MySQL 5.7 JSON Workshop

Do the installation steps only if you are installing mysql on Oracle Linux

Install MySQL 5.7 from RPM packages on Oracle Linux 6.3

```
rpm -Uhv /opt/packages/mysql/mysql*.rpm

/etc/init.d/mysqld start

chkconfig --levels 345 mysqld on

mysql –uroot -pmysql

mysql> create user root@'%' identified by '';
mysql> grant all privileges on *.* to root@'%' with grant option;
```

Everyone else simply install MySQL on your own Windows or MacOS and start from this point.

json

```
create database json;
use json

create table thermostatModel (modelID int primary key, model varchar(50),
capabilities json);
create table thermostatReading (readingID int primary key auto_increment,
reading json);

desc thermostatModel;
desc thermostatReading;
```

json arrays and objects

```
select json_array('programmable', 'fan', 'ac', 'furnace') json_array;
insert into thermostatModel values
  (1, 'TheBestContorl', json_array('programmable', 'fan', 'ac', 'furnace')),
  (2, 'UltimatePower', json_array('fan', 'furnace'));
select * from thermostatModel;

select json_array(1, 'abc', NULL, TRUE, now());
select json_object(1, 'abc', NULL, TRUE, now());
select json_object('id', 1, 'name', 'abc', 'location', NULL, 'isAwesome',
TRUE, 'timestamp', now());
select json_object('id', 1, 'array', json_array('a', 'b', 10));

insert into thermostatReading values (NULL,
  json_object(
    'deviceID', 1,
    'time', now(),
    'setting', 55,
    'reading', 58.7
  )
);

select * from thermostatReading;

insert into thermostatReading values (NULL, json_object('deviceID', 1,
'time', now(), 'setting', 55, 'reading', 56.3));
insert into thermostatReading values (NULL, json_object('deviceID', 2,
'time', now(), 'setting', 87, 'reading', 104.8));
insert into thermostatReading values (NULL, json_object('deviceID', 1,
'time', now(), 'setting', 55, 'reading', 54.1));

select * from thermostatReading;
```

Extract from json

```
select json_extract(capabilities , '$[0]') from thermostatModel;
select json_extract(reading, '$.time') from thermostatReading;
select reading->'$.time' from thermostatReading;
```

Manipulating json

- JSON_SET() replaces existing values and adds nonexisting values.
- JSON_INSERT() inserts values without replacing existing values.
- JSON_REPLACE() replaces only existing values.

```
SET @j = '{ "a": 1, "b": [2, 3]}';
```

```
SELECT @j;
SELECT JSON_SET(@j, '$.a', 10, '$.c', '[true, false]');
SELECT JSON_INSERT(@j, '$.a', 10, '$.c', '[true, false]');
SELECT JSON_REPLACE(@j, '$.a', 10, '$.c', '[true, false]');

insert into thermostatReading values (NULL, json_object('deviceID', 2,
'time', now(), 'setting', 87, 'reading', 17, 'ping', 30));
insert into thermostatReading values (NULL, json_object('deviceID', 2,
'time', now(), 'setting', 87, 'reading', 33, 'ping', 99));
insert into thermostatReading values (NULL, json_object('deviceID', 1,
'time', now(), 'setting', 55, 'reading', 78, 'ping', 2.7));
```

Adding member

```
select * from thermostatReading;

update thermostatReading set reading = json_insert(reading, '$.ping',
cast('null' as json));

select * from thermostatReading;
```

Adding members (only one for some of the rows and more then one for others)

```
insert into thermostatReading values (NULL, json_object('deviceID', 1,
'time', now(), 'setting', 55, 'reading', 94.8));
insert into thermostatReading values (NULL, json_object('deviceID', 1,
'time', now(), 'setting', 55, 'reading', -12.5));
insert into thermostatReading values (NULL, json_object('deviceID', 2,
'time', now(), 'setting', 87, 'reading', 77));

select * from thermostatReading;

update thermostatReading set reading = json_insert(reading, '$.ping',
cast('null' as json), '$.tempDiffrence', reading->'$.reading'-reading-
>'$.setting');

select * from thermostatReading;
```

Changing exsiting members (will ignore rows without this specific member)

```
update thermostatReading set reading = json_replace(reading,
'$.tempDiffrence', cast(reading->'$.tempDiffrence' as decimal(10,2)));

select * from thermostatReading;
```

Adding new members and replacing existing ones.

```
update thermostatReading set reading = json_set(reading, '$.time',
unix_timestamp(reading->'$.time'), '$.lightSensor', cast('null' as json));

select * from thermostatReading;
```

Removing members (if exist)

```
update thermostatReading set reading = json_remove(reading, '$.ping');

select * from thermostatReading;
```

Appending arrays and objects

```
select * from thermostatModel;

update thermostatModel set capabilities = json_array_append(capabilities,
'$', 'Smart Fan') where model = 'TheBestContorl';

select * from thermostatModel;

update thermostatModel set capabilities = json_array_append(capabilities,
'$[0]', 'EEPROM') where model = 'TheBestContorl';

select * from thermostatModel;

update thermostatModel set capabilities = json_merge(capabilities,
json_array('Light Sensor', 'Web', 'Password')) where model = 'UltimatePower';

select * from thermostatModel;
```

Index json with Generated Columns

```
alter table thermostatReading add column deviceID int generated always as
(reading->'$.deviceID') virtual;

desc thermostatReading;

select * from thermostatReading;

create index idx_deviceID on thermostatReading(deviceID);

desc thermostatReading;

explain select * from thermostatReading where deviceID = 1;
```

MySQL won't use index because the table is too small. Let's fill it up

```
delimiter //
drop procedure if exists fillReadings//
create procedure fillReadings(rowsToFill int)
begin
  declare i int;
  set i = 1;

  while i <= rowsToFill do
    insert into thermostatReading set reading = json_object('deviceID',
floor(1+(rand()*2)), 'time', now(), 'setting', rand()*100, 'reading',
rand()*100);
    if i % 200 = 0 then
      select concat('Wrote ', i, ' Rows. Another ', rowsToFill - i, ' to
go...') as Progess;
    end if;
    set i = i + 1;
  end while;
end//
delimiter ;

call fillReadings(2000);

explain select * from thermostatReading where deviceID = 1;
```