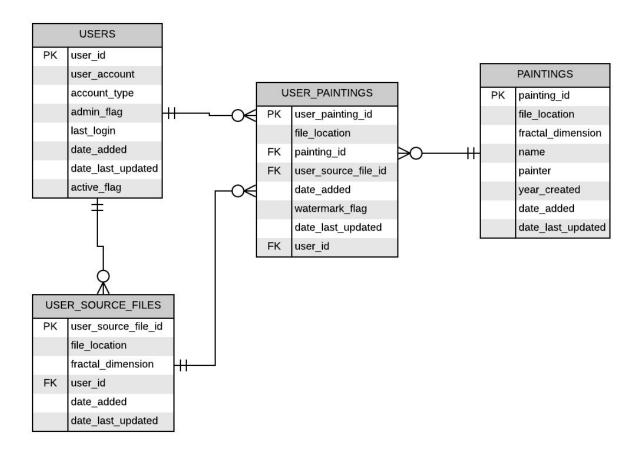
Fractal Factory



ER Diagram Documentation

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ER Diagram:



Tables:

- 1. **USERS** This table holds user account information.
 - a. **user_id** The *primary key* for the table; it is a guaranteed unique identifier for every user that signs up and receives an account on the site.
 - ➤ Data type: *uuid*
 - b. user_account The user's email or other identifier that they used during the signup process.
 - ➤ Data type: *varchar*(255)
 - c. account_type Whether the user signed up with Marist, Facebook, or Google account credentials.
 - > Data type: varchar(40)
 - d. admin flag Flag that determines if the user has administrative privileges.
 - ➤ Data type: boolean
 - e. last login Records the user's last login date and time.
 - > Data type: timestamp
 - f. date added The date and time the user is added to the system.
 - ➤ Data type: *timestamp*
 - g. date_last_updated The date and time the user's account information is last updated.
 - ➤ Data type: *timestamp*
 - h. active flag Flag that determines if the user account is deactivated or not.
 - ➤ Data type: boolean

- 2. <u>USER_SOURCE_FILES</u> This table holds information relating to the code source files uploaded by the user.
 - a. **user_source_file_id** The *primary key* for the table; it is unique for every source file uploaded.
 - ➤ Data type: *uuid*
 - b. **user_id** A *foreign key;* it relates the user_source_files table to the users_table (e.g. every piece of code uploaded will belong to one and only one user).
 - > Data type: uuid
 - **c. file location** Link to the source file that is stored in a separate location.
 - ➤ Data type: *varchar(250)*
 - d. **fractal dimension** The calculated fractal dimension of the source file.
 - \triangleright Data type: numeric(5, 3)
 - **e**. **date added -** The date and time the source file is uploaded.
 - ➤ Data type: *timestamp*
 - f. date last updated The date and time the source file information is last updated.
 - ➤ Data type: *timestamp*

- PAINTINGS This table holds information about the paintings imported from the Metropolitan Museum of Art's database.
 - a. painting id The *primary key* for the table; it is unique for every painting.
 - ➤ Data type: uuid
 - b. **file location** The link to the painting that is stored in a separate location.
 - ➤ Data type: *varchar(250)*
 - **c. fractal dimension** The calculated fractal dimension of the painting.
 - \triangleright Data type: numeric(5, 3)
 - d. name The name of the painting.
 - ➤ Data type: *varchar(150)*
 - e. painter The name of the painter.
 - > Data type: *varchar*(100)
 - f. year created The year that the painting was created.
 - > Data type: numeric(4)
 - g. date added The date and time that the painting is added to the database.
 - ➤ Data type: *timestamp*
 - h. date_last_updated The date and time that the painting information is last updated.
 - ➤ Data type: *timestamp*

- 4. <u>USER_PAINTINGS</u> This table holds information on the paintings that are created from the user's source file and selected painting.
 - a. **user_painting_id** The *primary key* for the table; it is unique for every painting created by the user's source code.
 - ➤ Data type: *uuid*
 - b. **painting_id** A *foreign key*; it relates the user_paintings table to the paintings table (e.g. every user painting created will have come about from one and only one painting).
 - ➤ Data type: *uuid*
 - c. user_source_file_id A foreign key; it relates the user_painting table to the user_source_file table (e.g. every user painting will be created from one and only one user source file).
 - ➤ Data type: *uuid*
 - d. **user_id** A *foreign key;* it relates the user_source_files table to the users_table (e.g. every piece of code uploaded will belong to one and only one user).
 - ➤ Data type: *uuid*
 - **e. file location -** The link to the user painting that is stored in a separate location.
 - > Data type: *varchar*(250)
 - f. watermark_flag Flag that determines whether the painting should be displayed with or without a watermark.
 - ➤ Data type: boolean
 - g. date added The date and time that the user painting is added to the database.
 - > Data type: timestamp
 - h. date last updated The date and time that the user painting is last updated.
 - ➤ Data type: *timestamp*

3NF Proof:

• Below are the four tables. Each contains five rows of example data:

<u>USERS:</u>

user_id	user_account	account_type	admin_flag	last_login	date_added	date_last_updated
072ba068-3256-46e7-9138-5f				2014-08-17	2002-02-27	
454b92b81e	example@gmail.com	Google	false	19:15:53	21:14:05	2009-12-22 10:34:32
a67d93f5-d24c-458e-b090-ad				2017-11-11	2014-03-22	
a03e10936e	kj17w	Marist	true	07:57:24	17:24:48	2017-11-11 07:57:24
1374801c-b520-4a55-aecc-b8				2009-12-22	2006-05-20	
41930a05d4	fc@yahoo.com	Facebook	false	10:34:32	17:03:43	2008-02-22 18:08:15
7ea674d9-eb9d-4ce4-9da9-0d				2011-09-04	2003-03-12	
0c50bfe55f	kjl8w	Marist	true	03:53:05	02:55:17	2009-12-22 10:34:32
35eeb5a1-670a-46a6-ad9c-56				2017-11-11	2008-08-05	
7d23fd339b	gg@gmail.com	Google	false	07:57:24	22:22:49	2017-11-11 07:57:24

<u>USER_SOURCE_FILES:</u>

user_source_file_id	file_location	fractal_dimension	user_id	date_added	date_last_updated
			072ba068-3256-46		
5eac02f8-1aa5-4646-944d-6dd468276			e7-9138-5f454b92	2004-09-13	
59c	/srv/source_files/usf0	1.67	b81e	11:27:50	2014-08-17 19:15:53
			a67d93f5-d24c-45		
f02e5204-ecad-41c4-a344-37d8fadca4			8e-b090-ada03e10	2017-11-11	
47	/srv/source_files/usf1	1.91	936e	07:57:24	2013-04-10 05:13:14
			1374801c-b520-4a		
dff03454-d205-4d57-8074-55b9019e7			55-aecc-b841930a	2008-02-22	
e02	/srv/source_files/usf2	1.34	05d4	18:08:15	2017-11-11 07:57:24
			7ea674d9-eb9d-4c		
86a2d9cd-9f5e-4ffe-b0cf-c64a0c9ab7			e4-9da9-0d0c50bfe	2009-12-22	
ae	/srv/source_files/usf3	1.56	55f	10:34:32	2011-09-04 03:53:05
			35eeb5a1-670a-46		
753cb0d6-240a-49e6-a07b-13430a90			a6-ad9c-567d23fd3	2008-02-22	
2743	/srv/source_files/usf4	1.89	39b	18:08:15	2005-01-29 04:45:45

<u>USER_PAINTINGS:</u>

user_painting_id	file_location	painting_id	user_source_file_id	user_id	date_added	watermark_flag	date_last_updated
				072ba068-3			
		afbbadc3-d088		256-46e7-9			
cd7870b2-2d4d-4ff9-	/srv/user_paintings/	-46b6-bbef-66	5eac02f8-1aa5-4646-94	138-5f454b	2004-11-08		2006-11-11
9801-05c6fa7c44a8	up0	494a659e7f	4d-6dd46827659c	92b81e	07:46:42	true	07:57:24
				a67d93f5-d			
		8eea83d0-5ff8		24c-458e-b0			
55ce7670-ccd5-4fc7-	/srv/user_paintings/	-42bf-8b19-aa	f02e5204-ecad-41c4-a3	90-ada03e1	2014-08-17		2017-11-11
9b88-6cdc0743d9ee	up1	584b904a3d	44-37d8fadca447	0936e	19:15:53	true	07:57:24
				1374801c-b			
		2aecd4b7-f48a		520-4a55-ae			
b93fc5cc-32aa-459e-9	/srv/user_paintings/	-4692-b972-89	dff03454-d205-4d57-80	cc-b841930	2006-09-04		2007-09-04
008-2e9b513df827	up2	0f20038031	74-55b9019e7e02	a05d4	03:53:05	false	03:53:05
				7ea674d9-e			
		f57633b0-969		b9d-4ce4-9d			
6019efa8-1657-42af-b	/srv/user_paintings/	c-44b7-b859-6	86a2d9cd-9f5e-4ffe-b0c	a9-0d0c50bf	2007-04-10		2008-04-10
dba-f7075a0d99b6	up3	dad96ceeae0	f-c64a0c9ab7ae	e55f	05:13:14	false	05:13:14
				35eeb5a1-6			
		2ad8d839-9c7f		70a-46a6-ad			
f3bdb8d5-7b8a-47ed-	/srv/user_paintings/	-4682-8740-64	753cb0d6-240a-49e6-a	9c-567d23f	2009-01-29		20014-08-05
9ef3-ee375a928abe	up4	b6413b3254	07b-13430a902743	d339b	04:45:45	true	22:22:49

PAINTINGS:

painting_id	file_location	fractal_dimension	name	painter	year_created	date_added	date_last_updated
afbbadc3-d088-46b6-bbe			Mona	Leanard Da			
f-66494a659e7f	/srv/paintings/p0	1.26	Lisa	Vinci	1557	2000-11-21 05:37:50	2005-01-29 04:45:45
			The				
8eea83d0-5ff8-42bf-8b19			Starry	Vincent Van			
-aa584b904a3d	/srv/paintings/p1	1.22	Night	Gogh	1889	2001-12-13 20:06:52	2016-11-08 07:46:42
2aecd4b7-f48a-4692-b97			The	Edvard			
2-890f20038031	/srv/paintings/p2	1.67	Scream	Munch	1893	2002-10-22 12:40:50	2008-12-13 20:06:52
			The				
f57633b0-969c-44b7-b85			Night				
9-6dad96ceeae0	/srv/paintings/p3	1.43	Watch	Rembrandt	1642	2003-06-20 13:22:52	2011-09-04 03:53:05
			The				
			Creation				
2ad8d839-9c7f-4682-874			of				
0-64b6413b3254	/srv/paintings/p4	1.87	Adam	Michelangelo	1512	2002-11-29 19:01:43	2017-11-11 07:57:24

- Each column contains only atomic values.
- There are no repeating groups.
- Each non-key column is dependent on the table's primary key.

- Each column is non-transitively dependent on the table's primary key.
- Left joining the user_paintings and user_source_files tables to the users table, then left joining the paintings table to the user_paintings table provides a complete table with referential integrity. Each user has one user painting and one user source file which makes use of each of the paintings, so no nulls are present. However, it is possible that a user may not have uploaded a source file or requested a painting which will result in nulls for those columns. Furthermore, not all paintings may be used to make user paintings, so nulls may result from that circumstance. Such nulls are expected and follow our business rules. Due to the length of the resulting table, it is shown below in four segments:



Abc paintings Painting Id (Painti	Abc ▼ paintings File Location (Pain	# paintings Fractal Dimension	Abo paintings Name	Abc paintings Painter	# paintings Year Created	paintings Date Added (Paint	t⊕ paintings Date Last Updated
AFBBADC3-D088-46B	/srv/paintings/p0	1.260000	Mona Lisa	Leanard Da Vinci	1557	11/21/2000 5:37:50 AM	1/29/2005 4:45:45 AM
8EEA83D0-5FF8-42BF	/srv/paintings/p1	1.220000	The Starry Night	Vincent Van Gogh	1889	12/13/2001 8:06:52 PM	11/8/2016 7:46:42 AM
2AECD4B7-F48A-469	/srv/paintings/p2	1.670000	The Scream	Edvard Munch	1893	10/22/2002 12:40:50	12/13/2008 8:06:52 PM
F57633B0-969C-44B7	/srv/paintings/p3	1.430000	The Night Watch	Rembrandt	1642	6/20/2003 1:22:52 PM	9/4/2011 3:53:05 AM
2AD8D839-9C7F-468	/srv/paintings/p4	1.870000	The Creation of Adam	Michelangelo	1512	11/29/2002 7:01:43 PM	11/11/2017 7:57:24 AN

Abc user_paintings User Painting Id	Abc user_paintings Painting Id	Abc user_paintings User Source File Id	Abc user_paintings User Id (User Pain	Abc user_paintings File Location	T F user_paintings Watermark Flag	user_paintings Date Added (User	user_paintings Date Last Updated
CD7870B2-2D4D-4FF	AFBBADC3-D088-46B	5EAC02F8-1AA5-4646	072BA068-3256-46E7	/srv/user_paintings/u	True	11/8/2004 7:46:42 AM	11/11/2006 7:57:24 AM
55CE7670-CCD5-4FC7	8EEA83D0-5FF8-42BF	F02E5204-ECAD-41C4	A67D93F5-D24C-458	/srv/user_paintings/u	True	8/17/2014 7:15:53 PM	11/11/2017 7:57:24 AM
B93FC5CC-32AA-459E	2AECD4B7-F48A-469	DFF03454-D205-4D5	1374801C-B520-4A55	/srv/user_paintings/u	False	9/4/2006 3:53:05 AM	9/4/2007 3:53:05 AM
6019EFA8-1657-42AF	F57633B0-969C-44B7	86A2D9CD-9F5E-4FFE	7EA674D9-EB9D-4CE	/srv/user_paintings/u	False	4/10/2007 5:13:14 AM	4/10/2008 5:13:01 AM
F3BDB8D5-7B8A-47E	2AD8D839-9C7F-468	753CB0D6-240A-49E	35EEB5A1-670A-46A	/srv/user_paintings/u	True	1/29/2009 4:45:45 AM	10/1/2019 12:00:00 AM

· · · · · · · · · · · · · · · · · · ·		*					
Abc user_spurce_files User Id (User Sour	Abc user_source_files File Location (Use	# user_source_files Fractal Dimension	user_source_files Date Added (User	user_source_files Date Last Updated	Abc users User Id	Abc users User Account	Abc users Account Type
072BA068-3256-46E7	/srv/source_files/usf0	1.670000	9/13/2004 11:27:50 AM	8/17/2014 7:15:53 PM	072BA068-3256-46E7	example@gmail.com	Google
A67D93F5-D24C-458	/srv/source_files/usf1	1.910000	11/11/2017 7:57:24 AM	4/10/2013 5:13:14 AM	A67D93F5-D24C-458	kjl7w	Marist
1374801C-B520-4A55	/srv/source_files/usf2	1.340000	2/22/2008 6:08:15 PM	11/11/2017 7:57:24 AM	1374801C-B520-4A55	fc@yahoo.com	Facebook
7EA674D9-EB9D-4CE	/srv/source_files/usf3	1.560000	12/22/2009 10:34:32	9/4/2011 3:53:05 AM	7EA674D9-EB9D-4CE	kjl8w	Marist
35EEB5A1-670A-46A	/srv/source_files/usf4	1.890000	2/22/2008 6:08:15 PM	1/29/2005 4:45:45 AM	35EEB5A1-670A-46A	gg@gmail.com	Google

T F users Admin Flag	t⊚ users Last Login	ப் Users Date Added	ம் users Date Last Updated	T F users Active Flag
False	8/17/2014 7:15:53 PM	2/27/2002 9:14:05 PM	12/22/2009 10:34:32	True
True	11/11/2017 7:57:24 AM	3/22/2014 5:24:48 PM	11/11/2017 7:57:24 AM	True
False	12/22/2009 10:34:32	5/20/2006 5:03:43 PM	2/22/2008 6:08:15 PM	True
True	9/4/2011 3:53:05 AM	3/12/2003 2:55:17 AM	12/22/2009 10:34:32	True
False	11/11/2017 7:57:24 AM	8/5/2008 10:22:49 PM	11/11/2017 7:57:24 AM	True

SOL:

CREATE STATEMENTS:

```
-- Need to add uuid-ossp extention to generate uuid's
CREATE EXTENSION "uuid-ossp";
CREATE TABLE users(
 user id UUID DEFAULT uuid generate v4() PRIMARY KEY,
 user account VARCHAR (255) NOT NULL,
 account type VARCHAR (40) NOT NULL,
 admin flag BOOLEAN DEFAULT 'f' NOT NULL,
 last login TIMESTAMP DEFAULT NOW() NOT NULL,
 date added TIMESTAMP DEFAULT NOW() NOT NULL,
 date_last_updated TIMESTAMP DEFAULT NOW(),
 active flag BOOLEAN DEFAULT 't' NOT NULL
);
CREATE TABLE paintings(
      painting id UUID DEFAULT uuid generate v4() PRIMARY KEY,
  file_location VARCHAR(250) NOT NULL,
      fractal dimension NUMERIC(5, 3), -- Null means it needs to be calculated
      -- Metadata for painting may be null ... be aware of this on front-end
      name VARCHAR(150),
      painter VARCHAR(100),
      year created NUMERIC(4),
      -- End of metadata
      date added TIMESTAMP DEFAULT NOW() NOT NULL,
  date last updated TIMESTAMP DEFAULT NOW() NOT NULL
);
```

```
CREATE TABLE user source files(
 user source file id uuid DEFAULT uuid generate v4() PRIMARY KEY,
 user id UUID NOT NULL REFERENCES users(user id) ON DELETE RESTRICT, -- Referential
integrity constraint
 file location VARCHAR(250) NOT NULL,
 fractal dimension NUMERIC(5, 3), -- Null means it needs to be calculated
 date added TIMESTAMP DEFAULT NOW() NOT NULL,
 date last updated TIMESTAMP DEFAULT NOW() NOT NULL
);
CREATE TABLE user paintings(
       user painting id UUID DEFAULT uuid generate v4() PRIMARY KEY,
       painting id UUID NOT NULL REFERENCES paintings(painting id) ON DELETE RESTRICT,
-- Referential integrity constraint
       user source file id UUID NOT NULL REFERENCES user source files(user source file id)
ON DELETE RESTRICT, -- Referential integrity constraint
       user id UUID NOT NULL REFERENCES users(user id) ON DELETE RESTRICT, --
Referential integrity constraint
      file location VARCHAR(250) NOT NULL,
       watermark flag BOOLEAN DEFAULT 't' NOT NULL,
      date added TIMESTAMP DEFAULT NOW() NOT NULL,
  date last updated TIMESTAMP DEFAULT NOW() NOT NULL
);
```

EXAMPLE DATA INSERT STATEMENTS:

```
INSERT INTO USERS(user id, user account, account type, admin flag, last login, date added,
date last updated) VALUES
('072ba068-3256-46e7-9138-5f454b92b81e', 'example@gmail.com', 'Google', false, '2014-08-17
19:15:53', '2002-02-27 21:14:05', '2009-12-22 10:34:32'),
('a67d93f5-d24c-458e-b090-ada03e10936e', 'kjl7w', 'Marist', true, '2017-11-11 07:57:24', '2014-03-22
17:24:48', '2017-11-11 07:57:24'),
('1374801c-b520-4a55-aecc-b841930a05d4', 'fc@yahoo.com', 'Facebook', false, '2009-12-22 10:34:32',
'2006-05-20 17:03:43', '2008-02-22 18:08:15'),
('7ea674d9-eb9d-4ce4-9da9-0d0c50bfe55f', 'kjl8w', 'Marist', true, '2011-09-04 03:53:05', '2003-03-12
02:55:17', '2009-12-22 10:34:32'),
('35eeb5a1-670a-46a6-ad9c-567d23fd339b', 'gg@gmail.com', 'Google', false, '2017-11-11 07:57:24',
'2008-08-05 22:22:49', '2017-11-11 07:57:24')
INSERT INTO PAINTINGS(painting id, file location, fractal dimension, name, painter, year created,
date added, date last updated) VALUES
('afbbadc3-d088-46b6-bbef-66494a659e7f', '/srv/paintings/p0', 1.26, 'Mona Lisa', 'Leanard Da Vinci',
'1557', '2000-11-21 05:37:50', '2005-01-29 04:45:45'),
('8eea83d0-5ff8-42bf-8b19-aa584b904a3d', '/srv/paintings/p1', 1.22, 'The Starry Night', 'Vincent Van
Gogh', '1889', '2001-12-13 20:06:52', '2016-11-08 07:46:42'),
('2aecd4b7-f48a-4692-b972-890f20038031', '/srv/paintings/p2', 1.67, 'The Scream', 'Edvard Munch',
'1893', '2002-10-22 12:40:50', '2008-12-13 20:06:52'),
('f57633b0-969c-44b7-b859-6dad96ceeae0', '/srv/paintings/p3', 1.43, 'The Night Watch', 'Rembrandt',
'1642', '2003-06-20 13:22:52', '2011-09-04 03:53:05'),
('2ad8d839-9c7f-4682-8740-64b6413b3254', '/srv/paintings/p4', 1.87, 'The Creation of Adam',
'Michelangelo', '1512', '2002-11-29 19:01:43', '2017-11-11 07:57:24')
```

```
INSERT INTO USER SOURCE FILES(user source file id, file location, fractal dimension, user id,
date added, date last updated) VALUES
('5eac02f8-1aa5-4646-944d-6dd46827659c', '/srv/source files/usf0', 1.67,
'072ba068-3256-46e7-9138-5f454b92b81e', '2004-09-13 11:27:50', '2014-08-17 19:15:53'),
('f02e5204-ecad-41c4-a344-37d8fadca447', '/srv/source files/usf1', 1.91,
'a67d93f5-d24c-458e-b090-ada03e10936e', '2017-11-11 07:57:24', '2013-04-10 05:13:14'),
('dff03454-d205-4d57-8074-55b9019e7e02', '/srv/source files/usf2', 1.34,
'1374801c-b520-4a55-aecc-b841930a05d4', '2008-02-22 18:08:15', '2017-11-11 07:57:24'),
('86a2d9cd-9f5e-4ffe-b0cf-c64a0c9ab7ae', '/srv/source files/usf3', 1.56,
'7ea674d9-eb9d-4ce4-9da9-0d0c50bfe55f', '2009-12-22 10:34:32', '2011-09-04 03:53:05'),
('753cb0d6-240a-49e6-a07b-13430a902743', '/srv/source files/usf4', 1.89,
'35eeb5a1-670a-46a6-ad9c-567d23fd339b', '2008-02-22 18:08:15', '2005-01-29 04:45:45')
INSERT INTO USER PAINTINGS(user painting id, file location, painting id, user source file id,
user id, date added, watermark flag, date last updated) VALUES
('cd7870b2-2d4d-4ff9-9801-05c6fa7c44a8', '/srv/user paintings/up0',
'afbbadc3-d088-46b6-bbef-66494a659e7f', '5eac02f8-1aa5-4646-944d-6dd46827659c',
'072ba068-3256-46e7-9138-5f454b92b81e', '2004-11-08 07:46:42', true, '2006-11-11 07:57:24'),
('55ce7670-ccd5-4fc7-9b88-6cdc0743d9ee', '/srv/user paintings/up1',
'8eea83d0-5ff8-42bf-8b19-aa584b904a3d', 'f02e5204-ecad-41c4-a344-37d8fadca447',
'a67d93f5-d24c-458e-b090-ada03e10936e', '2014-08-17 19:15:53', true, '2017-11-11 07:57:24'),
('b93fc5cc-32aa-459e-9008-2e9b513df827', '/srv/user paintings/up2',
'2aecd4b7-f48a-4692-b972-890f20038031', 'dff03454-d205-4d57-8074-55b9019e7e02',
'1374801c-b520-4a55-aecc-b841930a05d4', '2006-09-04 03:53:05', false, '2007-09-04 03:53:05'),
('6019efa8-1657-42af-bdba-f7075a0d99b6', '/srv/user paintings/up3',
'f57633b0-969c-44b7-b859-6dad96ceeae0', '86a2d9cd-9f5e-4ffe-b0cf-c64a0c9ab7ae',
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('f3bdb8d5-7b8a-47ed-9ef3-ee375a928abe', '/srv/user_paintings/up4', '2ad8d839-9c7f-4682-8740-64b6413b3254', '753cb0d6-240a-49e6-a07b-13430a902743', '35eeb5a1-670a-46a6-ad9c-567d23fd339b', '2009-01-29 04:45:45', true, '20014-08-05 22:22:49') ;
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