

Основные объекты баз данных. SQL.

Объекты баз данных

- Таблицы
- Индексы
- Представления (View)
- Последовательности (Sequence)
- Функции (Function) & Процедуры (Procedures)
- Триггеры
- Пользовательские типы данных
- Пакеты
- Схемы
- Пользователи, привилегии

Таблицы

Fields	Foreign Keys	Checks	Indices	Triggers	Rules	Properties	Dependencies	Data	Description	DDL	Permissions	
Field Name								Field Type	Key	Not Null	Default	Description
idaccount1								bigint		<input type="checkbox"/>	Null	
firstname1								varchar(40)		<input type="checkbox"/>	Null	
lastname1								varchar(40)		<input type="checkbox"/>	Null	
country1								varchar(60)		<input type="checkbox"/>	Null	
photo1								varchar(200)				
lastactivity1								timestamp(0)				
fake1								boolean				
idaccount2								bigint				
firstname2								varchar(40)				
lastname2								varchar(40)				
country2								varchar(60)				
photo2								varchar(200)				
lastactivity2								timestamp(0)				
fake2								boolean				
friend_date								timestamp(0)				
idfriend								bigint				

New Field

Field name:

Data type:

Type:

Size: ☐ Unlimited

Precision:

Number of array dimensions:

Field flags:

- ☐ Not Null
- ☐ Primary Key
- ☐ Unique

Statistics:


Number of statistic details (0 - no statistics): ☒ Default

Default Value:

Description:

OK Cancel Help

Таблица (Внешние ключи)

Fields	Foreign Keys	Checks	Indices	Triggers	Rules	Properties	Dependencies	Data	Description	DDL	Permissions
Foreign Key Name		On Field	FK Table	FK Field	On Update	On Delete	Deferrable	Check Time	Description		
 st_friend_requests_fk		idaccount1	account	id_account	Cascade	Cascade	<input type="checkbox"/>				

Add Foreign Key for

Properties

Description

Foreign key name: st_friend

Available Fields

fake1

firstname2

lastname2

country2

photo2

lastactivity2

Included Fields

idaccount2

Foreign table: account

Available Fields

email

password_hash

firstname

lastname

birthday

gender

Included Fields

id_account

On Delete action: Cascade

On Update action: No Action

Match type: Simple

Deferrable: ☐ Deferrable

Check Time: Immediate

OK

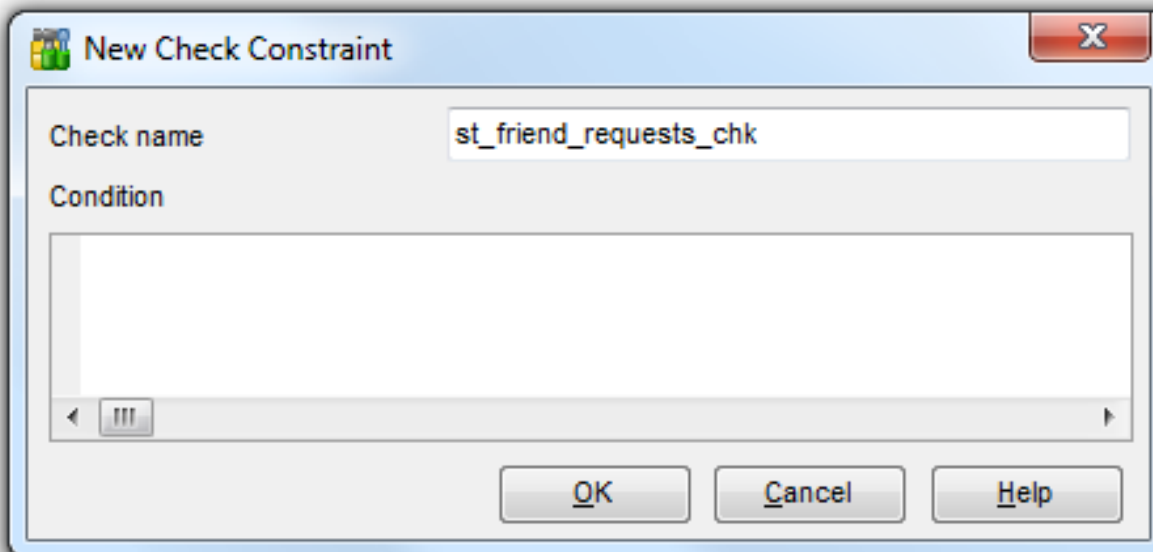
Cancel

Help

Таблицы (Проверки)










Fields	Foreign Keys	Checks	Indices	Triggers	Rules	Properties	Dependencies	Data	Description	DDL	Permissions
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Check Name	Definition	Description
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The dialog box titled "New Check Constraint" contains a "Check name" field with the value "st_friend_requests_chk" and a "Condition" text area. At the bottom are "OK", "Cancel", and "Help" buttons.

Таблицы (Индексы)

Fields	Foreign Keys	Checks	Indices	Triggers	Rules	Properties	Dependencies	Data	Description	DDL	Permissions
Index Name		Function	On Field(s)	Type	Unique	Primary Key	Where	Description			
	account_city_index		id_city	btree	<input type="checkbox"/>	<input type="checkbox"/>					
	account_email_key		email	btree	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
	account_fake_index		fake	btree	<input type="checkbox"/>	<input type="checkbox"/>					
	account_idx		facebook_id	btree	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
	account_image_index		id_profile_image	btree	<input type="checkbox"/>	<input type="checkbox"/>					
	account_pkey		id_account	btree	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
	idx_account_email		email	btree	<input type="checkbox"/>	<input type="checkbox"/>					
	idx_account_email_pv		email, password_hash	btree	<input type="checkbox"/>	<input type="checkbox"/>					
	idx_account_id		id_account	btree	<input type="checkbox"/>	<input type="checkbox"/>					

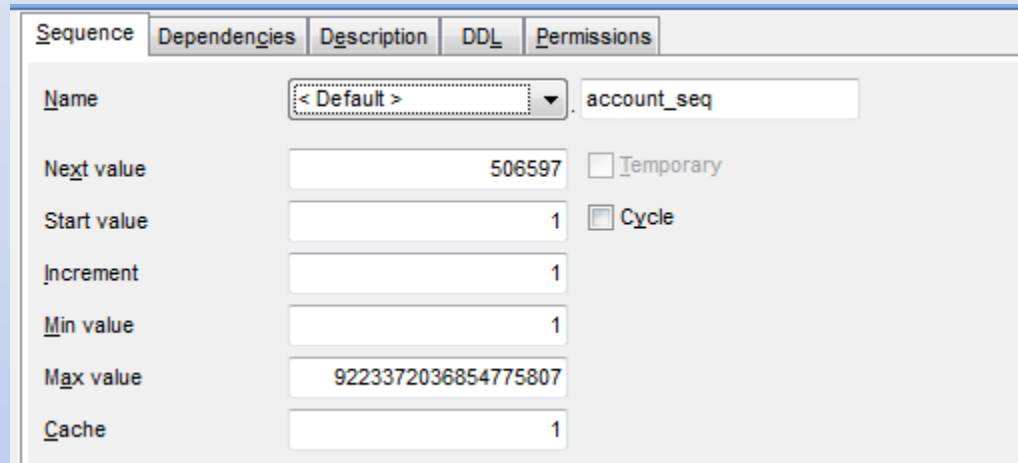
Представления (view)

View	Fields	Rules	Dependencies	Data	Description	DDL	Permissions
<pre>1 CREATE OR REPLACE VIEW <u>profile data</u>(2 idaccount, 3 firstname, 4 lastname, 5 country, 6 city, 7 photo, 8 lastactivity, 9 updatecount, 10 changedate, 11 email1, 12 email2, 13 emailconfirmed, 14 status) 15 AS 16 SELECT a.id_account AS idaccount, 17 a.firstname, 18 a.lastname, 19 c.name AS country, 20 city.name AS city, 21 i.uid AS photo, 22 a.last_activity AS lastactivity, 23 ac.email_change_count AS updatecount, 24 ac.email_change_updated AS changedate, 25 a.email AS email1, 26 ac.old_email AS email2, 27 a.email_confirmed AS emailconfirmed, 28 a.status 29 FROM <u>schema.account</u> a, 30 <u>schema.image</u> i, 31 <u>schema.country</u> c, 32 <u>schema.city</u> city, 33 <u>schema.account changes</u> ac 34 WHERE a.fake = false AND a.id_profile_image = i.id_image AND a.id_city = 35 city.id_city AND city.id_country = c.id_country AND a.id_account = ac.id_account;</pre>							

Материализованные представления

- **CREATE MATERIALIZED VIEW**
- **REFRESH MATERIALIZED VIEW**
- **DROP MATERIALIZED VIEW IF EXISTS**

Последовательности (Sequence)



The screenshot shows a database management interface for configuring a sequence. It has five tabs: 'Sequence' (selected), 'Dependencies', 'Description', 'DDL', and 'Permissions'. The 'Sequence' tab contains the following fields:

Field	Value	Options
Name	account_seq	< Default > (dropdown)
Next value	506597	<input type="checkbox"/> Temporary
Start value	1	<input checked="" type="checkbox"/> Cycle
Increment	1	
Min value	1	
Max value	9223372036854775807	
Cache	1	

`SELECT nextval('test_seq');`

`SELECT currval('test_seq');`

`SELECT setval('foo', 42);` *Next nextval will return 43*

`SELECT setval('foo', 42, false);` *Next nextval will return 42*

Функции

- **Функции SQL**

```
select count(*) from table1;
```

- **Функции СУБД**

```
select trim(a.column1) from table1 a;
```

- **Аналитические функции**

В основном Oracle

- **Пользовательские функции**

```
select my_first_function();
```

Функции SQL: Математические функции

- **AVG()** - функция возвращает среднее значение числового столбца.
- **COUNT()** - данная функция возвращает количество строк, которые соответствует определенным критериям.
- **FIRST()** - данная функция возвращает первое значение для выбранного столбца.
- **LAST()** - данная функция возвращает последнее значение для выбранного столбца.
- **MAX()** - функция возвращает наибольшее значение для выбранного столбца.
- **MIN()** - функция возвращает наименьшее значение для выбранного столбца.
- **SUM()** - функция возвращает сумму числового столбца.

Функции SQL: Строковые функции

- **UCASE()** - функция преобразует символы в верхний регистр.
- **LCASE()** - функция преобразует символы в нижний регистр.
- **MID()** - функция используется для получения определенного количества символов из текстового поля.
- **LEN()** - определяет длину строки.
- **ROUND()** - данная функция используется для округление плавающего числа.
- **NOW()** - функция, которая возвращает текущую системную дату и время.
- **FORMAT()** - данная функция используется для форматирования полей.

Функции СУБД

- <http://www.postgresql.org/docs/9.5/static/functions-string.html>
- Функции работы со строками
- Функции работы с датами и временем
- Операторы
- Битовые функции
- Функции перечислений
- Геометрические функции
- Функции работы с сетевыми адресами
- Полнотекстовый поиск
- XML и JSON функции

Пользовательские функции

Function		Dependencies	Description	DDL							
Name	< Default >	function1		<input type="checkbox"/> Returns null on null input							
Returns	<input checked="" type="radio"/> Single value <input type="radio"/> Set of values <input type="radio"/> Table			<input type="checkbox"/> Execute with definer's privileges							
Return type	BIGSERIAL			<input type="checkbox"/> Is window function							
Return table	<table border="1"><thead><tr><th>Column Name</th><th>Column Type</th></tr></thead><tbody></tbody></table>	Column Name	Column Type			<input type="checkbox"/> Replace multiple calls with single on same arguments					
Column Name	Column Type										
Language	plpgsql			<input type="radio"/> Always (IMMUTABLE) <input checked="" type="radio"/> Never (VOLATILE)							
Arguments	<table border="1"><thead><tr><th>Name</th><th>Type</th><th>Mode</th><th>Default Value</th></tr></thead><tbody><tr><td>1 arg1</td><td>BIGINT</td><td>Input/Output</td><td></td></tr></tbody></table>		Name	Type	Mode	Default Value	1 arg1	BIGINT	Input/Output		<input type="radio"/> Within transaction (STABLE)
Name	Type	Mode	Default Value								
1 arg1	BIGINT	Input/Output									
		Planner options (0 - default)		Estimated execution cost: 0							
				Estimated number of rows: 0							
Definition											
<pre>1 DECLARE 2 variable_name datatype; 3 BEGIN 4 statements; 5 EXCEPTION 6 WHEN exception_name THEN 7 statements; 8 END;</pre>											

Примеры пользовательских функций

```
CREATE FUNCTION add(integer, integer) RETURNS integer
  AS 'select $1 + $2;'
  LANGUAGE SQL
  IMMUTABLE
  RETURNS NULL ON NULL INPUT;
```

```
CREATE OR REPLACE FUNCTION increment(i integer) RETURNS integer AS $$
  BEGIN
    RETURN i + 1;
  END;
$$ LANGUAGE plpgsql;
```

```
CREATE FUNCTION dup(in int, out f1 int, out f2 text)
  AS $$ SELECT $1, CAST($1 AS text) || ' is text' $$
  LANGUAGE SQL;
SELECT * FROM dup(42);
```

```
CREATE FUNCTION dup(int) RETURNS TABLE(f1 int, f2 text)
  AS $$ SELECT $1, CAST($1 AS text) || ' is text' $$
  LANGUAGE SQL;
SELECT * FROM dup(42);
```

Триггеры

Trigger

Dependencies

Description

DDL

Name

trigger1

☒ Enabled

For table

Type

☒ Before

☐ After

For each

☐ Row

☒ Statement

On event

☐ Insert

☐ Delete

☐ Update

☐ Truncate

Condition

Function

Arguments

☐ Use existing function

Function name

☒ Create new function

Language

plpgsql

1

DECLARE

2

variable_name datatype;

3

BEGIN

4

statements;

5

EXCEPTION

6

WHEN exception_name THEN

7

statements;

8

END;

Пользовательские типы данных

Composite Type

Dependencies

Description

DDL

Name

< Default >

address

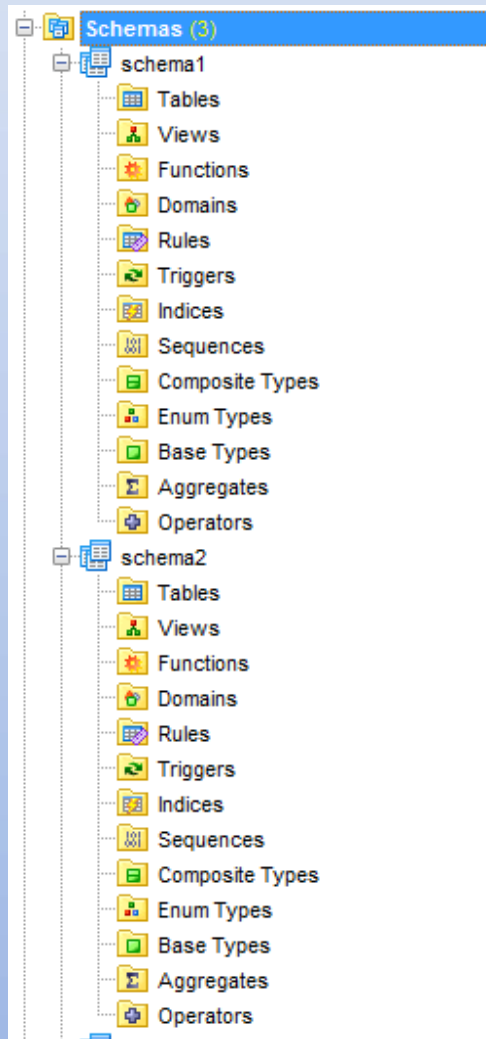
Columns

Name	Type	Size
city_name	<div>VARCHAR</div>	80
region_name	VARCHAR	80
strret_name	VARCHAR	255
house	VARCHAR	5
flat	INTEGER	

Пакеты

- Набор пользовательских типов данных + пользовательских функций и процедур (Oracle, SQL Server)

Схемы



Database Tools



Execute SQL script



Execute query



Manage permissions

Help and Support



SQL Manager 2011 help system



PostgreSQL reference

Internet Resources



SQL Manager 2011 home page



Support Center



SQL Manager 2011 online documentation



SQL Manager 2011 FAQ

Пользователи

- PgAdmin:

The screenshot shows the 'New Login Role...' dialog box in PgAdmin. The dialog has a title bar with a user icon and a close button. Below the title bar are five tabs: 'Properties', 'Role privileges', 'Role membership', 'Variables', and 'SQL'. The 'Properties' tab is selected. The form contains the following fields and controls:

- Role name:** A text input field.
- OID:** A text input field.
- Can login:** A checkbox that is checked.
- Password:** A text input field.
- Password (again):** A text input field.
- Account expires:** A date/time picker control.
- Connection Limit:** A text input field.
- Comment:** A large text area.
- Use replication:** A dropdown menu.

At the bottom of the dialog are three buttons: 'Help', 'OK', and 'Cancel'. Below the buttons is a status bar with the text 'Please specify name.' and a small icon.

Привелегии

- GRANT -- define access privileges

SELECT

INSERT

UPDATE

DELETE

TRUNCATE

REFERENCES

TRIGGER

CREATE

CONNECT

TEMPORARY

TEMP

EXECUTE

USAGE

ALL PRIVILEGES

Привилегии

- REVOKE -- remove access privileges

REVOKE INSERT ON films FROM PUBLIC;

REVOKE ALL PRIVILEGES ON kinds FROM manuel;

REVOKE admins FROM joe;

SQL

- DDL – CREATE, ALTER, DROP
 - DML – INSERT, UPDATE, DELETE
 - QUERY – SELECT
-
- ROLLBACK, COMMIT, BEGIN TRANSACTION

SELECT

```
SELECT [ ALL | DISTINCT [ ON ( expression [, ...] ) ] ] * | expression [ [ AS ] output_name ] [, ...]  
  [ FROM from_item [, ...] ]  
  [ WHERE condition ]  
  [ GROUP BY expression [, ...] ]  
  [ HAVING condition [, ...] ]  
  [ WINDOW window_name AS ( window_definition ) [, ...] ]  
  [ { UNION | INTERSECT | EXCEPT } [ ALL ] select ]  
  [ ORDER BY expression [ ASC | DESC | USING operator ] [ NULLS { FIRST | LAST } ] [, ...] ]  
  [ LIMIT { count | ALL } ] [ OFFSET start [ ROW | ROWS ] ]  
  [ FETCH { FIRST | NEXT } [ count ] { ROW | ROWS } ONLY ]  
  [ FOR { UPDATE | SHARE } [ OF table_name [, ...] ] [ NOWAIT ] [...] ]
```

where from_item can be one of:

```
[ ONLY ] table_name [ * ] [ [ AS ] alias [ ( column_alias [, ...] ) ] ]  
( select ) [ AS ] alias [ ( column_alias [, ...] ) ]  
with_query_name [ [ AS ] alias [ ( column_alias [, ...] ) ] ]  
function_name ( [ argument [, ...] ] ) [ AS ] alias [ ( column_alias [, ...] | column_definition [, ...] )  
  ]  
function_name ( [ argument [, ...] ] ) AS ( column_definition [, ...] )  
from_item [ NATURAL ] join_type from_item [ ON join_condition | USING ( join_column  
  [, ...] ) ]
```