

# How to SQL (Sierra)

## *Part 1*

- **JEREMY GOLDSTEIN:** Minuteman Library Network
- **PHIL SHIRLEY:** Cuyahoga Falls Library
- **RAY VOELKER:** The Public Library of Cincinnati and Hamilton County

 #IUG2019

**IUG2019**   
**Phoenix, AZ**

Sunday, May 5<sup>th</sup> | Pre-Conference

Monday, May 6<sup>th</sup> – Wednesday, May 8<sup>th</sup> | Main Conference

# Overview

- Intro
- Getting started
  - Getting set up to use SQL
  - How to use the software
- SQL basics
  - SELECT, FROM, WHERE, ORDER BY, GROUP BY, HAVING, JOIN, subqueries

## Introduction: SQL

- Comes with every Sierra system
- Read-only access
- Access to most but not all data
- Can access in lots of different ways
- Sierra uses PostgreSQL

## Official Resources, Innovative

- Manual: Sierra Direct SQL Access
  - Getting Started
  - Sierra DNA
  - Query Examples
  - Troubleshooting
- Sierra DNA: <http://techdocs.iii.com/sierradna/>
- Innovative Developer Network:  
<https://developer.iii.com/>

## Official Resources, PostgreSQL

- PostgreSQL

<https://www.postgresql.org/docs/10/static/queries.html>



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# IUG Resources

- IUG Forum – Sierra SQL category
- IUG Clearinghouse
- Past conference presentations
  
- All at <http://innovativeusers.org/>

# Resources from Other Customers

- Public Library of Cincinnati & Hamilton County
  - <https://github.com/plch/sierra-sql/wiki>
- Jeremy Goldstein
  - <https://github.com/jmgold/SQL-Queries>
- Joe Montibello
  - <https://github.com/joemontibello/iii-sql-queries>
- UNC-Libraries
  - <https://github.com/UNC-Libraries/III-Sierra-SQL/wiki>

## Other Resources

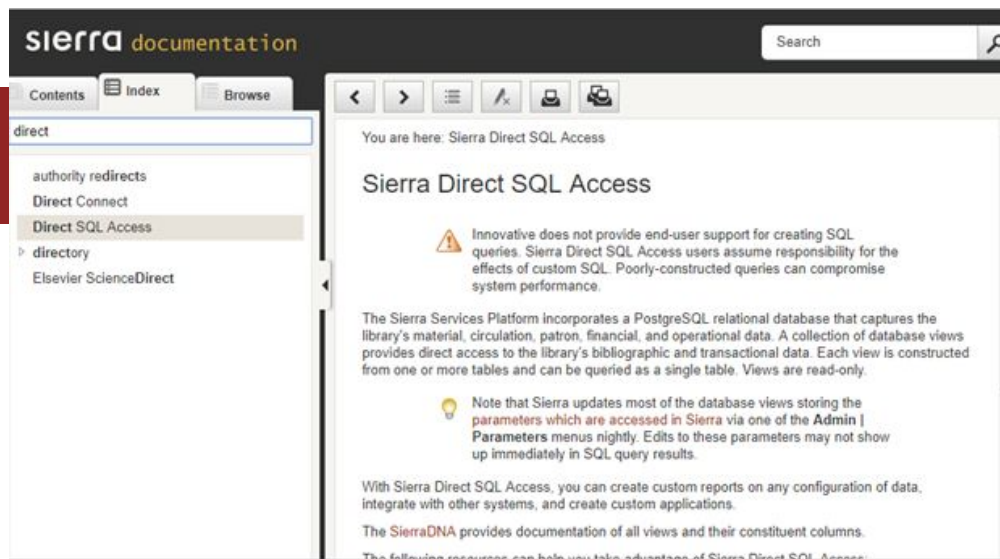
- Stanford free online mini-courses in SQL
  - <https://lagunita.stanford.edu/courses/DB/2014/SelfPaced/about>
- WiseOwl Training Videos
  - <https://www.wiseowl.co.uk/sql/videos/sql-selecting-data/>
- Codecademy
  - <https://www.codecademy.com/catalog/language/sql>
- SQL Cookbook by Anthony Molinaro





# Getting Set Up

## Sierra Documentation Sierra Direct SQL Access > Getting Started



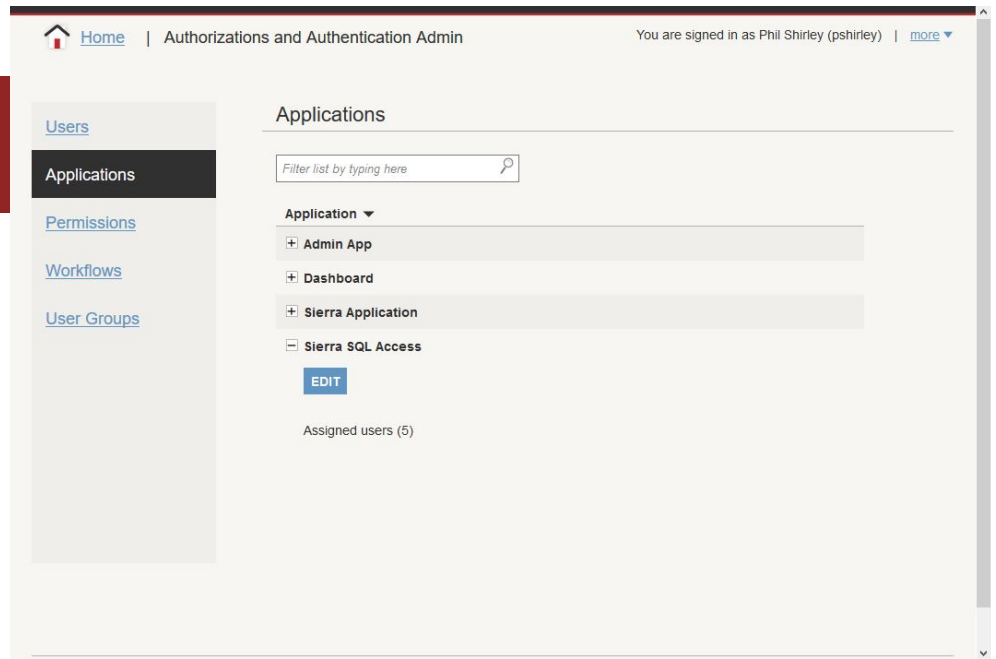
The screenshot shows the Sierra Documentation website. The top navigation bar includes 'Contents', 'Index', and 'Browse'. The left sidebar shows a tree view with 'Direct SQL Access' selected. The main content area displays the 'Sierra Direct SQL Access' page, which includes a warning icon and text stating: 'Innovative does not provide end-user support for creating SQL queries. Sierra Direct SQL Access users assume responsibility for the effects of custom SQL. Poorly-constructed queries can compromise system performance.' Below this, there is a paragraph describing the Sierra Services Platform and a note about database updates. The page also mentions that users can create custom reports and that SierraDNA provides documentation for all views.



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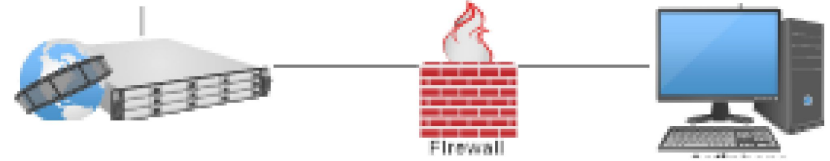
# Getting Set Up

## 1. Set up user



The screenshot displays the 'Authorizations and Authentication Admin' interface. The top navigation bar includes a home icon, a 'Home' link, the page title 'Authorizations and Authentication Admin', and a user status indicator 'You are signed in as Phil Shirley (pshirley)' with a 'more' dropdown. A left sidebar contains navigation links for 'Users', 'Applications' (which is highlighted), 'Permissions', 'Workflows', and 'User Groups'. The main content area is titled 'Applications' and features a search box with the placeholder text 'Filter list by typing here'. Below the search box, there is a list of applications under the heading 'Application'. The list includes 'Admin App', 'Dashboard', 'Sierra Application', and 'Sierra SQL Access'. An 'EDIT' button is positioned below the 'Sierra SQL Access' application. At the bottom of the application list, it indicates 'Assigned users (5)'.

# Getting Set Up



2. Ensure firewall access to port 1032

# Getting Set Up

## 3. Install pgAdmin

<https://www.pgadmin.org/download/>

### Quick Links



Screenshots



Download



Docs



Support Mailing List

## Download

pgAdmin is a free software project released under the [PostgreSQL/Artistic licence](#). The software is available in source and binary format from the [PostgreSQL mirror network](#). Because compiling from source requires technical knowledge, we recommend installing binary packages whenever possible.

The pages in this section give additional details about each binary package available as well as more direct download links. In addition, you can download source tarballs and pgAgent for your servers to enable additional functionality.

### pgAdmin 4

pgAdmin 4 is a complete rewrite of pgAdmin, built using Python and Javascript/Query. A desktop runtime written in C++ with Qt allows it to run standalone for individual users, or the web application code may be deployed directly on a webserver for use by one or more users through their web browser. The software has the look and feel of a desktop application whatever the runtime environment is, and vastly improves on pgAdmin III with updated user interface elements, multi-user/web deployment options, dashboards and a more modern design.



Container



macOS



Python Wheel



APT



RPM



Source Code



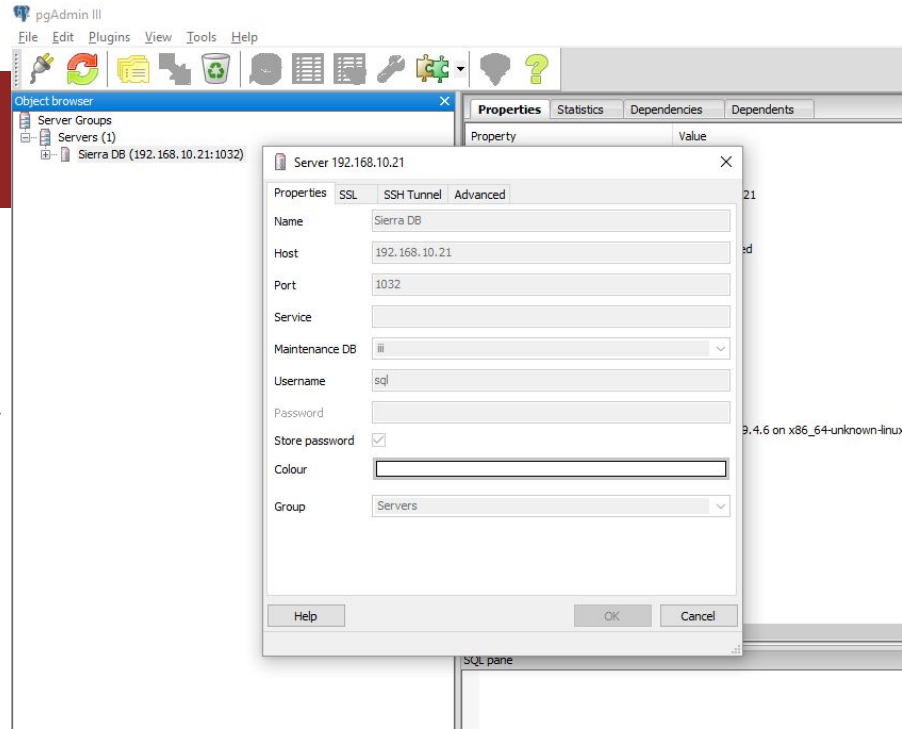
Windows



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# Getting Set Up

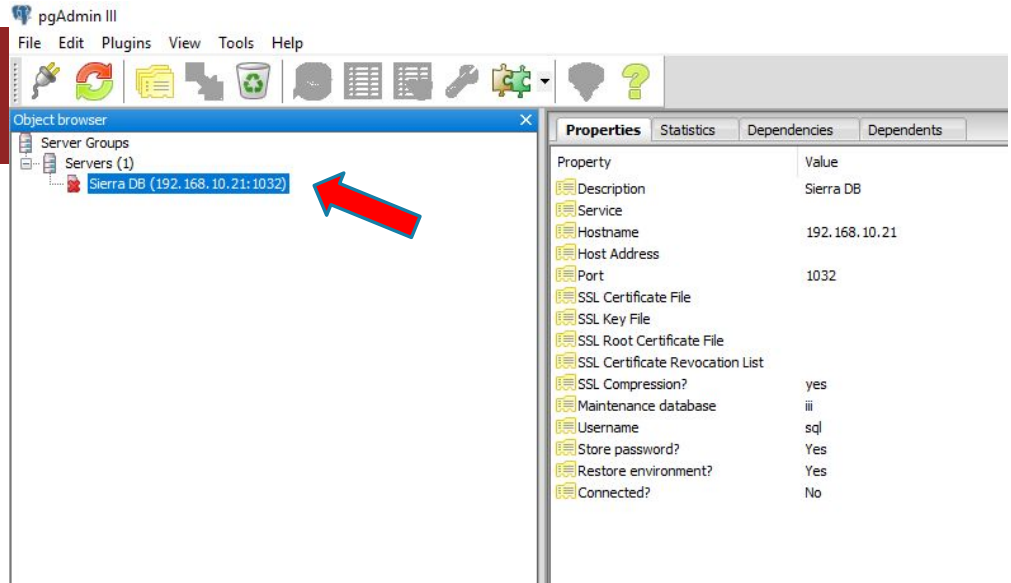
4. Configure pgAdmin  
Name: Whatever you want  
Host: Sierra *database* server



# How to Use pgAdmin

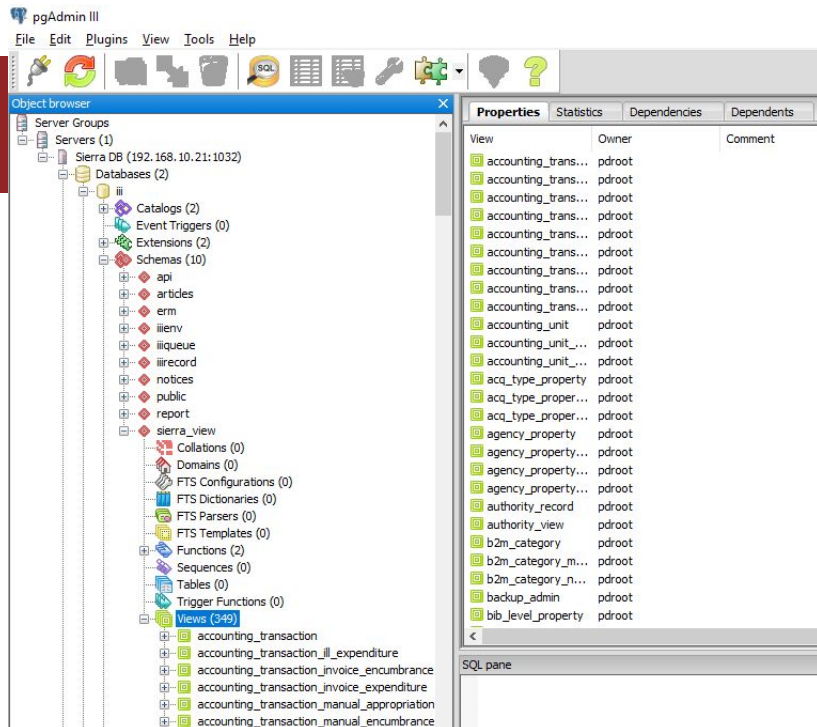
# To Connect

- Expand Servers
- Double-click



# Views

Servers > [name] > Databases >  
Schemas > sierra\_view > Views



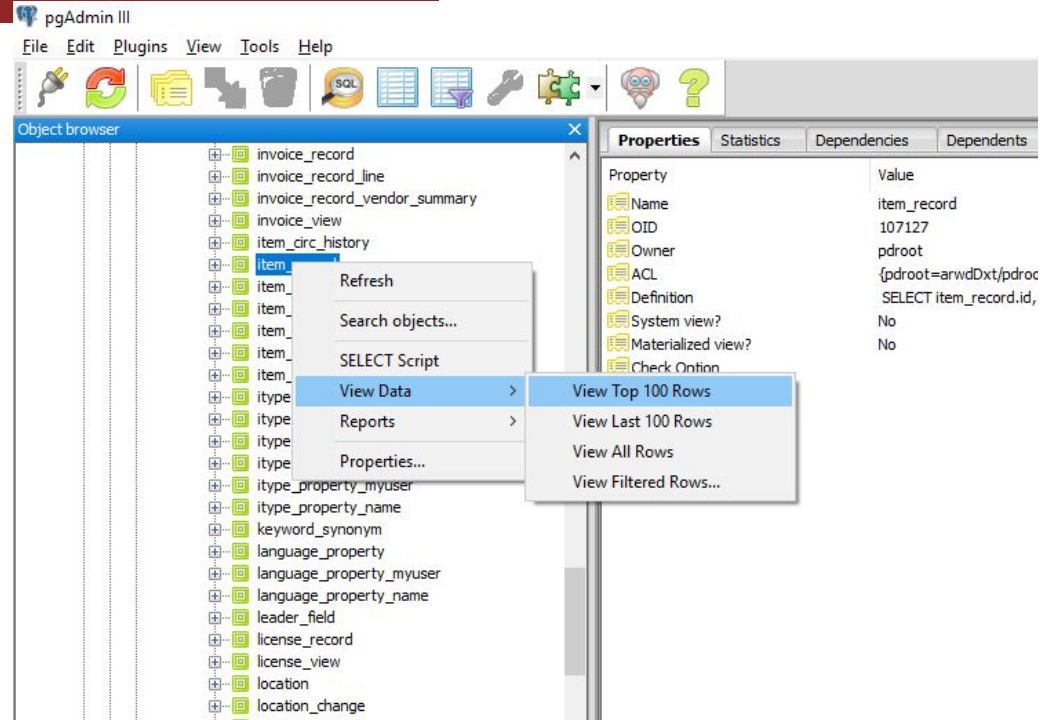
The screenshot shows the pgAdmin III interface. The 'Object browser' pane on the left displays the tree structure: Servers (1) > Sierra DB (192.168.10.21:1032) > Databases (2) > # > Schemas (10) > sierra\_view > Views (349). The 'Properties' pane on the right shows a table of views with columns for View, Owner, and Comment.

View	Owner	Comment
accounting_trans...	pdroot	
accounting_trans...	pdroot	
accounting_trans...	pdroot	
accounting_trans...	pdroot	
accounting_trans...	pdroot	
accounting_trans...	pdroot	
accounting_trans...	pdroot	
accounting_trans...	pdroot	
accounting_trans...	pdroot	
accounting_trans...	pdroot	
accounting_unit...	pdroot	
accounting_unit...	pdroot	
accounting_unit...	pdroot	
acq_type_property	pdroot	
acq_type_proper...	pdroot	
acq_type_proper...	pdroot	
agency_property	pdroot	
agency_property...	pdroot	
agency_property...	pdroot	
agency_property...	pdroot	
agency_property...	pdroot	
authority_record	pdroot	
authority_view	pdroot	
b2m_category	pdroot	
b2m_category_m...	pdroot	
b2m_category_n...	pdroot	
backup_admin	pdroot	
bib_level_property	pdroot	



# Ways to Learn About a View

Right click > View Data >  
View Top 100 Rows



	id bigint	record_id bigint	icode1 integer	icode2 character(1)	itype_code_num smallint	location_code character varying(5)	agency_code_num smallint	item_status_code character varying(3)	is_inherit_loc boolean	price numeri
1	3941100652988071	3941100652988071	0	-	230	9cinc	0	Ⓜ	FALSE	0.0000
2	10133550135207265	10133550135207265	0	-	230	re2pl	0	Ⓜ	FALSE	0.0000
3	6474375437855531	6474375437855531	0	-	230	pc2pl	0	Ⓜ	FALSE	0.0000
4	1126350881433238	1126350881433238	0	-	230	tllpl	0	Ⓜ	FALSE	0.0000
5	30962698412117321	30962698412117321	0	-	231	9cler	0	Ⓜ	FALSE	0.0000
6	4504050600725359	4504050600725359	0	-	230	9midp	0	Ⓜ	FALSE	0.0000
7	450972566211	450972566211	0	-	10	non	0	-	FALSE	24.950
8	1407825856742974	1407825856742974	0	-	230	9lane	0	Ⓜ	FALSE	0.0000
9	3941100652814480	3941100652814480	0	-	231	9cinc	0	Ⓜ	FALSE	0.0000
10	4785525577381147	4785525577381147	0	-	231	9wcpl	0	Ⓜ	FALSE	0.0000
11	450972871833	450972871833	0	-	10	fic	0	-	FALSE	24.950
12	450972674256	450972674256	0	-	10	jnon	0	-	FALSE	12.350
13	3378150696429195	3378150696429195	0	-	230	9ascp	0	Ⓜ	FALSE	0.0000
14	1689300833192927	1689300833192927	0	-	231	9ment	0	Ⓜ	FALSE	0.0000
15	450973024698	450973024698	0	-	10	jgrap	0	-	FALSE	26.650
16	3941100653275535	3941100653275535	0	-	230	9cinc	0	Ⓜ	FALSE	0.0000
17	281925950139744	281925950139744	0	-	230	we4pl	0	Ⓜ	FALSE	0.0000
18	450973133240	450973133240	0	-	42	crock	0	-	FALSE	13.980
19	281925949593159	281925949593159	0	-	231	we4pl	0	Ⓜ	FALSE	0.0000



# Ways to Learn About a View

Sierra DNA  
(Documentation Navigator)  
<https://techdocs.iii.com/sierradna/>

The screenshot shows the Sierra DNA documentation interface. The left sidebar contains a list of entities: Generic Record, Authority, Bib, Contact, Course, Holding, Invoice, Item (highlighted), License, Order, Patron, Program, Resource, Section, Vendor, Volume, and Users. The main content area is titled 'Item' and shows the view 'bib\_record\_item\_record\_link'. Below the title, there is a table with the following columns: Column, Data Type, Not NULL?, and Comment. The table contains the following rows:

Column	Data Type	Not NULL?	Comment
id	bigint	false	System-generated sequential ID.
bib_record_id	bigint	false	Foreign key to bib_record.
item_record_id	bigint	false	Foreign key to item_record.
items_display_order	int	false	Integer to manage the display order of an items list.
bibs_display_order	int	false	Integer to manage the display order of a bibliographic record list.

Below the table, there is a section for 'course\_record\_item\_record\_link' with a similar description: 'Each row of course\_record\_item\_record\_link identifies a linked course and item record pair.'

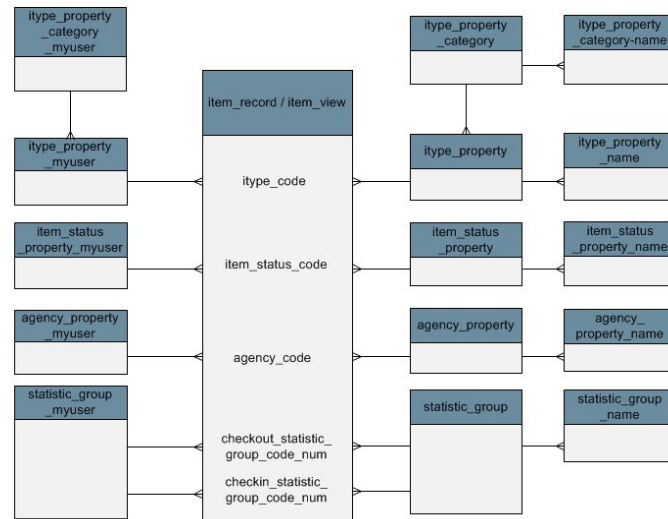
# ERD View

- Entities
- [Generic Record](#)
- [Authority](#)
- [Bib](#)
- [Contact](#)
- [Course](#)
- [Holding](#)
- [Invoice](#)
- Item
- [License](#)
- [Order](#)
- [Patron](#)
- [Program](#)
- [Resource](#)
- [Section](#)
- [Vendor](#)
- [Volume](#)
- [Users](#)

Item

[Detailed View](#)

**ERD View**



# How tables are linked

## Top rows for bib\_view and hold

Edit Data - Sierra DB (192.168.10.21:1032) - iii - sierra\_view.bib\_view

File Edit View Tools Help

100 rows

	<u>id</u> bigint	record_type_code character(1)	record_num integer	language character
1	420908065471	b	1270463	eng
2	420908172785	b	1377777	eng
3	420907795149	b	1000141	eng
4	420907795678	b	1000670	eng

Edit Data - Sierra DB (192.168.10.21:1032) - iii - sierra\_view.hold

File Edit View Tools Help

9 rows

	<u>id</u> bigint	patron_record_id bigint	<u>record_id</u> bigint	pla tin
1	483160	481037351623	3941100649441521	20:
2	481974	481037468270	420908493552	20:
3	486438	9852105222256298	450973194005	20:
4	487101	3096705790300726	450973164331	20:

## hold

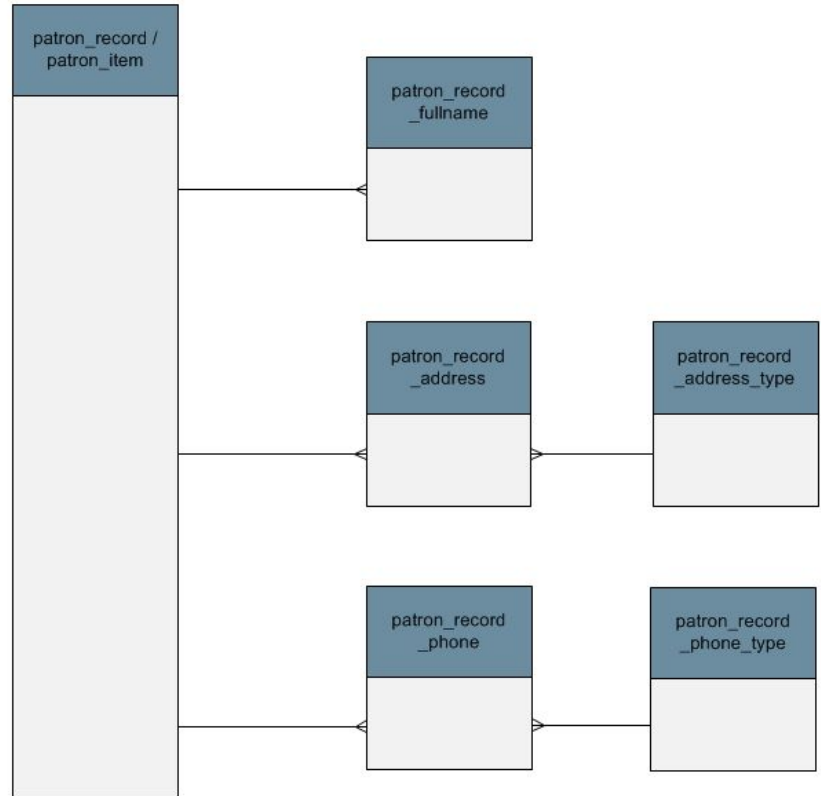
Each row of hold describes a bibliographic, item, or volume hold.

Column	Data Type	Not NULL?	Comment
id	bigint	false	System-generated sequential ID.
patron_record_id	bigint	false	Foreign key to patron_record.
record_id	bigint	false	Foreign key to record.
placed_gmt	timestamp	false	Date the hold was placed.
is_frozen	boolean	false	Specifies whether the hold is frozen (suspended).
delay_days	int	false	Stores the "not wanted before" date as a number of days. If a "not wanted before" date was not specified, it defaults to "180".



# Sierra DNA: Some Views

- patron\_record
- patron\_view
- patron\_record\_address
- patron\_address\_type
- patron\_record\_fullname
- patron\_record\_phone
- patron\_record\_phone\_type



## item\_record vs. item\_view

- item\_view also includes metadata like the item record number and the record creation date.
- item\_view also contains barcode.
- item\_record contains is\_available\_at\_library.
- item\_view is less efficient



# Sierra DNA

Each row of item\_view includes metadata and data for one item record. The contents include identification and circulation information, as well as data that determines how the system handles the record.

Column	Data Type	Not NULL?	Comment
id	bigint	false	System-generated sequential ID.
record_type_code	char	false	Record type code, i.e., 'I'.
record_num	int	false	Record number.
barcode	varchar	false	The item's barcode.
icode1	int	false	The library determines the name and purpose of this code and the code's definition.
icode2	char	false	The library determines the name and purpose of this code and the code's definition.
itype_code_num	int2	false	The type of item. (The library defines item types.)
location_code	varchar	false	The branch location code for the item.

# Sierra DNA

## circ\_trans

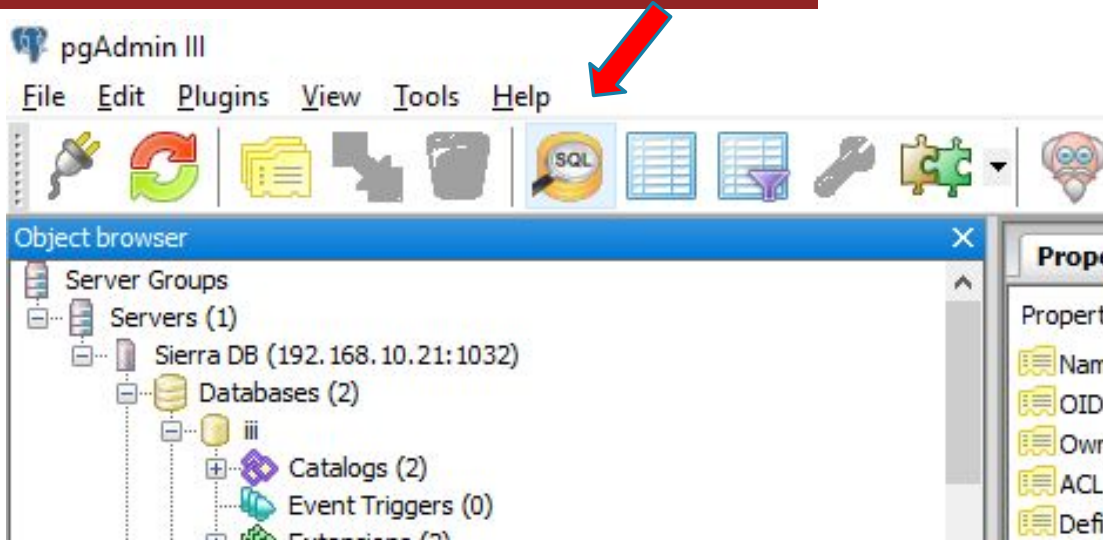
Each row of circ\_trans contains information about a circulation transaction.

Column	Data Type	Not NULL?	Comment				
id	int	false	System-generated sequential ID.				
transaction_gmt	timestampz	false	Transaction date in UNIX format.				
application_name	varchar	false	The name of the program that generated the transaction. Valid program names are: <ul style="list-style-type: none"><li>• circ (includes transactions made using PC Circ)</li><li>• circa (for transactions written by selfcheckwebserver and in-house use [transaction codes 'u' and 's'], which use webpac to execute transactions.)</li><li>• milcirc</li><li>• milmyselfcheck</li><li>• readreq</li><li>• selfcheck</li></ul>				
source_code	varchar	false	The transaction source. Possible values are: <ul style="list-style-type: none"><li>• local</li><li>• INN-Reach</li><li>• ILL</li></ul>				
op_code	varchar	false	Type of transaction: <table border="1"><tbody><tr><td>o = checkout</td><td>i = checkin</td></tr><tr><td>n = hold nb = bib hold ni = item hold</td><td>h = hold with recall hb = hold recall bib hi = hold recall item</td></tr></tbody></table>	o = checkout	i = checkin	n = hold nb = bib hold ni = item hold	h = hold with recall hb = hold recall bib hi = hold recall item
o = checkout	i = checkin						
n = hold nb = bib hold ni = item hold	h = hold with recall hb = hold recall bib hi = hold recall item						

# Top Rows

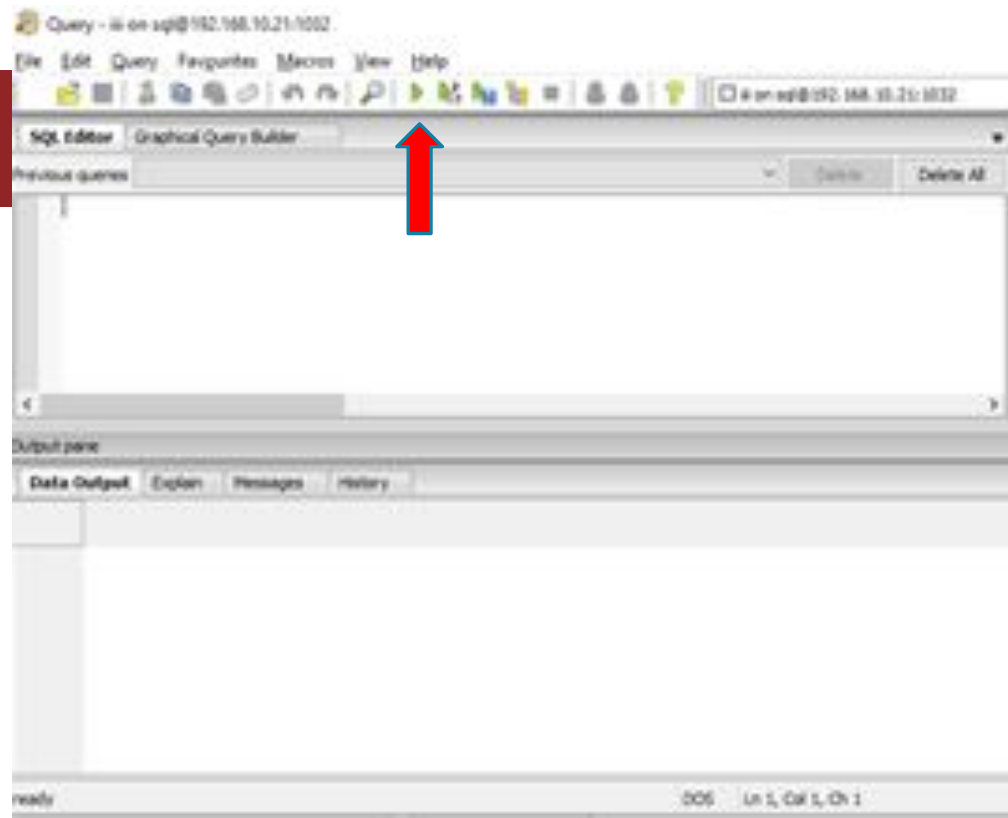
	id bigint	record_type_code character(1)	record_num integer	barcode character varying(1000)	icode1 integer	icode2 character(1)	itype_code_num smallint	locatio charac
1	450972975603	i	1409523	ITMPL004814752	0	-	42	crock
2	450973195937	i	1629857	ITMPL006179675	0	-	10	bio
3	450972914947	i	1348867	ITMPL004814828	0	-	43	jcdbk
4	450972567054	i	1000974	ITMPL000650100	0	u	10	mys
5	450972567230	i	1001150	ITMPL000930098	0	-	10	non
6	450972567962	i	1001882	ITMPL090129718	0	-	10	ov
7	450973001906	i	1435826	ITMPL004225801	0	-	10	non
8	450973028076	i	1461996	ITMPL004480786	0	-	31	dvde
9	450972566373	i	1000293	ITMPL000071794	0	-	10	non
10	450972566866	i	1000786	ITMPL090012575	0	z	10	rflhb
11	450972566325	i	1000245	ITMPL000053420	0	-	10	non
12	450973109849	i	1543769	ITMPL005310941	0	-	10	ov
13	450972567088	i	1001008	ITMPL001491165	0	-	10	jfic
14	450972567238	i	1001158	ITMPL000922939	0	-	10	jnon
15	450973188537	i	1622457	ITMPL006105720	0	-	10	jnon
16	450973059310	i	1493230	ITMPL004785903	0	-	31	dvdt
17	450973160585	i	1594505	ITMPL005831771	0	-	10	ific

# Entering SQL Queries in pgAdmin



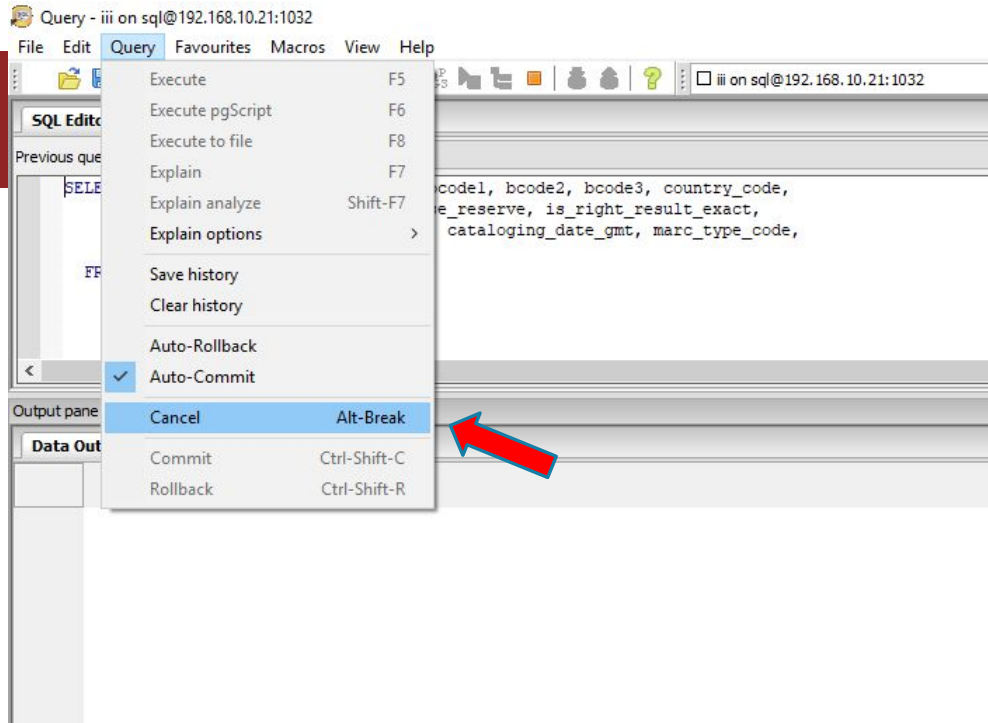
# SQL Window

1. Type your query
2. Click the green triangle  
(or press F5)



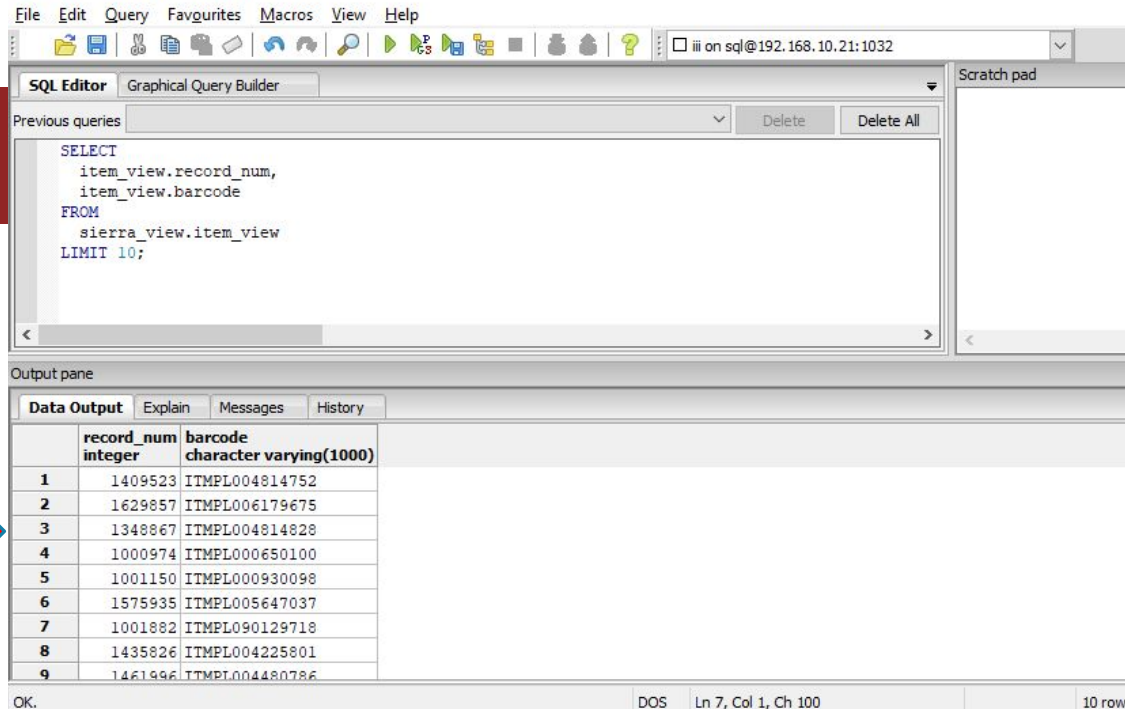
# Canceling It

- Query – Cancel  
(or press Alt-Break)



# Results

Results appear below



The screenshot shows an SQL Editor window with the following SQL query:

```
SELECT
  item_view.record_num,
  item_view.barcode
FROM
  sierra_view.item_view
LIMIT 10;
```

The Output pane displays the results in a table format:

	record_num integer	barcode character varying(1000)
1	1409523	ITMPL004814752
2	1629857	ITMPL006179675
3	1348867	ITMPL004814828
4	1000974	ITMPL000650100
5	1001150	ITMPL000930098
6	1575935	ITMPL005647037
7	1001882	ITMPL090129718
8	1435826	ITMPL004225801
9	1461996	ITMPL004480786

A red arrow points to the first row of the results table. The status bar at the bottom indicates "OK." and "Ln 7, Col 1, Ch 100".

# Export

- File – Export
- Click “...”
- Something.txt
- Change CSV to All files

The screenshot shows the SQL Editor interface with two dialog boxes open. The 'Export data to file' dialog is in the foreground, showing settings for row separator (CR/LF), encoding (Local charset), and quoting (all columns). The 'Select export filename' dialog is also open, showing the file name 'export.txt' and the 'Save as type' dropdown set to 'All files (\*.\*)'. Red arrows point to the file type dropdown and the 'OK' button.

cod	char	order	varchar	int	float	text	blob
1	ym2p1	1					
2	cr0zz	1					
3	jbigb	1					
4	wb3ug	1					
5	jp1c	1					
6	rfavd	1					
7	noltg	1					
8	7fic	1					



# Open in Excel

- Delimited

Text Import Wizard - Step 1 of 3

The Text Wizard has determined that your data is Delimited.  
If this is correct, choose Next, or choose the data type that best describes your data.

Original data type

Choose the file type that best describes your data:

Delimited - Characters such as commas or tabs separate each field.  
 Fixed width - Fields are aligned in columns with spaces between each field.

Start import at row: 1 File origin: 437 : OEM United States

My data has headers.

Preview of file \\fs1\users\pshirley\my documents\del.txt

```
1 "code";"display_order";"name"  
2 "@";"10";"SearchOhio OFF-SITE"  
3 "_";"11";"SearchOhio RE-REQ'D"  
4 "#";"1";"SearchOhio REC'D"  
5 "e";"16";"ON DISPLAY"
```

Cancel < Back Next > Finish

# Open in Excel

- Semicolon
- Finish



Text Import Wizard - Step 2 of 3

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters

Tab

Semicolon

Comma

Space

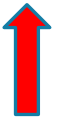
Other:

Treat consecutive delimiters as one

Text qualifier:

Data preview

code	display_order	name
@	10	SearchOhio OFF-SITE
_	11	SearchOhio RE-REQ'D
#	1	SearchOhio REC'D
e	16	ON DISPLAY



# Saving Queries, Opening Saved Queries

- File - Save
- File - Open

# SQL Queries

# What SQL Queries Looks Like

SELECT

item\_record.record\_id,  
item\_record.last\_checkin\_gmt,  
item\_record.location\_code

FROM

sierra\_view.item\_record;

## Comments

-- Returns record numbers, last checkin, and barcodes

SELECT

Item\_record.record\_id,

last\_checkin\_gmt,

item\_record.location\_code

FROM

sierra\_view.item\_record;

## Very Little White Space

```
SELECT item_record.record_id, last_checkin_gmt,  
item_record.location_code FROM sierra_view.item_record;
```

# Plenty of White Space

```
SELECT
    item_record.record_id,
    last_checkin_gmt,
    item_record.location_code

FROM
    sierra_view.item_record;
```



## AS: Aliases for Column Headings

```
SELECT
    item_record.id AS item_id,
    item_record.last_checkin_gmt AS last_checkin,
    item_record.location_code AS location
FROM
    sierra_view.item_record;
```

## Double Quotes (Spaces, Capitalization)

```
SELECT
  item_record.id AS "Item ID",
  item_record.last_checkin_gmt AS "Last checkin",
  item_record.location_code AS "Location"
FROM
  sierra_view.item_record;
```

## Alias for a Table

```
SELECT
  i.record_id AS "Item ID",
  i.last_checkin_gmt AS "Last checkin",
  i.location_code AS "Location"
FROM
  sierra_view.item_record i;
```

## A Few Functions: id2reckey()

```
SELECT
    id2reckey(i.record_id) AS "Record number",
    i.last_checkin_gmt AS "Last checkin",
    i.location_code AS "Location"
FROM
    sierra_view.item_record i;
```



## A Few Functions: Concatenation

```
SELECT
  CONCAT(id2reckey(i.record_id), 'a') AS "Record number",
  last_checkin_gmt AS "Last checkin",
  i.location_code AS "Location"
FROM
  sierra_view.item_record i;
```



# Time Stamps

	<b>Record number bigint</b>	<b>Last checkin timestamp with time zone</b>	<b>Location character varying(5)</b>
<b>1</b>	3941100652988071	2014-03-11 15:22:09-04	9cinc
<b>2</b>	10133550135207265	2016-01-10 15:39:53.411-05	re2pl
<b>3</b>	6474375437855531	2015-09-29 14:34:21.077-04	pc2pl
<b>4</b>	1126350881433238	2015-07-16 09:07:05.766-04	t11pl
<b>5</b>	30962698412117321	2015-08-22 10:26:40.819-04	9cler

## Extracting date from a time stamp

```
SELECT
  i.record_id AS "Record number",
  last_checkin_gmt::date AS "Last checkin",
  i.location_code AS "Location"
FROM
  sierra_view.item_record i;
```



# WHERE: Introduction

```
SELECT
  i.record_id,
  last_checkin_gmt,
  i.location_code
FROM
  sierra_view.item_record i
WHERE i.location_code = 'dvdj';
```



## WHERE: Equals and Not Equals

WHERE i.location\_code = 'dvdj'

WHERE i.checkout\_total = 0

WHERE i.location\_code <> 'dvdj'

WHERE i.checkout\_total <> 0

WHERE i.location\_code != 'dvdj'

WHERE i.checkout\_total != 0



## WHERE: Greater Than, Less Than

WHERE i.location\_code > 'd'

WHERE i.checkout\_total > 0

WHERE i.location\_code >= 'd'

WHERE i.checkout\_total >= 0

WHERE i.location\_code < 'd'

WHERE i.checkout\_total < 1000

WHERE i.location\_code <= 'd'

WHERE i.checkout\_total <= 1000

## WHERE: BETWEEN

WHERE o.volume\_count BETWEEN 1 AND 5;  
WHERE b.title BETWEEN 'A' AND 'B';

WHERE UPPER(b.title) BETWEEN 'A' AND 'B';  
WHERE LOWER(b.title) BETWEEN 'a' AND 'b';



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## WHERE: Dates

WHERE p.activity\_gmt > '1/31/2018'

WHERE p.activity\_gmt > '2018-1-31'

WHERE p.activity\_gmt BETWEEN '1/1/2017' AND  
'12/31/2017'

WHERE p.activity\_gmt > now() - interval '1 year'



## WHERE: IN

```
WHERE o.material_type_code IN ('a', 'b', 'g');  
WHERE o.volume_count IN (1,2,7);
```

## WHERE: LIKE, NOT LIKE

\_ (underscore) exactly one character

% zero or more characters (anything, or nothing)

```
WHERE LOWER(b.title) LIKE '%librar%';
```

```
WHERE b.title LIKE '_';
```

# WHERE: POSIX Regular Expressions

~ matches

~\* matches (not case sensitive)

!~ does not match

!~\* does not match (not case sensitive)

WHERE i.location\_code ~ '^j.\*'

## ORDER BY

```
SELECT
    i.record_id,
    i.last_checkin_gmt,
    i.location_code
FROM
    sierra_view.item_record i
WHERE i.location_code = 'dvdj'
ORDER BY i.last_checkin_gmt DESC,
    i.location_code;
```



# GROUP BY and COUNT

```
SELECT
  i.id,
  i.item_status_code
FROM
  sierra_view.item_view i
WHERE
  i.location_code = 'jpic';
```

id bigint	item_status_code character varying(3)
450973125002	-
450972603170	m
450973024308	-
450972614775	-
450973197141	-
450973088494	-
450973178979	-
450973189931	-
450973197687	-
450973234627	-
450972594279	m
450972597532	m
450972949579	-
450973069468	-
450973119497	-
.....	.....

# GROUP BY and COUNT

```
SELECT
  COUNT(i.id),
  i.item_status_code
FROM
  sierra_view.item_view i
WHERE
  i.location_code = 'jpic'
GROUP BY
  i.item_status_code;
```

count bigint	item_status_code character varying(3)
16	u
6	!
1	w
4	a
1	(
8094	-
99	n
4	z
26	\$
197	m
5	d
12	@

# GROUP BY and AVG

```
SELECT
  i.location_code,
  AVG(i.checkout_total)
FROM
  sierra_view.item_view i
GROUP BY
  i.location_code;
```

location_code character varying(5)	avg numeric
jgrap	23.1386735572782084
largm	8.6666666666666667
csoun	29.7857142857142857
nwnon	2.4578447794528197
cdbkn	21.3684210526315789
dvdjn	34.9349593495934959
pbkn	7.9784172661870504
nwov	3.5572519083969466
cfoln	4.7857142857142857
cjazn	9.0869565217391304
cbkx	22.4453781512605042
rfatl	0.200000000000000000
blusn	7.6666666666666667
ygrap	29.1884346959122632
plar	31.1666666666666667

# GROUP BY and AVG and ROUND

```
SELECT
  i.location_code,
  ROUND(AVG(i.checkout_total))
FROM
  sierra_view.item_view i
GROUP BY
  i.location_code;
```

location_code character varying(5)	round numeric
igrap	23
largm	9
csoun	30
nwnon	2
cdbkn	21
dvdjn	35
pbkn	8
nwov	4
cfoln	5
cjazn	9
cbkx	22
rfatl	0
blusn	8
ygrap	29
plar	31
...	...



# HAVING

```
SELECT
  COUNT(i.id),
  i.item_status_code
FROM
  sierra_view.item_view i
WHERE
  i.location_code = 'jpic'
GROUP BY
  i.item_status_code
HAVING COUNT(i.id) < 100;
```



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# JOIN

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## The SQL (snippet)

```
FROM  
    sierra_view.bib_view b  
JOIN  
    sierra_view.hold h  
ON b.id = h.record_id;
```

# How to Join Two Views

One table has to have the other table's ID number.

OR

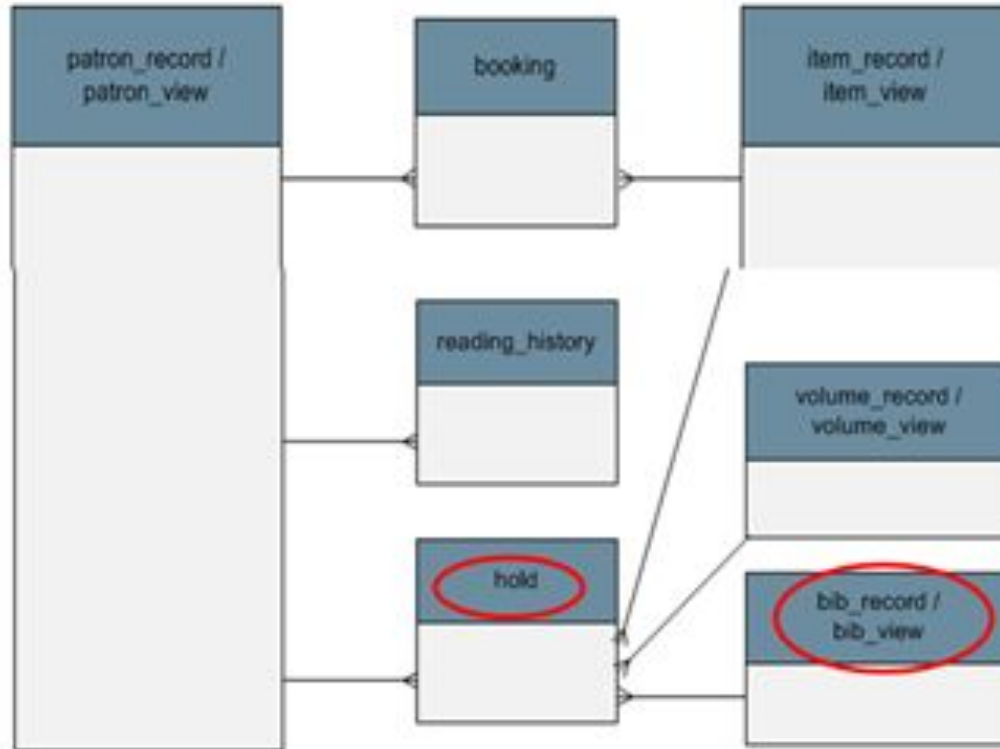
A third table has to have the ID numbers of both tables.\*

## How to Join Two Views - We'll look at:

- Sierra DNA (web site)
  - Detailed view
  - ERD view
- Top rows (in pgAdmin)

# Bibs with Bib-level Holds

# Sierra DNA - ERD View



# Sierra DNA - Detailed View for hold

## hold

Each row of hold describes a bibliographic, item, or volume hold.

Column	Data Type	Not NULL?	Comment
id	bigint	false	System-generated sequential ID.
patron_record_id	bigint	false	Foreign key to patron_record.
<u>record_id</u>	bigint	false	<u>Foreign key to record.</u>
placed_on	timestamp	false	Date the hold was placed



# Top Rows for bib\_view and hold

## Top rows for bib\_view and hold

Edit Data - Sierra DB (192.168.10.21:1032) - iii - sierra\_view.bib\_view

File Edit View Tools Help

100 rows

	<u>id</u> bigint	record_type_code character(1)	record_num integer	language character
1	420908065471	b	1270463	eng
2	420908172785	b	1377777	eng
3	420907795149	b	1000141	eng
4	420907795678	b	1000670	eng

Edit Data - Sierra DB (192.168.10.21:1032) - iii - sierra\_view.hold

File Edit View Tools Help

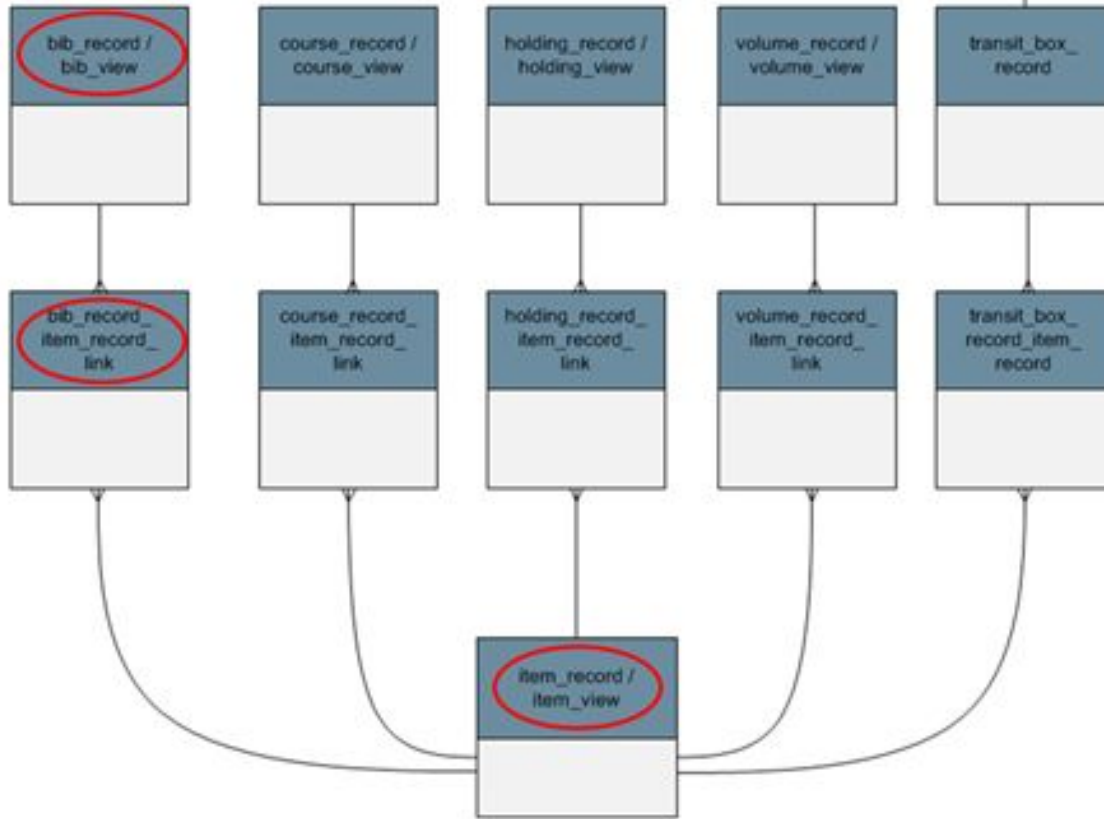
9 rows

	<u>id</u> bigint	patron_record_id bigint	<u>record_id</u> bigint	pla tin
1	483160	481037351623	3941100649441521	20:
2	481974	481037468270	420908493552	20:
3	486438	9852105222256298	450973194005	20:
4	487101	3096705790300726	450973164331	20:

## Using JOIN with bib\_view and hold

```
SELECT
  b.record_num,
  h.id
FROM
  sierra_view.bib_view b
JOIN
  sierra_view.hold h
ON b.id = h.record_id;
```

# Sometimes There's a "Link" View



# Sierra DNA

## bib\_record\_item\_record\_link

Each row of bib\_record\_item\_record\_link identifies a linked bibliographic and item record pair.

Column	Data Type	Not NULL?	Comment
id	bigint	false	System-generated sequential ID.
<u>bib_record_id</u>	bigint	false	<u>Foreign key to bib_record</u>
<u>item_record_id</u>	bigint	false	<u>Foreign key to item_record</u>
items_display_order	int	false	Integer to manage the display order of an items list.
bibs_display_order	int	false	Integer to manage the display order of a bibliographic record list.

	<b>id bigint</b>	<b>bib_record_id bigint</b>	<b>item_record_id bigint</b>	<b>items_display_order integer</b>	<b>bibs_display_order integer</b>
<b>1</b>	110484	420908192612	450973016239	0	0
<b>2</b>	168664	420908268026	450973099199	0	0
<b>3</b>	326793	420908532670	450973209082		0
<b>4</b>	82	420908348172	450973129978	0	0
<b>5</b>	84	420908348197	450973128732	0	0
<b>6</b>	339059	30962668348043236	30962698412814308	0	0
<b>7</b>	246963	420908372871	450973159892		0
<b>8</b>	234485	5629920442032659	5629950506803731	0	0
<b>9</b>	246970	420908467025	450973159899		0
<b>10</b>	274415	420908487713	450973176058		0
<b>11</b>	326797	420908536452	450973209086		0
<b>12</b>	234490	1126320818405145	1126350883176217	0	0
<b>13</b>	314605	420908533437	450973201587		0

## JOIN Bib, link, and item

```
SELECT *  
FROM  
    sierra_view.bib_record b  
JOIN  
    sierra_view.bib_record_item_record_link L  
    ON b.id = L.bib_record_id  
JOIN  
    sierra_view.item_record i  
    ON i.id = L.item_record_id;
```



# When to Use Different Kinds of JOIN

JOIN

LEFT JOIN

## Example

```
SELECT
  b.record_num,
  b.title,
  h.id
FROM sierra_view.bib_view b
JOIN sierra_view.hold h
  ON h.record_id = b.id;
```





## Output pane

Data Output

Explain

Messages

History

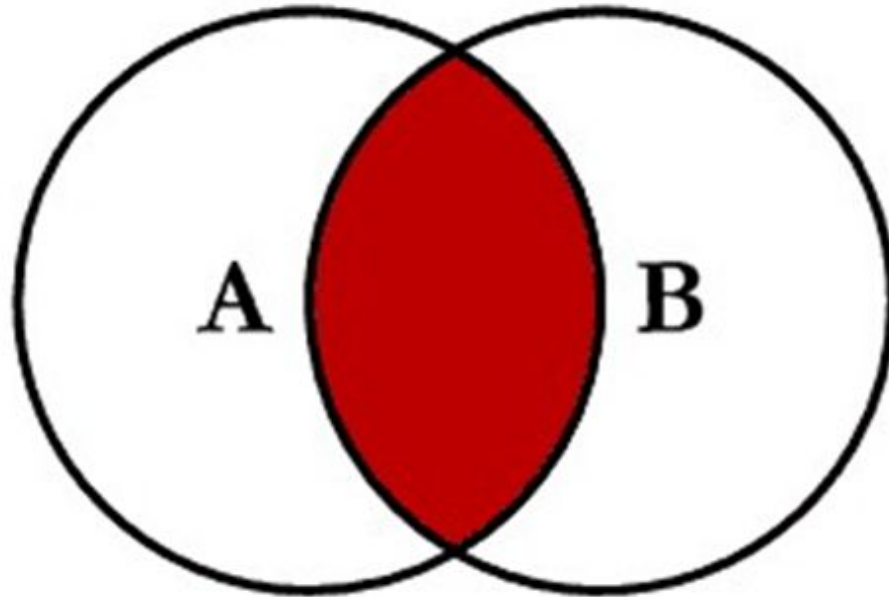
	record_num integer	title character varying(1000)	id bigint
1	1569295	"C" is for corpse : a Kinsey Millhone mystery	484848
2	1703624	"D" is for deadbeat	457766
3	1764291	12 Rules for life : an antidote to chaos	482335
4	1764291	12 Rules for life : an antidote to chaos	481754
5	1765746	12 Strong (Rental)	470220
6	1765746	12 Strong (Rental)	480175
7	1765745	12 Strong (Rental)	480174
8	1765746	12 Strong (Rental)	475560
9	1765745	12 Strong (Rental)	468942
10	1765745	12 Strong (Rental)	467844
11	1765745	12 Strong (Rental)	468580
12	1765746	12 Strong (Rental)	469224
13	1765746	12 Strong (Rental)	474459
14	1765745	12 Strong (Rental)	467879



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This doesn't include bibs with zero bib-level holds.

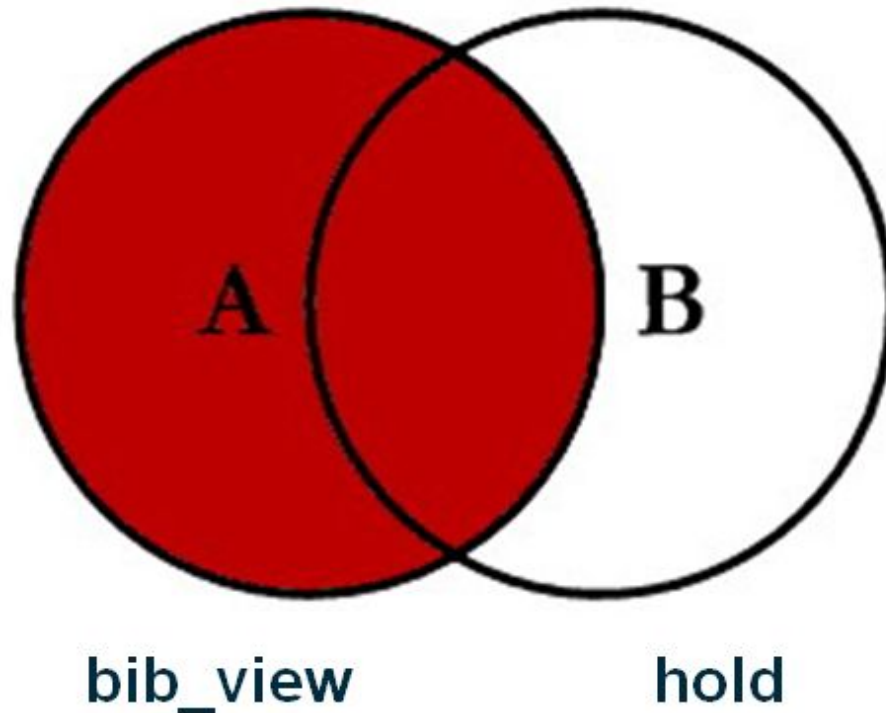
**JOIN (INNER JOIN):**  
**Bibs with title-level holds**



`bib_view`

`hold`

**LEFT JOIN (LEFT OUTER JOIN):**  
All bibs, some of which have title-level holds



## Include Bibs with No Bib-level Holds

```
SELECT
  b.record_num,
  b.title,
  h.id
FROM sierra_view.bib_view b
LEFT JOIN sierra_view.hold h
  ON h.record_id = b.id;
```

# A Different Kind of Table

- varfield
- varfield\_view
- subfield
- subfield\_view

## varfield\_view: Each line has:

- The content of a variable-length field
- The ID of the record it's from
- The kind of record it's from (b, i, p, etc.)
- The field tag
- The MARC tag and indicators

	id bigint	record_id bigint	record_type_code character(1)	record_num integer	varfield_type_code character(1)	marc_tag character varying(3)	marc_ind1 character(1)	marc_ind2 character(1)	occ_num integer	field_content character varying(20001)
74	5994477	481037404117	p	1066965	x				2	Fri Jun 11 2010: Bill \$18.9
75	5994479	481037404117	p	1066965	x				3	Fri Jul 02 2010: Bill \$18.9
76	485202	420907795149	b	1000141	t	245	1	0	0	aCrooning : ba collection
77	485203	420907795149	b	1000141	r	300			0	a287 p.
78	485204	420907795149	b	1000141	c	092			0	a814 Dun
79	485205	420907795149	b	1000141	p	260			0	aNew York : bSimon and Sch
80	485206	420907795149	b	1000141	a	100	1		0	aDunne, John Gregory, d19
81	485207	420907795149	b	1000141	n	590			0	aDUNNE 363121 \$19.95
82	485208	420907795149	b	1000141	l	010			0	a90009404
83	485209	420907795149	b	1000141	y	005			0	19900105082902.2
84	485210	420907795149	b	1000141	y	040			1	aDLC cDLC
85	485211	420907795149	b	1000141	i	020			0	z0671672362
86	222097	450972975603	i	1409523	b				0	ITMPL004814752
87	222098	450972975603	i	1409523	p				0	CD ROCK
88	222099	450972975603	i	1409523	l				0	\$11.98 1CD 1/08
89	12399802	450973195937	i	1629857	b				0	ITMPL006179675
90	152297	450972914947	i	1348867	b				0	ITMPL004814828
91	152298	450972914947	i	1348867	p				0	J CD BOOK
92	152299	450972914947	i	1348867	l				0	\$90.00 17CD 7/05
93	152300	450972914947	i	1348867	m				0	17 cds.
94	152301	450972914947	i	1348867	x				0	RTI CLEANED ALL 17 DISCS
95	176	450972567054	i	1000974	b				0	ITMPL000650100
96	177	450972567054	i	1000974	a	947			0	aITMPL000650100 bMN cMYST



# Get MARC Field 245 for Bib Records

```
SELECT
  b.record_num,
  v.field_content
FROM
  sierra_view.bib_view b
JOIN sierra_view.varfield_view v
  ON (v.record_num = b.record_num
      AND v.marc_tag = '245');
```

## Output pane

Data Output

Explain

Messages

History

	record_num integer	field_content character varying(20001)
1	1000113	aThe foxman / cby Gary Paulsen.
2	1000162	aSliver : ba novel / cIra Levin.
3	1756201	aNo room for small dreams : bcourage, imagination, and the making of modern Israel / cShimon Peres.
4	1000573	aRealms of fantasy / cMalcolm Edwards & Robert Holdstock.
5	1000682	aThe river bank : band other stories from the Wind in the willows / cKenneth Grahame ; illustrated by Inga
6	1623482	aClassical harp h[electronic resource] / cPatricia Spero.
7	1000410	aThe Christmas album h[sound recording].
8	1767558	aSoul / cJoey W. Hill.
9	1309072	aThe costume party / cstory and pictures by Victoria Chess.
10	1000519	aWashington County, Ohio, to 1980 : ba collection of topical & family sketches / cWashington County Historic



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## Two fields? Two JOINS to varfield\_view

```
JOIN sierra_view.varfield_view v1 ON (b.record_num =  
v1.record_num AND v1.marc_tag = '245')
```

```
JOIN sierra_view.varfield_view v2 ON (b.record_num =  
v2.record_num AND v2.marc_tag = '260')
```



```
SELECT
  b.record_num AS "Bib#",
  v1.field_content AS "245",
  v2.field_content AS "260"
FROM
  sierra_view.bib_view b
JOIN sierra_view.varfield_view v1 ON (b.record_num =
v1.record_num AND v1.marc_tag = '245')
JOIN sierra_view.varfield_view v2 ON (b.record_num =
v2.record_num AND v2.marc_tag = '260');
```

Output pane

Data Output Explain Messages History

	Bib# integer	245 character varying(20001)	260 character varying(20001)
1	1000113	aThe foxman / cby Gary Paulsen.	aNew York : bPuffin Books, c1990.
2	1000162	aSlover : ba novel / cIra Levin.	aNew York : bBantam Books, c1991.
3	1000573	aRealms of fantasy / cMalcolm Edwards & Robert Holdo	aGarden City, N.Y. : bDoubleday, c1983.
4	1000682	aThe river bank : band other stories from the Wind i	aCambridge, Massachusetts : bCandlewick Press, cc1996.
5	1623482	aClassical harp h[electronic resource] / cPatricia S	aSuffolk, Eng. ; aBoulder, Colo. : bNew World Music, c2
6	1000410	aThe Christmas album h[sound recording].	a[S.l.] : bPhilips Digital Classics, cp1990.
7	1309072	aThe costume party / cstory and pictures by Victoria	aLa Jolla, CA : bKane/Miller, c2005.
8	1000519	aWashington County, Ohio, to 1980 : ba collection of	a[Marietta] : bThe Society, cc1980.
9	1309664	aPeyton Place / cby Grace Metalious ; with a new int	aBoston : bNortheastern University Press, c1999.
10	1559864	aThe lion and the bird / cMarianne Dubuc ; translate	aNew York : bEnchanted Lion Books, c2014.
11	1003075	aFamous kings & queens of England & Scotland / cby J	aNew York : bArco Pub. Co., cc1977.
12	1004207	aHow to write a play / cby Raymond Hull.	aCincinnati, Ohio : bWriter's Digest Books, cc1983.
13	1007964	aMotor auto engines and electrical systems / ceditor	aNew York : bMotor, cc1977.
14	1003974	aPassage to Pontefract / cJean Plaidy	aNew York : bPutnam, c1982

**What if you have a repeatable field?**

```
SELECT
  v.field_content as "245",
  v2.field_content as "500"
FROM
  sierra_view.bib_view b
JOIN
  sierra_view.varfield_view v ON (b.record_num =
v.record_num and v.marc_tag = '245')
LEFT JOIN
  sierra_view.varfield_view v2 ON (b.record_num =
v2.record_num and v2.marc_tag = '500');
```

245 character varying(20001)	500 character varying(20001)
aInvestigating your own back yard / cNatalie	aIncludes index.
aInvestigating your own back yard / cNatalie	a"N6157."
aInvestigating your own back yard / cNatalie	aTeacher guide - ask at desk. (Invest
aWhere's my jetpack? h[electronic resource] :	aDownloadable audio file.
aWhere's my jetpack? h[electronic resource] :	aTitle from: Title details screen.
aWhere's my jetpack? h[electronic resource] :	aUnabridged.
aWhere's my jetpack? h[electronic resource] :	aDuration: 3:41:05.
aAmerica 1941 : ba nation at the crossroads /	aIncludes index.
aAmerica 1941 : ba nation at the crossroads /	wnnnc aPaige, Robin
aA ghoul's guide to love and murder / cVictor	a"An Obsidian mystery."
aPreschool prep. pCounting around the zoo.	aWidescreen (16x9)
aAn Americana Christmas h[sound recording].	aTitle from container.
aAn Americana Christmas h[sound recording].	aCompact disc.



**SELECT**

**v.field\_content as "245",  
v2.field\_content as "500",  
v3.field\_content as "700"**

**FROM**

**sierra\_view.bib\_view b**

**JOIN**

**sierra\_view.varfield\_view v on (b.record\_num =  
v.record\_num and v.marc\_tag = '245')**

**LEFT JOIN**

**sierra\_view.varfield\_view v2 on (b.record\_num =  
v2.record\_num and v2.marc\_tag = '500')**

**LEFT JOIN**

**sierra\_view.varfield\_view v3 on (b.record\_num =  
v3.record\_num and v3.marc\_tag = '700');**

245 character varying(20001)	500 character varying(20001)	700 character varying(20001)
aAnne of Green Gables h[videorec	aBased on the novel by L.M.	aNicholls, George, d1897-1939.
aAnne of Green Gables h[videorec	aBased on the novel by L.M.	aMintz, Sam.
aAnne of Green Gables h[videorec	aBased on the novel by L.M.	aShirley, Anne, d1918-
aAnne of Green Gables h[videorec	aBased on the novel by L.M.	aBrown, Tom, d1913 Jan. 6-
aAnne of Green Gables h[videorec	aBased on the novel by L.M.	aHeggie, O. P. q(Otto Peters), d1876-1934
aAnne of Green Gables h[videorec	aBased on the novel by L.M.	aMontgomery, L. M. q(Lucy Maud), d1874-19
aAnne of Green Gables h[videorec	aOriginally released as a mo	aNicholls, George, d1897-1939.
aAnne of Green Gables h[videorec	aOriginally released as a mo	aMintz, Sam.
aAnne of Green Gables h[videorec	aOriginally released as a mo	aShirley, Anne, d1918-
aAnne of Green Gables h[videorec	aOriginally released as a mo	aBrown, Tom, d1913 Jan. 6-
aAnne of Green Gables h[videorec	aOriginally released as a mo	aHeggie, O. P. q(Otto Peters), d1876-1934
aAnne of Green Gables h[videorec	aOriginally released as a mo	aMontgomery, L. M. q(Lucy Maud), d1874-19
aAnne of Green Gables h[videorec	aFeatures: scene selections,	aNicholls, George, d1897-1939.
aAnne of Green Gables h[videorec	aFeatures: scene selections,	aMintz, Sam.
aAnne of Green Gables h[videorec	aFeatures: scene selections,	aShirley, Anne, d1918-
aAnne of Green Gables h[videorec	aFeatures: scene selections,	aBrown, Tom, d1913 Jan. 6-
aAnne of Green Gables h[videorec	aFeatures: scene selections,	aHeggie, O. P. q(Otto Peters), d1876-1934
aAnne of Green Gables h[videorec	aFeatures: scene selections,	aMontgomery, L. M. q(Lucy Maud), d1874-19

## If you want one line per title

Combine all 500 fields and all 700 files onto one line.

OR

Just get the first 500 field and the first 700 field.

## All 500 fields and all 700 files onto one line

```
SELECT...  
STRING_AGG(v.field_content, ';' order by occ_num) as  
"500"  
  
...  
GROUP BY v.field_content;
```

**SELECT**

**v.field\_content as "245",  
STRING\_AGG(v2.field\_content, ';' order by v2.occ\_num) as "500",  
STRING\_AGG(v3.field\_content, ';' order by v3.occ\_num) as "700"**

**FROM**

**sierra\_view.bib\_view b**

**JOIN**

**sierra\_view.varfield\_view v on (b.record\_num =  
v.record\_num and v.marc\_tag = '245')**

**LEFT JOIN**

**sierra\_view.varfield\_view v2 on (b.record\_num =  
v2.record\_num and v2.marc\_tag = '500')**

**LEFT JOIN**

**sierra\_view.varfield\_view v3 on (b.record\_num =  
v3.record\_num and v3.marc\_tag = '700')**

**GROUP BY v.field\_content;**



245 character varying(20001)	500 text	700 text
aAnne of Green Gables h[videorec	aBased on the novel by L.M. Montgome	aNicholls, George, d1897-1939.;  aN

Only the first 500 field and the first 700 f

This requires a subquery

## The Way We Did it Earlier

```
SELECT
  b.record_num,
  v.field_content
FROM
  sierra_view.bib_view b
JOIN sierra_view.varfield_view v
  ON v.record_num = b.record_num
WHERE
  v.marc_tag = '500';
```



# Using a Subquery

```
SELECT
  b.record_num,

  (SELECT field_content AS b500
   FROM sierra_view.varfield_view v
   WHERE b.id = v.record_id AND v.marc_tag = '500'
   LIMIT 1)

FROM
  sierra_view.bib_view b;
```

```
SELECT
```

```
  b.record_num,
```

```
  (SELECT field_content AS b500
```

```
  FROM sierra_view.varfield_view v
```

```
  WHERE b.id = v.record_id AND v.marc_tag = '500'
```

```
  LIMIT 1),
```

```
  (SELECT field_content AS b700
```

```
  FROM sierra_view.varfield_view v2
```

```
  WHERE b.id = v2.record_id AND v2.marc_tag = '700'
```

```
  LIMIT 1)
```

```
FROM
```

```
  sierra_view.bib_view b;
```

# Consider Attending

- Automating Booklist Curation with SQL
  - Tuesday 1:30-2:30 Deer Valley
- Cache and Release: Capturing and Using Sierra's Temporary SQL Data
  - Wednesday 3:00-4:00 Deer Valley
- SQL Users Birds of A Feather

## Find Us On Slack

All three of us can be found on the Sierra\_ILS slack workspace, run by Craig Bowman



# Questions?

Jeremy Goldstein

[jgoldstein@minlib.net](mailto:jgoldstein@minlib.net)

Phil Shirley

[pshirley@fallslibrary.org](mailto:pshirley@fallslibrary.org)

Ray Voelker

[ray.voelker@cincinnati.library.org](mailto:ray.voelker@cincinnati.library.org)