# System Design

System Design is the using concept from computer science such as network, distributed system and parallel computing to build large scale system.

Like Facebook, Google, Amazon, twitter etc.

# Cheat sheet

<https://gist.github.com/vasanthk/485d1c25737e8e72759f>

# Scalability

The ability to handle more requests by buying more or bigger machines.

* Buying more machines – Horizontal Scaling.
* Buying bigger machine – Vertical Scaling.

# Horizontal vs Vertical Scaling

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| 1. Load Balancing is required. | NA. |
| 1. Resilient. | Single Point of Failure. |
| 1. Network calls (RPC- Remote procedure call) - Slow | Inter Process communication. - Fast |
| 1. Data Inconsistency | Consistent. – No dirty reads and writes. |
| 1. Scales well as users increases | Hardware limit. |
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Real world we use both like we take some of the good qualities from both sides as highlighted. The hybrid solution is essential horizontal scaling only where each machine has a big box which is feasible of money wise.

**Initially take vertical scaling, we the customer becomes bigger changed to horizontal scaling.**

# Proxy vs Reverse Proxy vs Load balancer

**Proxy Server**

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Proxy server is used for the security of the client. Benefits are:-

1. It acts as firewall for the client.
2. Multiple clients can talk to the same proxy and it help.
3. Security.
4. Caching.
5. Encryption and Decryption like it can encrypt the sensitive data before passing it to server, it can hide the ip address.

**Reverse Proxy server**

Reverse proxy server does exactly same as proxy server but instead of protecting the client rather protect the server.

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Benefits are exactly same as proxy server with respect to server not client but can also act as a load balancer. Also, in compressing the response size.

Reverse proxy server can act as a load balancer. Load balancer means balancing the request sending via multiple server but for the reverse proxy can act also in single server.