SQL COMMANDS

Prepared By

Pandeeswari M

CONTENTS

DQL(Data Query Language)

To fetch the data from the database

Example: SELECT

DML(Data Manipulation Language)-

To modify the database objects

Example: INSERT,UPDATE,DELETE

DDL(Data Definition Language)

To create & modify database objects

Example: CREATE,DROP,ALTER,TRUNCATE

1.Fundamentals of SQL

CREATE

CREATE statement is used to create a table

Syntax:

```
CREATE TABLE ''TABLE_NAME''(
    ''COLUMN1''  ''DATA_TYPE''  CONSTRAINTS,
    ''COLUMN2''  ''DATA_TYPE''  CONSTRAINTS,
    ''COLUMN3''  ''DATA_TYPE''  CONSTRAINTS,
    ……..
    ''COLUMN N''  ''DATA_TYPE'' CONSTRAINTS
);
```

INSERT

INSERT statement is used insert new data into the table

Syntax:

INSERT INTO

"TABLE_NAME" (COL1, COL2, ……..COL_N)

VALUES (Col_val_1,Col_val_2, ……. Col_val_N);

Import data from file(PostgreSQL)

For csv file

COPY TABLE_NAME(column1, column2,…) FROM FILE_PATH DELIMITER ' , ' CSV HEADER;

For txt file

COPY TABLE_NAME(column1, column2,…) FROM FILE_PATH DELIMITER ' , ' ;

SELECT

SELECT statement is used to retrieve data from the table

Syntax

SELECT * FROM "TABLE_NAME";

For select one column

SELECT "COLUMN_NAME" FROM "TABLE_NAME";

For select multiple columns

SELECT "COLUMN1,COLUMN2,..."

FROM "TABLE_NAME";

For select all columns

SELECT * FROM "TABLE_NAME";

DISTINCT

DISTINCT keyword is used to eliminate all duplicate records & fetch only unique records

Syntax:

SELECT DISTINCT(*) FROM "TABLE_NAME";

WHERE

WHERE clause is used to filter a records

Syntax:

SELECT "COLUMN_NAME(S)"

FROM “TABLE_NAME “

WHERE CONDITION;

AND/OR

The AND/OR is used to combine multiple conditions

Syntax:

SELECT “COLUMN_NAMES(s)”

FROM “TABLE_NAME”

WHERE CONDITION AND/OR CONDITION;

UPDATE

It is used to modify the existing data in the table

Syntax:

UPDATE “TABLE_NAME”

SET COL_1=VAL_1,COL_2=VAL_2,…

WHERE CONDITION;

DELETE

It is used to delete existing records in the table

Syntax:

For delete all rows

```
DELETE FROM "TABLE_NAME";
```

For delete single/multiple row(s)

```
DELETE FROM "TABLE_NAME "
WHERE CONDITION;
```

ALTER

It is used to change the definition or structure of the table

Syntax:

ADD COLUMN

```
ALTER TABLE " TABLE_NAME"
ADD "COLUMN_NAME " "DATA_TYPE";
```

DROP COLUMN

```
ALETR TABLE "TABLE_NAME"
DROP "COLUMN_NAME";
```

MODIFY DATA TYPE

```
ALTER TABLE "TABLE_NAME"
ALTER COLUMN "COL_NAME" TYPE NEW_DATA_TYPE;
```

RENAME COLUMN

ALTER TABLE "TABLE_NAME"

RENAME COLUMN "COL_NAME" TO "NEW_NAME";

ADD CONSTRAINTS

ALTER TABLE "TABLE_NAME"

ADD CONSTRAINT COL_NAME CHECK CONDITION;

2.Filtering Commands

IN

Used to reduce multiple OR logical operator in SELECT,DELETE,INSERT & UPDATE statements

Syntax:

SELECT "COL_NAME" FROM "TABLE_NAME"

WHERE "COL_NAME" IN ('VAL1', 'VAL2',...);

BETWEEN

Used to retrieve data within a given range

Syntax:

SELECT "COL_NAME(S)" FROM "TABLE_NAME"

WHERE "COL_NAME" BETWEEN "VAL1" AND "VAL2";

LIKE

Used to perform pattern matching/regex using wildcards(% , _)

% - match any string of any length

_ - match on a single character

Syntax:

SELECT "COL_NAME" FROM "TABLE_NAME"

WHERE "COL_NAME" LIKE 'PATTERN';

3.Ordering Commands

ORDER BY

Used to sort the data & it is only used in SELECT statement

Syntax:

SELECT "COL_NAME(s)" FROM "TABLE_NAME"

ORDER BY "COL_NAME" ASC/DESC;

LIMIT

Used to limit the number of records based on a given limit

Syntax:

SELECT "COL_NAME(S)" FROM "TABLE_NAME"

[WHERE & ORDER BY – Optional]

LIMIT "LIMIT_VALUE";

4.ALIAS

AS

Used to assign an alias to the column

Syntax:

SELECT "COL_NAME" as "COL_ALIAS"

FROM "TABLE_NAME";

5.AGGREGATE COMMANDS

COUNT

Used to count the expression

Syntax:

SELECT COUNT(COL_NAME) FROM "TABLE_NAME";

SUM

Used to sum the expression

Syntax:

SELECT SUM(COL_NAME) FROM "TABLE_NAME";

AVG

Used to average the expression

Syntax:

SELECT AVG(COL_NAME) FROM “TABLE_NAME”;

MIN

Used to retrieve the minimum value

Syntax:

SELECT MIN(COL_NAME) FROM “TABLE_NAME”;

MAX

Used to retrieve the maximum value

Syntax:

SELECT MAX(COL_NAME) FROM “TABLE_NAME”;

6.GROUP BY COMMANDS

GROUP BY

GROUP BY clause is used to group the results by one or more columns

Syntax:

SELECT "COL_1", "COL_2",…… FROM "TABLE_NAME"

GROUP BY "COL_NAME";

HAVING

HAVING clause is added to SQL because the WHERE keyword cannot be used with aggregate functions

Syntax:

SELECT "COL_1", "COL_2",…… FROM "TABLE_NAME"

GROUP BY "COL_NAME"

HAVING 'CONDITION';

7.CONDITIONAL STATEMENT

CASE

CASE expression is a conditional expression

Syntax:

```
CASE
    WHEN  CONDITION THEN RESULT
   [WHEN  CONDITION THEN RESULT]
   [WHEN  CONDITION THEN RESULT]
    ELSE RESULT
END
```

8.JOINS

JOINS used to fetch data from multiple tables

TYPES:

INNER JOIN

INNER JOIN produces only the set of records that match in table A and table B

Syntax:

```
SELECT COL1,COL2,.....
FROM  "TABLE_1"
INNER JOIN "TABLE_2"
ON TABLE_1. COMMON_COL = TABLE_2. COMMON_COL;
```

LEFT JOIN

LEFT JOIN returns all the rows in the table A(Left),even if there is no matches in the table B(Right)

Syntax:

```
SELECT  COL_1,COL_2,...
FROM  "TABLE_1"
LEFT JOIN  "TABLE_2"
ON TABLE_1. COMMON_COL = TABLE_2. COMMON_COL;
```

RIGHT JOIN

RIGHT JOIN returns all the rows in the table B(Right),even if there is no matches in the table A(left)

Syntax:

```
SELECT  COL_1,COL_2,…
FROM  “TABLE_1”
RIGHT JOIN  “TABLE_2”
ON TABLE_1.COMMON_COL = TABLE_2. COMMON_COL;
```

FULL JOIN

FULL JOIN combines the results of both right & left join

Syntax:

```
SELECT  COL_1,COL_2,…
FROM  “TABLE_1”
FULL JOIN  “TABLE_2”
ON TABLE_1.COMMON_COL = TABLE_2. COMMON_COL;
```

CROSS JOIN

CROSS JOIN creates Cartesian product between two sets

Syntax:

SELECT TAB1.COL,TAB2.COL,…..

FROM “TABLE_1”, “TABLE_2”,……..

EXCEPT

Used to fetch all the data from table A except that matches with table B

Syntax:

```
SELECT  COL1,COL2,……..
FROM  TABLE_A  [WHERE]
EXCEPT
SELECT  COL_1,COL_2,……
FROM  TABLE_B  [WHERE];
```

UNION

Used to combine two or more SELECT statements

Syntax:

```
SELECT  COL1,COL2,……..
FROM  TABLE_A  [WHERE]
UNION
SELECT  COL_1,COL_2,……
FROM  TABLE_B  [WHERE];
```

SUBQUERY

SUBQUERY is a query within a query

Syntax:

SUBQUERY is in WHERE clause

```
SELECT "COL_1" FROM "TABLE_NAME_1"
WHERE "COL_2" [operator]
(SELECT "COL_3" FROM "TABLE_NAME_2"
WHERE CONDITION);
```

VIEW

VIEW is a virtual table created by a query joining one or more tables

Syntax:

```
CREATE[OR RESPONSE] view_name AS
SELECT "COL_NAME(S)"
FROM "TABLE_NAME"
```

INDEX

An INDEX creates an entry for each value that appears in the indexed column

Syntax:

CREATE[UNIQUE] INDEX "index_name"

ON "TABLE_NAME"

(index_col1 [ASC/DESC],……..

11.STRING FUNCTIONS

LENGTH:

LENGTH function retrieves the length of the specified string

Syntax:

LENGTH('string')

UPPER/LOWER

UPPER/LOWER function converts all the characters in the specified string to uppercase/lowercase

Syntax:

upper('string')

lower('string')

REPLACE

REPLACE function replaces all the occurrences of the specified string

Syntax:

REPLACE('string', 'from string', to string')

TRIM

TRIM function removes all specified characters either from beginning or end of the string or both

Syntax:

TRIM([Leading|Trailing|Both] [trim char] from string)

RTRIM

RTRIM function removes all specified characters from RHS of the string

Syntax:

RTRIM('string', trim char)

LTRIM

LTRIM function removes all specified characters from LHS of the string

Syntax:

LTRIM('string', trim char)

CONCATENATION

|| operator used to concatenate two or more strings

Syntax:

'string_1' || 'string_2' || 'string_3'

SUBSTRING

SUBSTRING function used to extract substring from a string

Syntax:

SUBSTRING('string' [start position]

[substring length]);

STRING_AGG

String aggregate function concatenates input values into a string, separated by a delimiter

Syntax

STRING_AGG('expression', delimiter)

12.MATHEMATICAL FUNCTIONS

CEIL

CEIL function returns the smallest integer value which is greater than or equal to a number

Syntax:

CEIL(number)

FLOOR

FLOOR function returns the largest integer value which is less than or equal to a number

Syntax:

FLOOR(number)

RANDOM

RANDOM function used to generate random number between 0 & 1 (1 will be excluded)

Syntax:

RANDOM( );

SETSEED

SETSEED function used to set a seed for the next time that we call the RANDOM function

Syntax:

SETSEED(seed)

[seed can have a value between 1 and -1(both are inclusive]

ROUND

ROUND function rounds a number to a specified number of decimal places

Syntax:

ROUND(number)

POWER

POWER function returns m raised to the nth power

Syntax:

POWER(m,n)

13. DATE-TIME FUNCTIONS

CURRENT_DATE

CURRENT_DATE function returns the current date

Syntax:

CURRENT_DATE( )

CURRENT_TIME

CURRENT_TIME function returns the current time with the time zone

Syntax:

CURRENT_TIME( )

CURRENT_TIMESTAMP

CURRENT_ TIMESTAMP function returns the current date & current time with the time zone

Syntax:

CURRENT_ TIMESTAMP ( )

AGE

AGE function returns the difference between two dates

Syntax:

AGE(date1,date2)

EXTRACT

EXTRACT function extract specified parts from date

Syntax:

EXTRACT('unit' FROM 'date')

[unit will be day,month,year,doy,decade,hour,minute,

second,etc.,]

14.PATTERN MATCHING

There are three different approaches to pattern matching

- Using LIKE
- Using SIMILAR TO
- Using Regular Expression

- | denotes alternation (either of two alternatives).
- * denotes repetition of the previous item zero or more times.
- + denotes repetition of the previous item one or more times.
- ? denotes repetition of the previous item zero or one time.
- {***m***} denotes repetition of the previous item exactly ***m*** times.
- {***m***,} denotes repetition of the previous item ***m*** or more times.
- {***m***,***n***} denotes repetition of the previous item at least ***m*** and not more than ***n*** times.
- Parentheses () can be used to group items into a single logical item.
- A bracket expression [...] specifies a character class,

15.DATA TYPE CONVERSION FUNCTIONS

TO_CHAR

TO_CHAR function converts number/date to String

Syntax:

TO_CHAR(value,format-mask)

TO_DATE

TO_DATE function converts string to date

Syntax:

TO_DATE(string,format-mask)

T0_NUMBER

T0_NUMBER function converts string to date

Syntax:

TO_NUMBER(string,format-mask)

Format	Description
9	Numeric value with the specified number of digits
0	Numeric value with leading zeros
. (period)	decimal point
D	decimal point that uses locale
, (comma)	group (thousand) separator

Format	Description
FM	Fill mode, which suppresses padding blanks and leading zeroes.
PR	Negative value in angle brackets.
S	Sign anchored to a number that uses locale
L	Currency symbol that uses locale
G	Group separator that uses locale
MI	Minus sign in the specified position for numbers that are less than 0.
PL	Plus sign in the specified position for numbers that are greater than 0.
SG	Plus / minus sign in the specified position
RN	Roman numeral that ranges from 1 to 3999
TH or th	Upper case or lower case ordinal number suffix

Pattern	Description
Y,YYY	year in 4 digits with comma
YYYY	year in 4 digits
YYY	last 3 digits of year

YY	last 2 digits of year
Y	The last digit of year
IYYY	ISO 8601 week-numbering year (4 or more digits)
IYY	Last 3 digits of ISO 8601 week-numbering year
IY	Last 2 digits of ISO 8601 week-numbering year
I	Last digit of ISO 8601 week-numbering year
BC, bc, AD or ad	Era indicator without periods
B.C., b.c., A.D. ora.d.	Era indicator with periods
MONTH	English month name in uppercase
Month	Full capitalized English month name
Month	Full lowercase English month name
MON	Abbreviated uppercase month name e.g., JAN, FEB, etc.
Mon	Abbreviated capitalized month name e.g, Jan, Feb, etc.
Mon	Abbreviated lowercase month name e.g., jan, feb, etc.
MM	month number from 01 to 12
DAY	Full uppercase day name
Day	Full capitalized day name

Day	Full lowercase day name
DY	Abbreviated uppercase day name
Dy	Abbreviated capitalized day name
Dy	Abbreviated lowercase day name
DDD	Day of year (001-366)
IDDD	Day of ISO 8601 week-numbering year (001-371; day 1 of the year is Monday of the first ISO week)
DD	Day of month (01-31)
D	Day of the week, Sunday (1) to Saturday (7)
ID	ISO 8601 day of the week, Monday (1) to Sunday (7)
W	Week of month (1-5) (the first week starts on the first day of the month)
WW	Week number of year (1-53) (the first week starts on the first day of the year)
IW	Week number of ISO 8601 week-numbering year (01-53; the first Thursday of the year is in week 1)
CC	Century e.g, 21, 22, etc.
J	Julian Day (integer days since November 24, 4714 BC at midnight UTC)
RM	Month in upper case Roman numerals (I-XII; >

Rm	Month in lowercase Roman numerals (i-xii; >
HH	Hour of day (0-12)
HH12	Hour of day (0-12)
HH24	Hour of day (0-23)
MI	Minute (0-59)
SS	Second (0-59)
MS	Millisecond (000-999)
US	Microsecond (000000-999999)
SSSS	Seconds past midnight (0-86399)
AM, am, PM or pm	Meridiem indicator (without periods)
A.M., a.m., P.M. or p.m.	Meridiem indicator (with periods)

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DevOps Tools

a quick glossary

DevOps Tools: A Quick Glossary

This glossary lists tools in the following categories:

- **IaaS / PaaS**
- **Application Deployment**
- **Application Servers**
- **Behavior-Driven Development Testing**
- **Code Inspection / Code Quality**
- **Configuration Management**
- **Containerization Tools**
- **Continuous Integration & Deployment**
- **Databases**
- **Linux OS Installation**
- **Logging**
- **Monitoring, Alerting, and Trending**
- **Network *(also see Software Defined Networking)***
- **OS**
- **Process Supervisors**
- **Queues, Caches, etc.**
- **Security**
- **Software Defined**
- **Test and Build**
- **Test Automation**
- **Version Control / Branch Management**
- **Virtualization Platforms**
- **Web Servers**
- **Workflow Management, Agile Project Management**

IaaS / PaaS

- **Amazon Web Services (AWS)** – Long the market leader in cloud services, Amazon continues to dominate the commodity cloud computing providers. Performance was high in 2014 with few outages, and Amazon adds new services all the time.
- **Azure –** Microsoft's public cloud. Azure can work well for those on the Microsoft stack, but was also plagued by notable outages and customer communication challenges in 2014.
- **Cloud Foundry** – Open source PaaS provider, Cloud Foundry was originally devised by a team at Google, and is now a joint venture between EMC, GE, and VMWare.

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- **Eucalytpus –** Another private, open source alternative to the big public clouds like AWS and Rackspace, Eucalyptus sits quietly in the background, offering non-proprietary PaaS services while they wait for the market demand to swing towards a free/open-source model.
- **OpenStack –** Widely considered to be the main enterprise open-source response to for-profit cloud providers, Openstack has received heavy sponsorship by many big blue-chip companies, but has also met with adoption challenges amid complaints of heavy maintenance needs and design-by-committee syndrome.
- **Rackspace –** Long a dominant provider of physical infrastructure, it's no surprise that Rackspace quickly entered the world of cloud infrastructure.

Application Deployment

- **Capistrano -** is an open source tool for running scripts on multiple servers, mainly used for deploying web applications.
- **Microsoft Team Foundation Server –** TFS provides a full-spectrum tool environment for building and releasing projects and applications. Built to support Agile practices.

Application Servers

- **WildFly (formerly JBoss) –** Developed by Red Hat, JBoss was formerly known as JBoss AS but is now called "WildFly." It is available as an open-source product but Red Hat also offers a paid enterprise version. WildFly provides a nice range of application server features.
- **Tomcat -** Open-source web server and servlet container developed by Apache. Tomcat implements several Java EE specifications including Java Servlet, JavaServer Pages (JSP), Java EL, and WebSocket, and provides a "pure Java" HTTP web server environment for Java code to run in.
- **Jetty –** is a pure Java-based HTTP (Web) server and Java Servlet container. While Web Servers are usually associated with serving documents to people, Jetty is now often used for machine to machine communications, usually within larger software frameworks. Jetty is developed as a free and open source project as part of the Eclipse Foundation.

- **Glassfish –** GlassFish is an open-source application server project started by Sun Microsystems for the Java EE platform and now sponsored by Oracle Corporation. It is the reference implementation of Java EE, supporting Enterprise JavaBeans, JPA, JavaServer Faces, JMS, RMI, JavaServer Pages, servlets, etc. This allows developers to create enterprise applications that are portable and scalable, and that integrate with legacy technologies. Optional components can also be installed for additional services.
- **Websphere –** IBM application and integration middleware products. It is considered enterprise software. Websphere is used by end-users to create applications and integrate applications with other applications.
- **Weblogic** – Java EE application server currently developed by Oracle Corporation. Oracle acquired WebLogic Server when it purchased BEA Systems in 2008.

Behavior-Driven Development Testing

- **Cucumber –** Testing tool. Written in Ruby. Performs automated acceptance tests in a Behavior Driven Development (BDD) style.

Code Inspection / Code Quality

- **Code Climate** – Automated code review tool. Runs standard tests on code without actually executing it. It can uncover security vulnerabilities, potential bugs, repetition of existing code, and unnecessarily complex programming, in Ruby and JavaScript.
- **Sonar Qube –** Formerly **Sonar**, SonarQube offers IT and application teams the ability to automate important QA work with its uncanny ability to quickly find quality issues in code that make continuous improvement dramatically easier.
- **Sonargraph -** Monitors conformance of code to intended architecture, also computes a wide range of software metrics.
- **Visual Studio Team System –** Bundled with TFS, Microsoft's new Visual Studio suite is built for continuous integration, continuous improvement, and DevOps.

Configuration Management

- **Ansible –** A somewhat new kid on the block in the world of configuration automation, Ansible is gaining popularity due to its easy, intuitive usage and it's powerful enterprise solutions.
- **CFEngine –** An early but powerful open source tool, CFEngine provides automated configuration and maintenance of large-scale systems and unified management of servers, desktops, embedded networked devices, mobile smartphones, and tablets with an operating system-independent interface to Unix-like host configuration. It requires some expert knowledge to deal with peculiarities of different operating systems, but has the power to perform maintenance actions across multiple hosts.
- **Chef –** The popular and powerful config toolset uses "recipes" to configuration models, automate resources, and automate setup of cloud or physical infrastructure.
- **Puppet / MCollective –** One of the godfather organizations of DevOps, Puppet Labs has provided visionary leadership and sponsorship to the DevOps movement and its champions.
- **RANCID –** Used for managing network configurations, the "Really Awesome New Cisco conflg Differ (RANCID)" is a network management application released under a BSD-style license.
- **SaltStack** – Salt or SaltStack is a Python-based open source configuration management and remote execution application. Supporting an IaaS approach to deployment and cloud management, it competes primarily with Puppet, Chef, and Ansible.

Containerization Tools

- **Docker –** Docker made waves in the DevOps community right away, with its easy-to-use near-universal ability to containerize and deploy applications across any environment or OS with only a tiny Linux kernel to get it started.
- **LXC –** Linux Containers (LXC) is a well-known containerization toolset that uses OS virtualization. It can be used in conjunction with Docker, and relies on Linux kernel cgroups functionality that was released in version 2.6.24
- **Solaris Containers –** An implementation of operating system-level virtualization technology for x86 and SPARC systems, first released publicly in February 2004 in build 51 beta of Solaris 10

Continuous Integration & Deployment

- **Jenkins –** The leading open-source continuous integration server. Built with Java, it provides 985 plugins to support building and testing virtually any project.
- **Team Foundation Server –** Microsoft's development platform for Agile projects and deployment.

Databases

- **Cassandra**
- **MongoDB**
- **MS SQL**
- **MySQL**
- **OpenLDAP**
- **Oracle**
- **Percona Server**
- **PostgreSQL**
- **HBase**

Linux OS Installation

- **Cobbler** – Linux provisioning server that facilitates and automates the network-based system installation of multiple computer operating systems from a central point using services such as DHCP, TFTP, and DNS.[
- **Fai** – FAI (Fully Automatic Installation) is a non-interactive system to install, customize and manage Linux systems and software configurations on computers as well as virtual machines and chroot environments, from small networks to large infrastructures and clusters.
- **Kickstart** – Red Hat's Kickstart installation is used primarily, but not exclusively, by the Red Hat Enterprise Linux operating system to automatically perform unattended operating system installation and configuration. Red Hat publishes Cobbler as a tool to automate the Kickstart configuration process.

Logging

- **PaperTrail –** Lets you track changes to your models' data. It's good for auditing or versioning. You can see how a model looked at any stage in its lifecycle, revert it to any version, and even undelete it after it's been destroyed.

- **Logstash** – Tool for managing events and logs. You can use it to collect logs, parse them, and store them for later use (i.e. searching).
- **Loggly** – Loggly provides enterprise-class cloud-based solutions for log management, allowing users to solve operational problems faster.
- **Splunk** – Captures, indexes and correlates real-time data in a searchable repository from which it can generate graphs, reports, alerts, dashboards and visualizations.
- **SumoLogic** – Cloud-based log management and analytics service that leverages machine-generated big data to deliver real-time IT insights. Features an elastic petabyte scale platform that collects, manages, and analyzes enterprise log data, reducing millions of log lines into operational and security insights in real time.

Monitoring, Alerting, and Trending

- **New Relic** – New Relic offers one of the world's most popular suites of SaaS monitoring and alerting tools for applications. It's available as a subscription, on-premise, or hybrid solution.
- **Nagios –** Nagios is a highly-regarded open source toolset for monitoring systems, networks, and infrastructure. It alerts users to problems and sends another alert when they are resolved.
- **Icinga –** Originally built as a form of Nagios, Icinga strives to fix what some felt were shortcomings in the original tool.
- **iPerf –** Tool for active measurements of the maximum achievable bandwidth on IP networks.
- **Graphite –** Graphite is a free open source tool for monitoring and graphing real-time data on the performance of a system.
- **Ganglia –** Ganglia is a monitoring and performance tool built for use with distributed systems, clusters, and other high-performance computing infrastructures. It is scalable and powerful.
- **Cacti –** An open-source, web-based network monitoring and graphing tool designed as a front-end application for the open-source, industry-standard data logging tool RRDtool.
- **PagerDuty –** PagerDuty is an operations performance platform delivering visibility and actionable intelligence across the lifecycle of an incident. It is designed as an incident management toolset.

- **Sensu –** Sensu is a large open-source project that is designed to deliver powerful, scalable and comprehensive monitoring, visibility, and notification. Also available in an enterprise package for paid users.

Network *(also see Software Defined Networking)*

- **lldp –** Implementation of Link Layer Discovery Protocol (LLDP) allowing identification and discovery of network devices, identity, capabilities, and neighbors.
- **Multihost SSH Wrapper** - Mussh is a shell script that allows you to execute a command or script over ssh on multiple hosts with one command. When possible mussh will use ssh-agent and RSA/DSA keys to minimize the need to enter your password more than once.

OS

- **Linux (RHEL, CentOS, Ubuntu, Debian)** – Without Linux there might not be any DevOps.
- **Mac OS X –** Sometimes you have to think different.
- **Unix (Solaris, AIX, HP/UX, etc.) –** When plain old Linux just isn't good enough.
- **Windows –** They say it's a Windows world.

Process Supervisors

- **Blue Pill -** Simple process monitoring tool written in Ruby.
- **god –** Ruby process manager.
- **Monit –** Free, open source process supervision tool for Unix and Linux. With Monit, system status can be viewed directly from the command line, or via the native HTTP(S) web server.
- **runit –** init scheme for Unix-like operating systems that initializes, supervises, and ends processes throughout the operating system.
- **systemd –** Suite of system management daemons, libraries, and utilities designed as a central management and configuration platform for the Linux computer operating system.
- **Supervisor –** A process control system, Supervisor is a client/server system that allows users to monitor and control a number of processes on UNIX-like operating systems.

- **Upstart –** Event-based replacement for the /sbin/init daemon which handles starting of tasks and services during boot, stopping them during shutdown and supervising them while the system is running.

Queues, Caches, etc.

- **ActiveMQ** – Open source Apache message broker written in Java together with a full Java Message Service (JMS) client, with Enterprise Features. Used in enterprise service bus implementations such as Apache ServiceMix and Mule.
- **memcache –** High-performance, distributed memory object caching system, primarily intended for fast access to cached results of datastore queries.
- **RabbitMQ –** Open source message broker software that implements the Advanced Message Queuing Protocol (AMQP). Written in Erlang and built on the Open Telecom Platform framework for clustering and failover.
- **squid –** Proxy server and web cache daemon with a wide variety of uses, from speeding up a web server by caching repeated requests; to caching web, DNS and other computer network lookups for a group of people sharing network resources; to aiding security by filtering traffic.
- **varnish –** HTTP accelerator designed for content-heavy dynamic web sites as well as heavily consumed APIs.

Security

- **Snorby Threat Stack –** Ruby on rails web application for network security monitoring that interfaces with popular intrusion detection systems (Snort, Suricata and Sagan). Designed around simplicity, organization and power. The project goal is to create a free, open source and highly competitive application for network monitoring for both private and enterprise use.
- **Tripwire –** Portland-based security tools company co-founded by DevOps evangelist and Phoenix Project author Gene Kim. The original open source Tripwire is a free security and data integrity tool useful for monitoring and alerting on specific file change(s) on a range of systems.
- **Snort –** Free, open source network intrusion prevention system (NIPS) and network intrusion detection system (NIDS) created by Martin Roesch.

Software Defined Networking

- **Floodlight** – Apache licensed, Java-based enterprise-class OpenFlow controller.
- **Indigo –** The open source project Indigo enables support for OpenFlow on both physical and hypervisor switches. It is also the basis of Switch Light by Big Switch Networks.
- **OpenStack Networking "Neutron" –** Part of the OpenStack project, Neutron provides a "networking as a service" between interface devices like NICs managed by OpenStack services like Nova. Though part of the core of OpenStack, Neutron deserves special notice for its size and functionality as a "NaaS" product.
- **Open vSwitch –** A multilayer software switch, support a wide range of features including 802.1Q VLAN with trunk and access ports, NIC bonding (with and without LACP upstream), NetFlow/sFlow, QoS, GRE, GRE over IPSEC, VXLAN, and LISP tunneling, 802.1ag connectivity fault management, OpenFlow, high-performance forwarding via the Linux kernel, and a transactional configuration database.

Test and Build

- **Ant** – Apache's open-source software build automation tool is Java-centric and replaced Apache's previous Make Build tool.
- **Gradle –** Gradle builds on the concepts of Ant and Maven to provide automation tools for build, testing, and deployment/publishing.
- **Jenkins –** Jenkins offers a simple but powerful web-based platform for real-time deployment.
- **Maven –** Also an Apache project, Maven is another Java-centric build automation tool, however unlike Ant it uses conventions, reducing work by requiring only exceptions. Formerly part of the Jakarta project.
- **Team Foundation Server (TFS) –** TFS enables powerful unified environments for developers, deployment and engineering teams to share a common platform.

Test Automation

- **Ranorex –** Provides comprehensive test automation of your applications in any environment and on any device. Powerful automated options for verifying and building in quality.

- **Rational Functional Tester** - Rational Functional Tester is an automated functional testing and regression testing tool.
- **Watir** - Open-source (BSD) family of ruby libraries for automating web browsers. It allows you to write tests that are easy to read and maintain and is simple and flexible.

Version Control / Branch Management

- **Git –** Git is a code repository tool that provides push/pull features that encourage collaboration, re-use, and shared version control.
- **GitHub** – GitHub is a socially-driven code repository website with a ton of re-usable code and excellent push/pull features for developers.
- **Team Foundation Server –** For those on the Microsoft stack, TFS provides many of the same features as Git and Github, and provides support for integrating with both.

Virtualization Platforms

- **KVM -** (Kernel-based Virtual Machine) is a virtualization infrastructure for the Linux kernel that turns it into a hypervisor.
- **VMware –** The biggest mainstream virtualization provider made a big mark in cloud computing history when they made their basic virtualization tool free around 2008.
- **Vagrant –** Creates/configures virtual development environments. Used as a wrapper around virtualization software such as VirtualBox, KVM, VMware and around configuration management software such as Ansible, Chef, Salt or Puppet.
- **VirtualBox** – Virtualization software package for x86 and AMD64/Intel64-based computers from Oracle.
- **Xen -** Hypervisor using a microkernel design, providing services that allow multiple computer operating systems to execute on the same computer hardware concurrently.

Web Servers

- **nginx –** Free open source web server, with known strengths around load balancing, static catch, and reverse proxy.

- **Apache –** The web server's web server.
- **IIS –** Internet Information Services (formerly Server) is a modular product from Microsoft.

Workflow Management, Agile Project Management

- **Kanbanize –** Kanbanize offers paid options from starter to enterprise, and offers 1,000 events for free as a trial, which is enough for a couple months of work.
- **KanbanTool –** Another online tool for visually managing project work, Kanbantool offers subscription options by number of users, rather than based on events.
- **VersionOne –** One of the early Agile project management tools, VersionOne continues to be a big player for enabling teams to manage their agile projects.
- **JIRA –** JIRA is a popular tool for issue tracking and agile project management support.
- **Rally –** Rally's agile project management tools are designed to enable efficient and successful agile practices in the enterprise environment.
- **Team Foundation Server –** Microsoft designed TFS to be a full-service collaboration platform for developing and deploying Agile projects on the Microsoft stacks.