

Google™



Using Secure Data Connector to Access Enterprise Data from Google's Cloud

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Welcome



The Question

How can I access an **on-premise**, **relational** database from Google Apps?

First - the Data

```
CREATE TABLE employee  
(  
  id serial NOT NULL,  
  lastname character varying,  
  firstname character varying,  
  jobtitle character varying,  
  location character varying,  
  phoneoffice character varying,  
  CONSTRAINT employee_pk PRIMARY KEY (id)  
);
```

Employee Search Query

```
select * from employee
```

```
where (firstname like '% ' or lastname  
      like '% ') and location like '% '
```

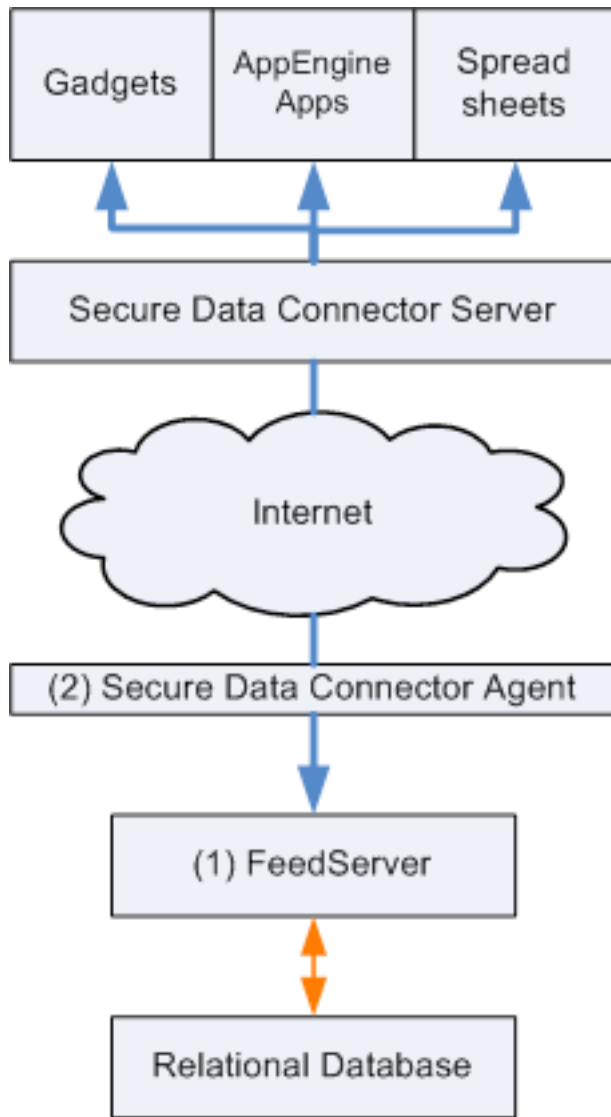
```
order by lastname, firstname
```

```
limit 20 offset 0
```

Proposal of Solution

- Step 1: Turn relational data into a standard format (AtomPub/GData) that Google Apps can consume ([Google FeedServer](#))
- Step 2: Enable secure access to enterprise data from the cloud ([Google Secure Data Connector](#))

Architecture Diagram



Cloud Apps

Secure Data Tunnel

Secure Data Connector Agent

FeedServer

Private Data Sources

Install FeedServer

<http://code.google.com/p/google-feedservers>

Configure FeedServer: Database Role Account

conf/database/dbConfig.properties:

JDBC.Driver=org.postgresql.Driver

JDBC.ConnectionURL=

jdbc:postgresql://mydb:5432/feedserver

JDBC.Username=feedserver

JDBC.Password=...

JDBC.Jar=postgresql-8.1-404.jdbc3.jar

... connection pool parameters ...

Configure FeedServer: Transform Request to SQL

/resource/employeeSearch?

name=John&location=NYC

conf/feedserver/**resource**/FeedConfig/**employeeSearch.xml**:

```
<select id="employeeSearch-get-feed"
```

```
  resultMap="result-map">
```

```
  select * from employee
```

```
  where (firstname like #name# or
```

```
    lastname like #name#)
```

```
    and location like #location#
```

```
  order by lastname, firstname
```

```
  limit 20 offset 0
```

```
</select>
```

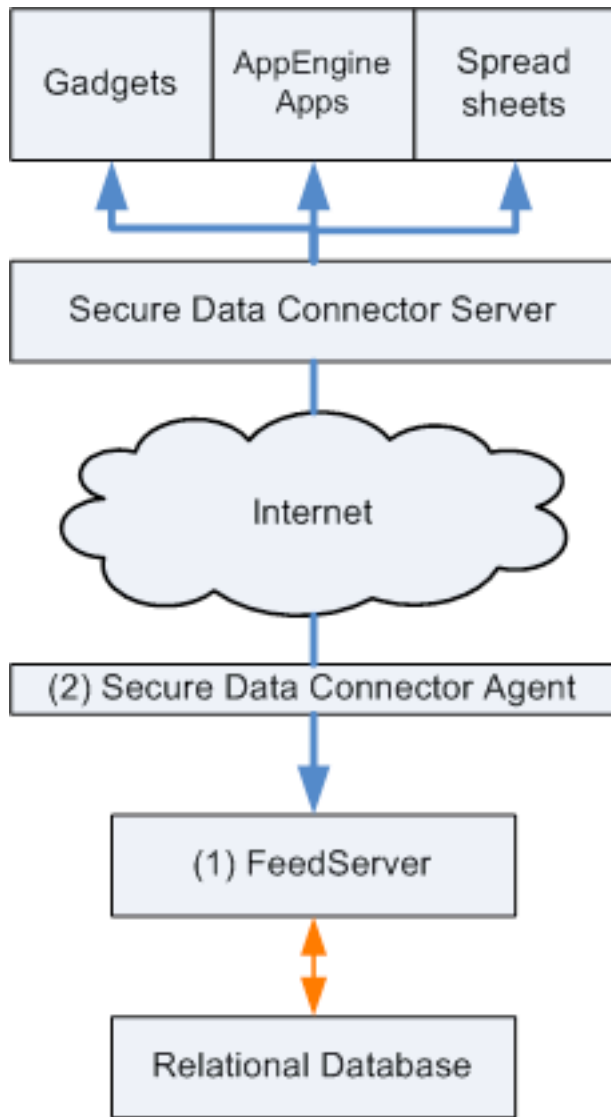
Configure FeedServer: Transform Results to Response

```
<resultMap id="employee" class="HashMap">  
  <result property="id" column="id"/>  
  <result property="lastName"  
    column="lastname"/>  
  <result property="firstName"  
    column="firstname"/>  
  <result property="jobTitle"  
    column="jobtitle"/>  
  <result property="location"  
    column="location"/>  
  <result property="phoneOffice"  
    column="phoneoffice"/>  
</resultMap>
```

Test FeedServer Locally

```
curl localhost:8080/resource/employee
```

Architecture Diagram



Cloud Apps

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Private Data Sources

Install Secure Data Connector

<http://code.google.com/sdc>

Configure Secure Data Connector

Enable it in Google Apps Control Panel


Dashboard	Users and groups	Domain settings	Advanced tools	Support	Service settings
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Advanced tools

Secure Data Connector Secure Data Connector allows Google Apps to access data on your local network. This means you can better integrate Google Apps with internal services. [Learn more](#)

To use this tool:

1. [Activate and configure Secure Data Connector](#)
First you must activate Secure Data Connector and set a password for the SDC Agent account.
2. [Download and install Secure Data Connector agent](#)
Then you must install Secure Data Connector agent. This is an open source component which runs behind your firewall and allows Google Apps to make secure connections to your enterprise data.

 This feature requires that you have root level access to a Linux server behind your firewall.

Configure Secure Data Connector

```
<rule repeatable="true">  
  <ruleNum>1</ruleNum>  
  <agentId>all</agentId>  
  <viewerEmail repeatable="true">  
    jyang@joonix.net</viewerEmail>  
  <apps repeatable="true">  
    <service>AppEngine</service>  
    <appId>java-sdc-io</appId>  
  </apps>  
  <url>http://palmtree.corp.joonix.net:8080  
  </url>  
  <urlMatch>HOSTPORT</urlMatch>  
</rule>
```

Run Secure Data Connector Agent

- `sudo /opt/google-secure-data-connector/bin/start.sh`
- `sudo tail -f /var/opt/google-secure-data-connector/log/agent`

Employee Search Gadget

```
function search(name, location, cont) {
  var url = 'http://palmtree.corp.
    joonix.net:8080/resource/
    employeeSearch?name=' +
    getPattern(name) + '&location=' + ...;
  var service = new google.gdata.client
    .FeedServerService("esp", "demo");
  service.setGadgetsAuthentication(
    'SIGNED', {REFRESH_INTERVAL:0,
    OAUTH_ENABLE_PRIVATE_NETWORK: 'true'});
  service.getFeed(url, function(response) {
    cont(response.feed.entry);
  }, showError);
};
```

Employee Search AppEngine App

```
public class Employee {  
    private String lastName;  
    public String getLastName() {  
        return lastName;  
    }  
    public void setLastName(String ln) {  
        lastName = ln;  
    }  
    ...  
}
```

Employee Search AppEngine App

```
GoogleService service =  
    new GoogleService("esp", "demo");  
FeedServerClient<Employee> client =  
    new FeedServerClient<Employee>(  
        service, Employee.class);  
service.getRequestFactory()  
    .setHeader("use_intranet", "yes");  
URL feedUrl = new URL("http://palmtree.  
corp.joonix.net:8080/resource  
/employeeSearch?name=...");  
List<Employee> employees =  
    client.getEntities(feedUrl);
```

Employee Search in Spreadsheets

```
C1: =CONCATENATE(  
"http://palmtree.corp.joonix.net:8080/  
resource/employeeSearch?name=",B1,  
"%25&location=%25",B2,"&132321")
```

```
A4: =importXML(C1, '//entity')
```



Review



What have we done?

- Mapped relational data to Atom feeds
- Connected behind-the-firewall data to Google Apps securely
- Wrote 3 clients for the data

What we didn't have to do?

- No special code to access relational data
- No complex firewall configuration
- No special configuration for app developers

What's next?

- Write data back to the database
- Manipulate and process the data
- Integrate data into other Google Apps



Google Apps Script Demo



For More Information

Google Secure Data Connector

<http://code.google.com/sdc/>

Google FeedServer

<http://code.google.com/p/google-feedserver/>

Google Apps Script

<http://googleenterprise.blogspot.com/>



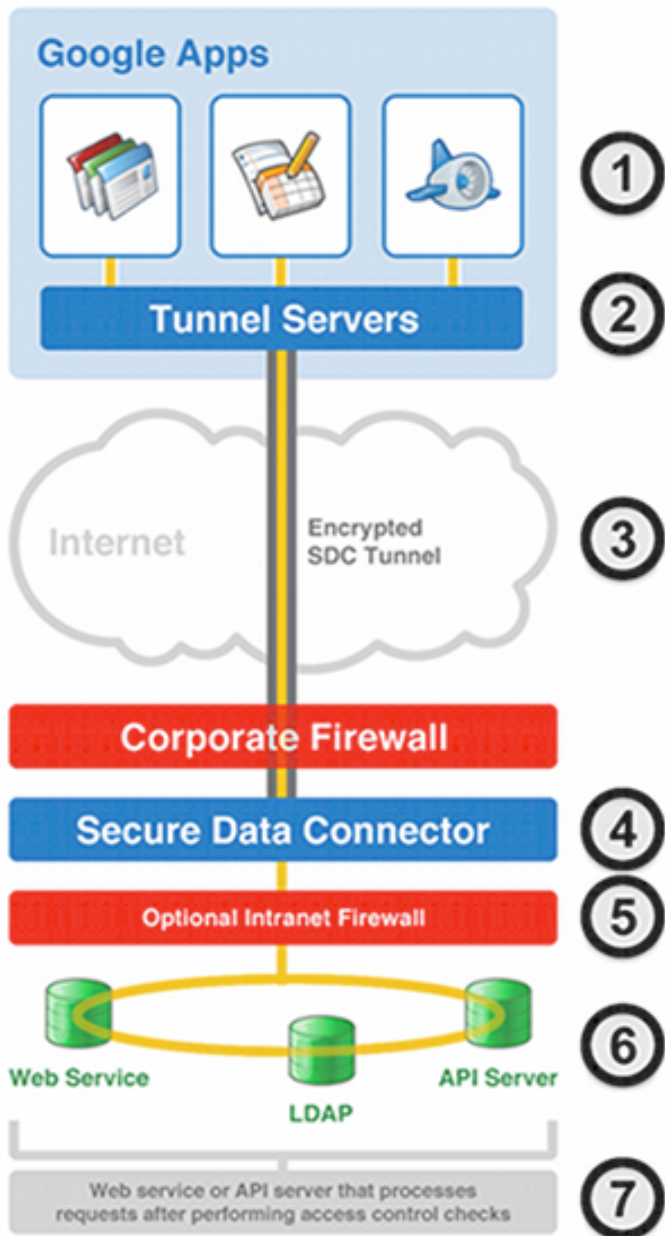
Q + A



Google™

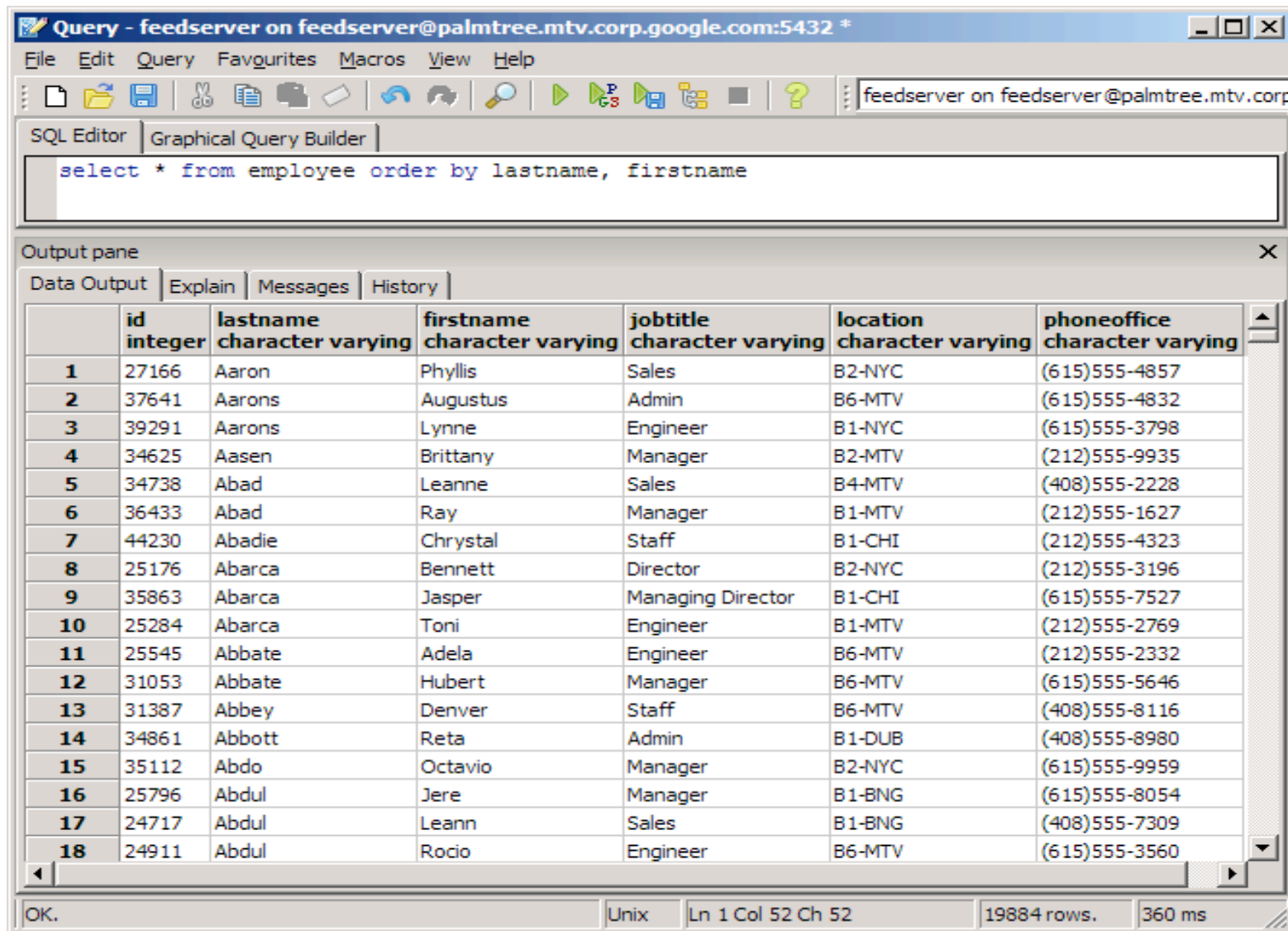


Architecture Diagram



1. Cloud apps: gadgets, AppEngine, spreadsheets (authn, authz)
2. SDC Tunnel Server
3. Encrypted Traffic on Internet
4. SDC Agent (authn, authz)
5. Optional Second Firewall
6. Enterprise Data Sources
7. Internal Access Control (authn, authz)

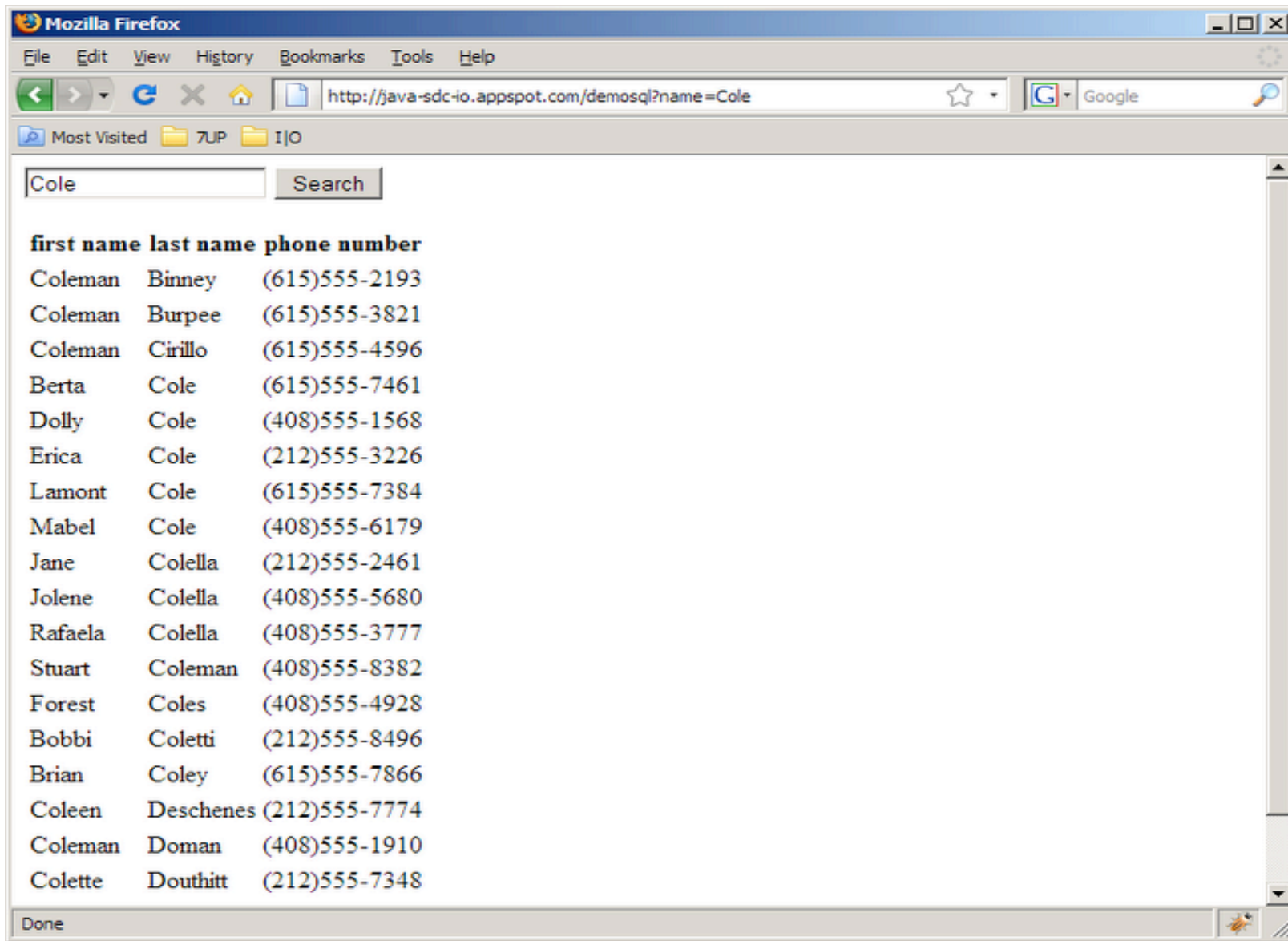
My Relational Data: Where I am at



The screenshot shows a SQL query editor window titled "Query - feedserver on feedserver@palmtree.mtv.corp.google.com:5432 *". The query entered is `select * from employee order by lastname, firstname`. The output pane displays a table with 18 rows and 7 columns. The columns are: **id** (integer), **lastname** (character varying), **firstname** (character varying), **jobtitle** (character varying), **location** (character varying), and **phoneoffice** (character varying). The status bar at the bottom indicates "OK.", "Unix", "Ln 1 Col 52 Ch 52", "19884 rows.", and "360 ms".

	id integer	lastname character varying	firstname character varying	jobtitle character varying	location character varying	phoneoffice character varying
1	27166	Aaron	Phyllis	Sales	B2-NYC	(615)555-4857
2	37641	Aarons	Augustus	Admin	B6-MTV	(615)555-4832
3	39291	Aarons	Lynne	Engineer	B1-NYC	(615)555-3798
4	34625	Aasen	Brittany	Manager	B2-MTV	(212)555-9935
5	34738	Abad	Leanne	Sales	B4-MTV	(408)555-2228
6	36433	Abad	Ray	Manager	B1-MTV	(212)555-1627
7	44230	Abadie	Chrystal	Staff	B1-CHI	(212)555-4323
8	25176	Abarca	Bennett	Director	B2-NYC	(212)555-3196
9	35863	Abarca	Jasper	Managing Director	B1-CHI	(615)555-7527
10	25284	Abarca	Toni	Engineer	B1-MTV	(212)555-2769
11	25545	Abbate	Adela	Engineer	B6-MTV	(212)555-2332
12	31053	Abbate	Hubert	Manager	B6-MTV	(615)555-5646
13	31387	Abbey	Denver	Staff	B6-MTV	(408)555-8116
14	34861	Abbott	Reta	Admin	B1-DUB	(408)555-8980
15	35112	Abdo	Octavio	Manager	B2-NYC	(615)555-9959
16	25796	Abdul	Jere	Manager	B1-BNG	(615)555-8054
17	24717	Abdul	Leann	Sales	B1-BNG	(408)555-7309
18	24911	Abdul	Rocio	Engineer	B6-MTV	(615)555-3560

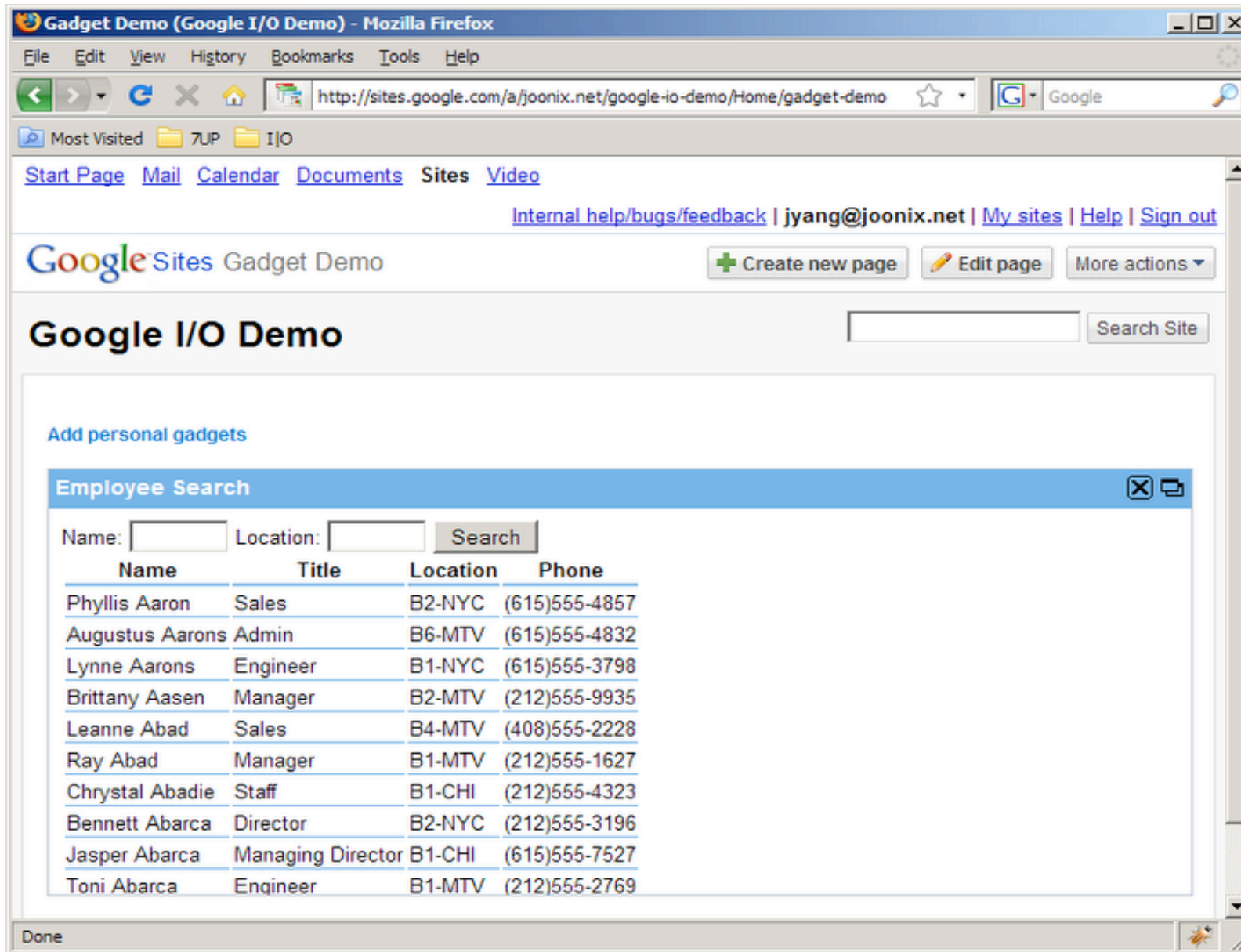
Google AppEngine: Where I want to be



The screenshot shows a Mozilla Firefox browser window with the address bar displaying `http://java-sdc-io.appspot.com/demosql?name=Cole`. The search results are displayed in a table format with the following data:

first name	last name	phone number
Coleman	Binney	(615)555-2193
Coleman	Burpee	(615)555-3821
Coleman	Cirillo	(615)555-4596
Berta	Cole	(615)555-7461
Dolly	Cole	(408)555-1568
Erica	Cole	(212)555-3226
Lamont	Cole	(615)555-7384
Mabel	Cole	(408)555-6179
Jane	Colella	(212)555-2461
Jolene	Colella	(408)555-5680
Rafaela	Colella	(408)555-3777
Stuart	Coleman	(408)555-8382
Forest	Coles	(408)555-4928
Bobbi	Coletti	(212)555-8496
Brian	Coley	(615)555-7866
Coleen	Deschenes	(212)555-7774
Coleman	Doman	(408)555-1910
Colette	Douthitt	(212)555-7348

Gadgets: Where I want to be



The screenshot shows a Mozilla Firefox browser window displaying a Google Sites page. The page title is "Gadget Demo (Google I/O Demo)". The address bar shows the URL: <http://sites.google.com/a/joonix.net/google-io-demo/Home/gadget-demo>. The page includes a navigation menu with links for "Start Page", "Mail", "Calendar", "Documents", "Sites", and "Video". Below the navigation menu, there are links for "Internal help/bugs/feedback", "jyang@joonix.net", "My sites", "Help", and "Sign out". The page title "Google Sites Gadget Demo" is displayed, along with buttons for "Create new page", "Edit page", and "More actions". A search bar is present with the text "Google I/O Demo" and a "Search Site" button. Below the search bar, there is a section titled "Add personal gadgets" with a blue header "Employee Search". This gadget contains a search form with "Name:" and "Location:" input fields and a "Search" button. Below the search form is a table with the following data:

Name	Title	Location	Phone
Phyllis Aaron	Sales	B2-NYC	(615)555-4857
Augustus Aarons	Admin	B6-MTV	(615)555-4832
Lynne Aarons	Engineer	B1-NYC	(615)555-3798
Brittany Aasen	Manager	B2-MTV	(212)555-9935
Leanne Abad	Sales	B4-MTV	(408)555-2228
Ray Abad	Manager	B1-MTV	(212)555-1627
Chrystal Abadie	Staff	B1-CHI	(212)555-4323
Bennett Abarca	Director	B2-NYC	(212)555-3196
Jasper Abarca	Managing Director	B1-CHI	(615)555-7527
Toni Abarca	Engineer	B1-MTV	(212)555-2769

Google Spreadsheets: Where I want to be

A	B	C	D
Name	Jo	http://palmtree.corp.j/resource/employeeSearch?nlocation=%25CHI	
Location	CHI		
First Name	Last Name	Title	Phone Number
Joesph	Abrahamson	Staff	(212)555-6053
Jospeh	Anding	Engineer	(212)555-1088
Jocelyn	Ashbaugh	Engineer	(212)555-9564
Johnson	Aubin	Manager	(212)555-2673
Jon	Bagley	Manager	(212)555-7099
Johnathan	Barden	Sales	(408)555-9996
Josue	Barra	Manager	(408)555-9199
Jordon	Bazan	Staff	(212)555-8958
Joanna	Belote	Managing Director	(212)555-8993
Jordan	Billington	Engineer	(212)555-2644
Jo	Blumer	Staff	(212)555-8695
Johnathan	Bogert	Vice President	(212)555-9435
Jolene	Bowlby	Engineer	(408)555-3072
Jose	Butz	Manager	(615)555-3556
Joseph	Carreno	Sales	(615)555-8116
Jodie	Clymer	Sales	(408)555-4889
Josie	Collar	Sales	(212)555-2338
Josie	Cortinas	Admin	(212)555-2963
Jospeh	Cushing	Sales	(408)555-4537
Jo	Cuyler	Manager	(615)555-4698