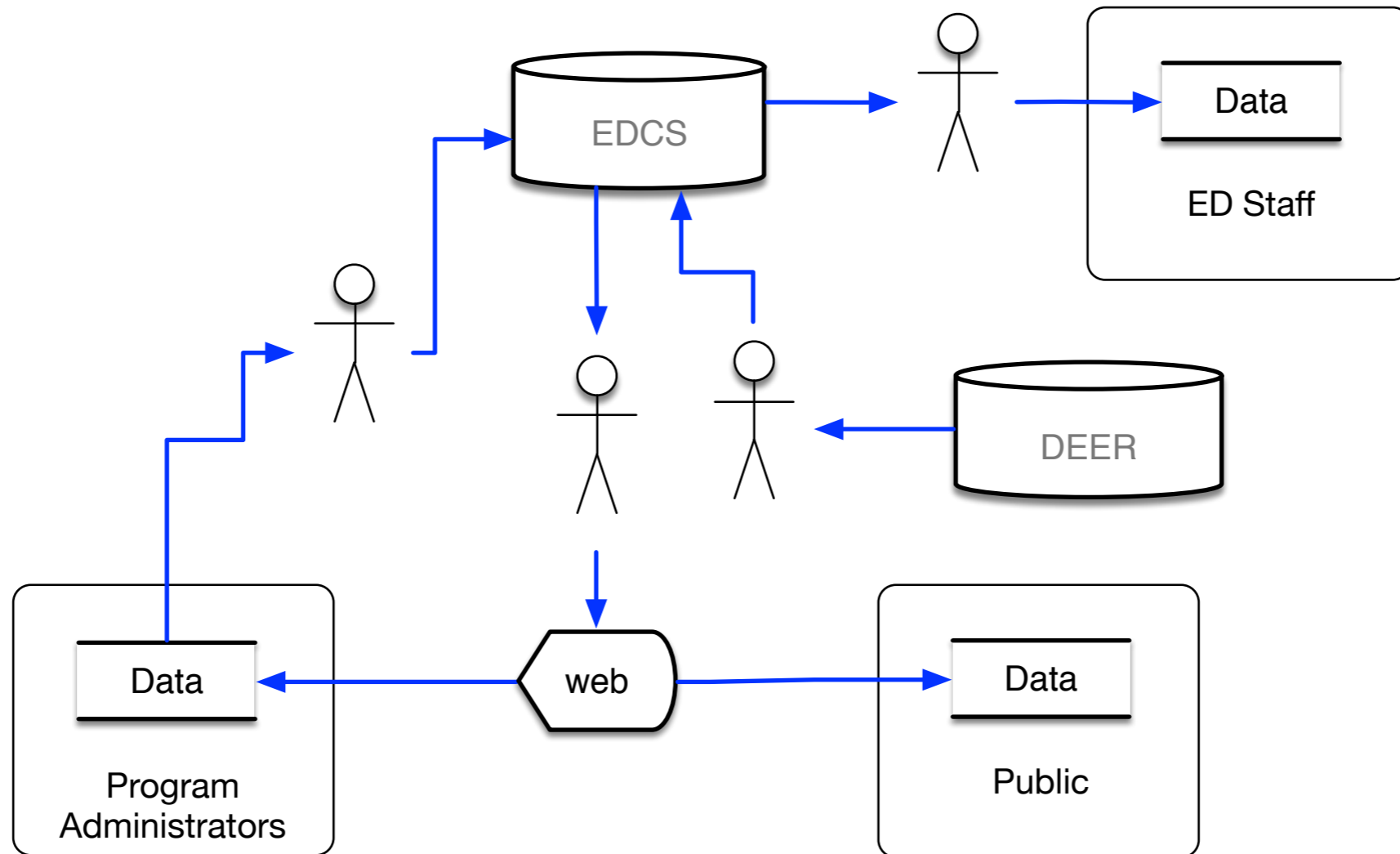
Cost Effectiveness Tool (CET)

- Need to run data through a cost effectiveness calculator built with MS-specific software.

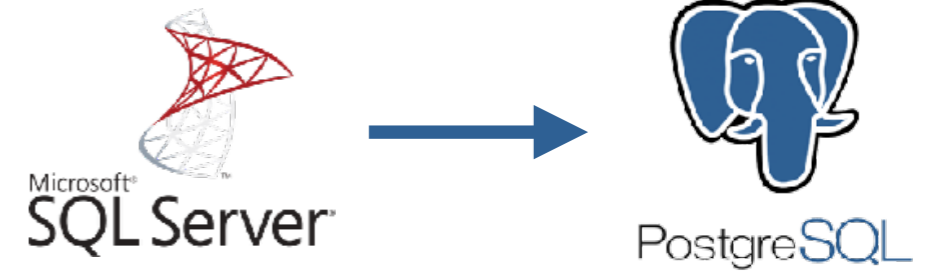
Program Administrators (PAs)

- Need efficient collaboration for data submissions and QC.

OVERVIEW



VISION



How do data come into the database?

What work has to happen in the database?

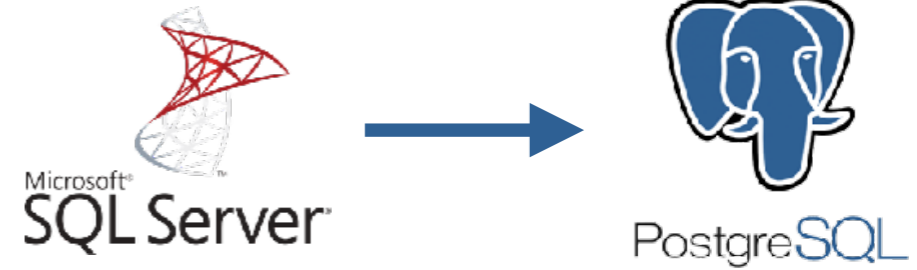
What access do database users need to do their work?

What external tools does the database need to integrate with?

What do the required integrations look like?

How are public data accessed?

ROADBLOCKS



User Access

- MS people want MS tools

Integrations

- Calculation engine uses MS software

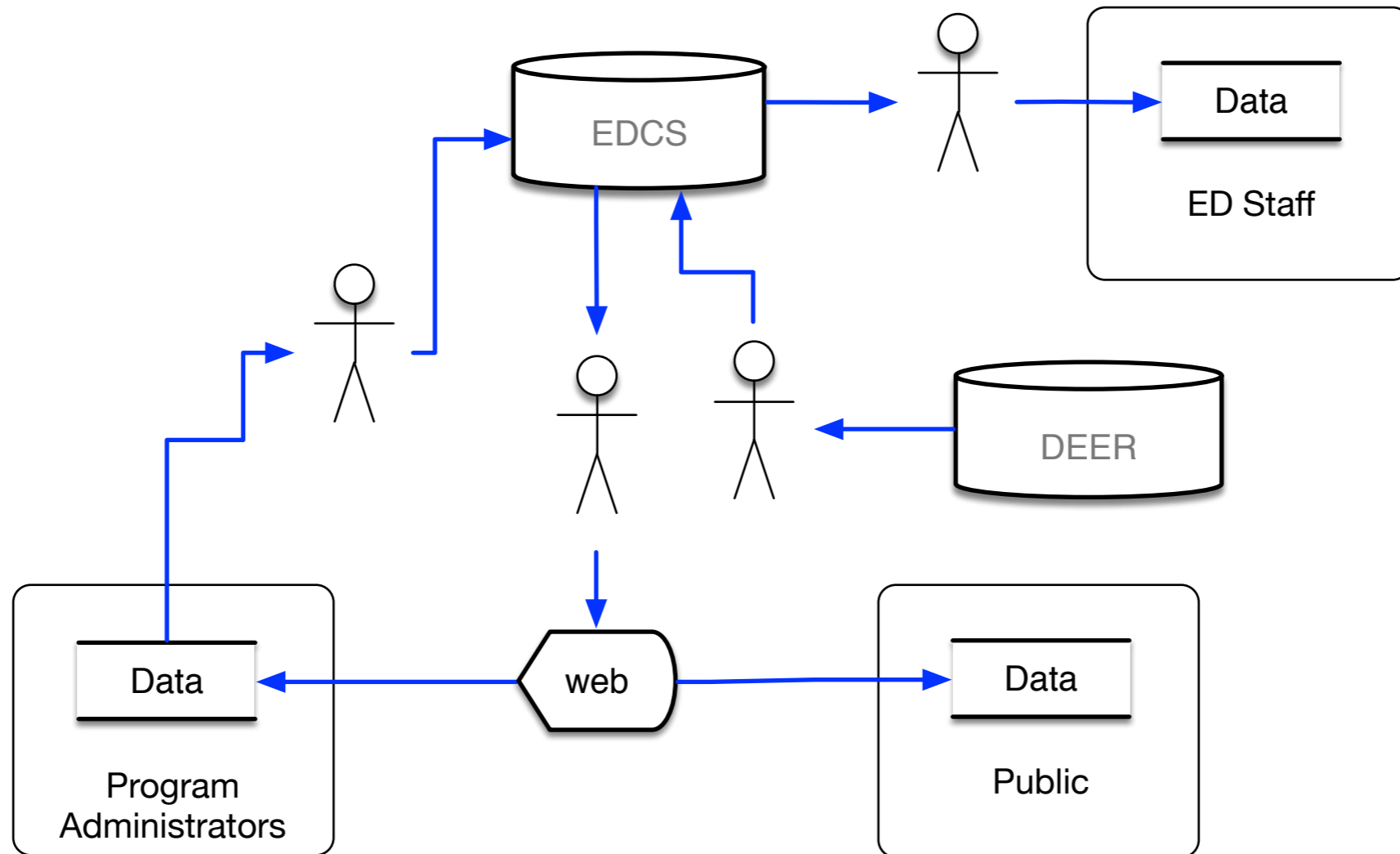
File storage

- Conflation of SFTP file storage with database server

Server Administrator

- Windows only

OVERVIEW



WEB APP



CEDARS CALIFORNIA ENERGY DATA AND REPORTING SYSTEM

Programs Monthly Reports Budget Filings **Query Claims** Cost Effectiveness Tool (CET) Data Users Tasks jennifer

All Confirmed Dashboards

- Upload Claim
- Upload History
- Specification

Confirmed Claims Dashboards for **2017**

Program Administrator	Latest Confirmation	Confirmation Date	Cost Effectiveness Output
PGE	YR	30 April, 2018	Download
SCF	YR	28 April, 2018	Download
SCG	YR	21 May 2018	Download
EDGE	YR	30 April, 2018	Download

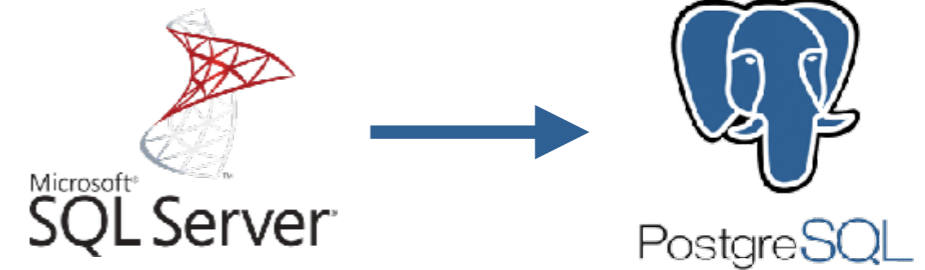
Program Administrator	Latest Confirmation	Confirmation Date	Cost Effectiveness Output
BAY	YR	20 April, 2018	Download
MCF	YR	20 April, 2018	Download
SCF	YR	1 May 2018	Download

Statewide Claims Summary for 2017 Include GAS Include CCAs/RENs [Download This Data](#)

Primary Sector	Cost Effectiveness						First Year Gross			First Year Net			Utility	
	TRC	PAC	TRC (no admin)	PAC (no admin)	RIM	Total Expenditures	Filing Budget	kWh	kW	Therm	kWh	kW	Therm	kWh
Portfolio (all Sectors)	1.58	0.57	2.36	10.84	5.41	757,476,137	963,017,666	3,533,606,051	704,582	72,451,967	3,158,071,134	631,643	63,262,615	38,502,521,84
Residential	0.99	0.59	1.32	2.47	4.05	260,860,834	292,849,670	773,254,096	208,285	10,013,367	639,334,412	177,309	8,595,922	6,506,244,85
Cross-Cutting	2.74	0.93	3.14	11.06	3.85	138,013,941	180,396,070	2,057,379,977	399,795	10,068,378	2,039,851,091	367,285	40,180,248	24,938,138,76
Commercial	1.10	0.75	1.41	3.31	4.92	191,825,663	256,665,981	430,725,879	77,446	12,174,156	286,957,036	54,097	7,565,338	4,113,305,87
Public	0.57	0.45	1.00	2.82	1.01	101,102,431	115,047,073	144,160,163	16,782	254,227	103,164,263	12,845	171,694	1,530,427,66
Industrial	1.03	1.01	2.08	5.74	2.75	59,767,015	86,782,671	72,050,338	11,361	7,003,628	47,427,737	7,395	4,529,304	598,010,10
Agricultural	1.05	0.59	1.46	5.38	2.07	21,905,532	37,771,141	65,635,638	20,013	2,608,802	42,842,662	13,181	1,539,200	605,616,66

cedars.sound-data.com

KEY DECISIONS



Where will the database server be hosted?

- In the AWS Gov cloud, under IT

How many consultants will have access the server?

- 20

How are consultants going to access the server?

- ODBC

How will Energy Division access the server?

- ODBC
- Web application

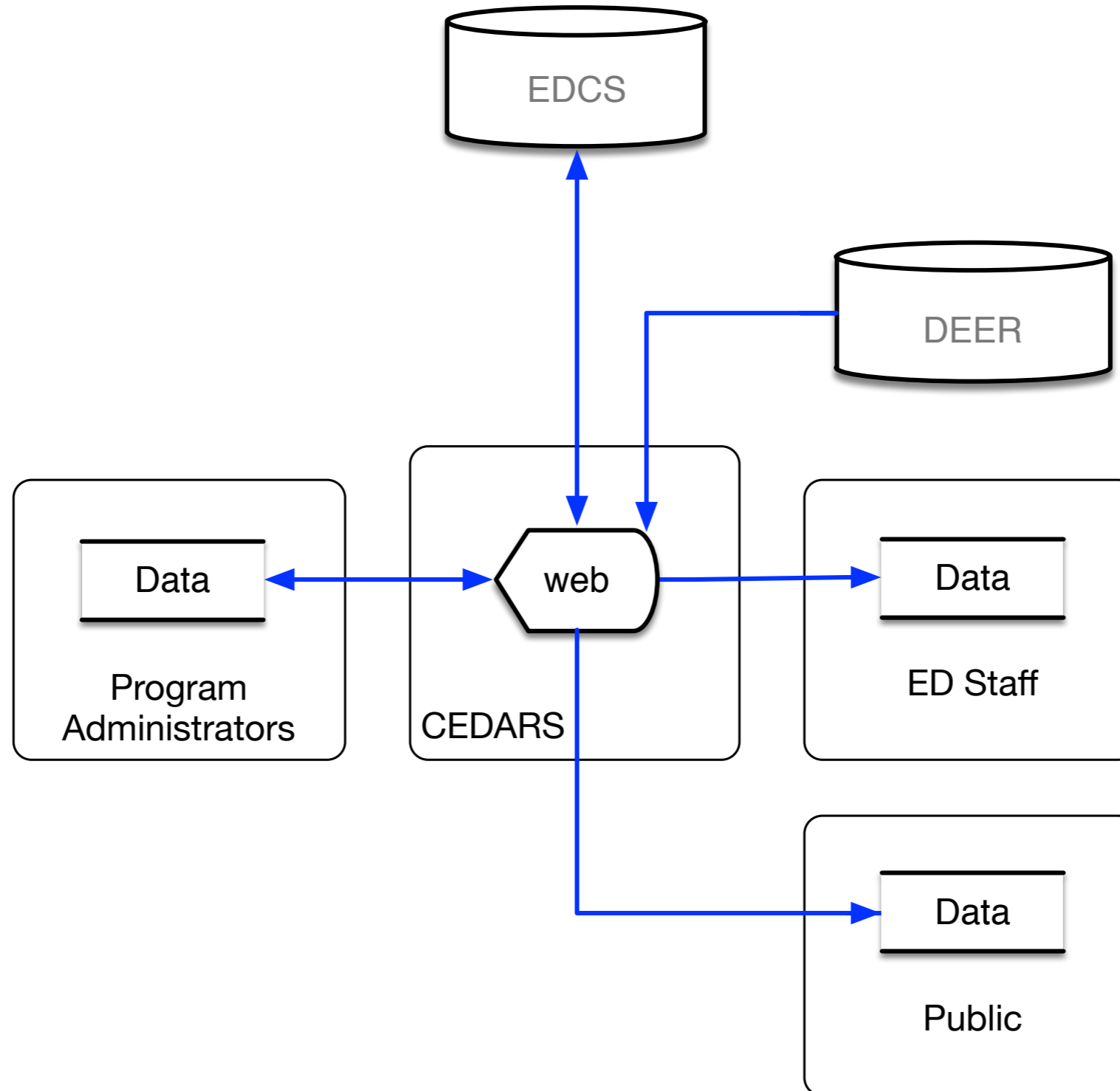
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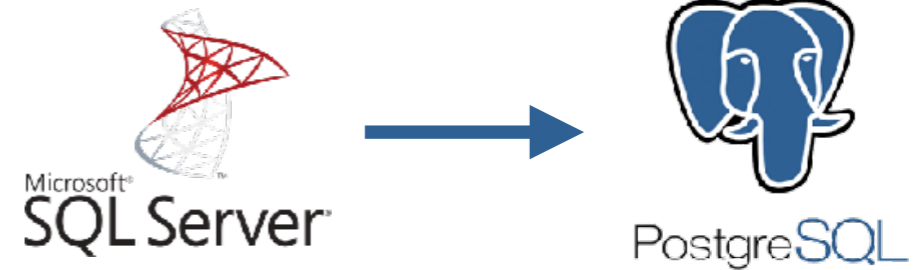
How will PAs submit data inputs?

- SFTP

OVERVIEW



LESSONS



- Keep focus on smart and efficient **user access**, it can lead to smart architecture.
- Reducing **latency** can lead decision makers to important architecture improvements.
- Consider **incremental** migration when a wholesale migration isn't feasible.
- Point out **financial implications** of architecture choices to the decision makers.
- **Web applications** abstract the database software from the users and provide freedom to select software that users don't think they can use.
- **APIs** allow seamless integrations across systems, so there is no need to pick the same software as the sister system.
- Building a **shared vision** of what the system could look like opened minds to undertaking a migration that had seemed intimidating.

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