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Evaluation of clustering strategies

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Introduction

Globalisation, technology and the internet have emerged as the most significant forces influencing humans. The secure connection among these three makes them operate as one unstoppable force. Judging by popularity, the internet seems to cause a much higher impact on the lives of people. This is because of the current information era where nearly every information is accessible through devices such as smartphones, tablets, and iPhones. The internet contains content in the form of web pages. A typical example is when an internet user accesses the content of a web page generated by a server application.

Structure of the 3-tier web hosting.

A 3-tier web service hosting would consist of three tiers or layers; the client tier also called presentation tier, the application tier and database tier [1].

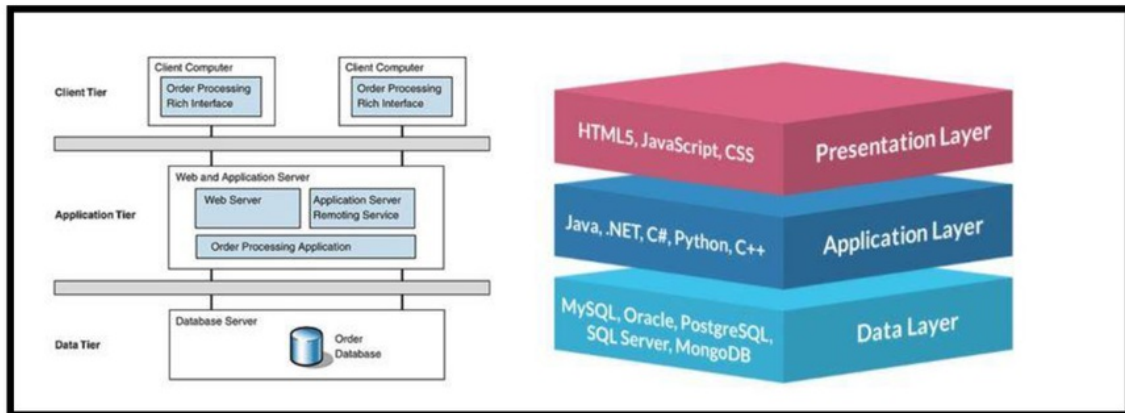


Figure 1: 3-tier web hosting [2] [3]

“3-tier web hosting cluster”

It is often considered that both cloud computing and cloud services played major roles in current and new web application hosting environment. Mainly driven by the requirement of web applications and some of the great characteristics of could services like elasticity and scalability [1].

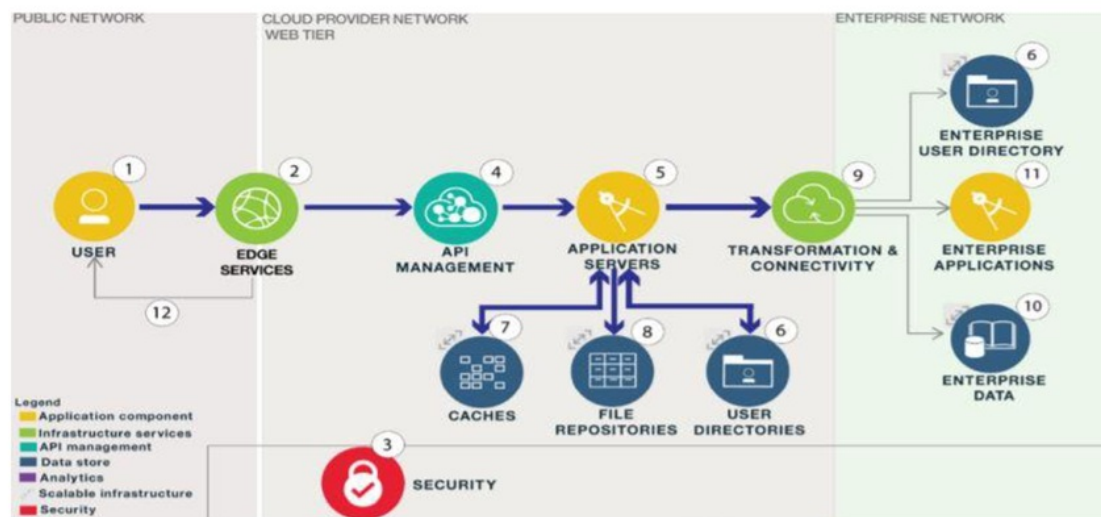


Figure 2: “3-tier Web Hosting”

The unique structure of the 3-tier web architecture is designed to allow great flexibility and higher level of security for every service level, at the level of web application there is a big increase of performance because the tasks are shared between servers and high security is applied across the 3 layers.

The first key element on this web service would be the user interacting with the web application using different systems and a variety of devices. For this process to take place many services play great roles to achieve successful and secure interaction.

In this part, details of the 3 tiers components:

Front or “Edge” service

1. **DNS server:** Domain Name System (DNS) help to translate URL text to an IP address so that the client successfully manages to communicate with the Web server.
2. **Content Delivery Network:** by deploying a good number of geographical distribution systems servers to serve many users so that the service is highly available and reduce latency.
3. **Firewall:** provide good level of security to the network traffics in and out, they could be hardware or software in an operating system.
4. **Load balancer:** they distribute the network traffic across the resources to achieve high throughput, reduce the latency and achieve high reliability, they can be used either locally or globally.

Web Service Tier

This is achieved using some Program logic on the web service tier to generate dynamic web content, applications and web servers can take different forms depending on objective, either integrated or separated by load balancers.

1. **Web Application Servers:** their primary role is to return resources like web content or images when responding to a HTTP request, they could also support clustering, high availability and auto scaling.
2. **Cache:** helps to reduce latency to the client requests by storing temporary data sent by the web application server.
3. **Files Repositories:** they are applications or devices that allow access to files repositories, so they can be deleted, retrieved or stored.
4. **User Directory:** this is where all credentials and user IDs are to access the web servers, applications servers and database.

Transformation and Connectivity

The primary role of this service is to establish a secure connection between all the systems within the enterprise, also it allows filtering, collecting and modifying of the data moving across the web components. It also includes these capabilities:

1. **Enterprise Secure Connectivity**
2. **Transformation**
3. **Enterprise Data Connectivity**

API Management

These API management functionalities help to advertise all services available that the application can access, they offer API discovery and catalogs.

1. **API Discovery/Documentation:** This allows mobile developers finding APIs and using them in secure mode.
2. **Management:** They deliver a management view to the API usage.

Service tier

1. **Enterprise user directory:** This is where security data is stored, these information support authentication, authorisation and personal data.
2. **Enterprise data:** These will include the records of the enterprise applications as well as all the metadata.

Security across the 3 tiers

It is fundamental that every business need to have good security implemented across their entire IT infrastructure regardless if it is local or cloud based, the aim is to achieve data confidentiality, data integrity, high availability and achieve industry compliance.

Evaluation of 3-tier web hosting clustering strategy.

The clustering strategy for a 3-tier web hosting can vary depending on the type of service provided, the size of the enterprise hosting it, the potential number of users and the type of data dealing with it. The design should always serve its purpose.

For example, small business web hosting will be very different from large corporate, when dealing with big names like Facebook or Bloomberg, engineers start to deal with farm servers not single ones [4].

The aim of using this strategy is to provide high availability, good scalability, high level of security and good redundancy.

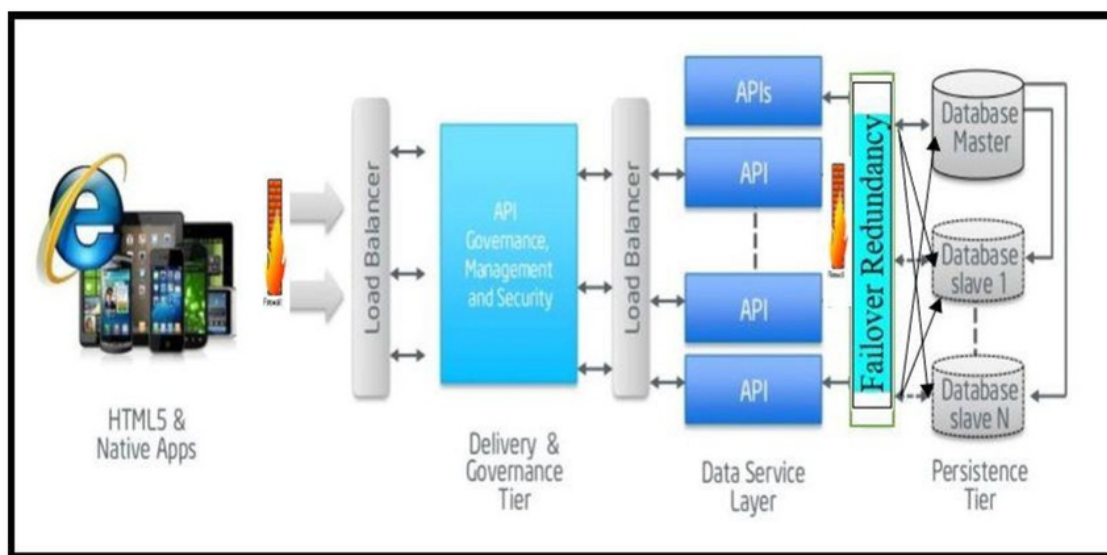


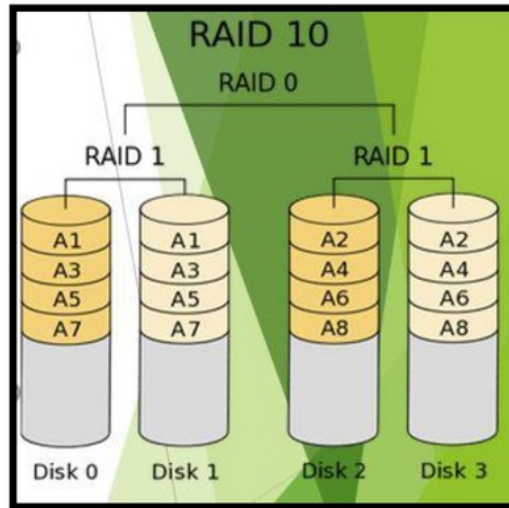
Figure 3: Topology of these 3-tier web hosting clustering strategy

In this model we will apply load balancing [5] between the top layers, clients and application layer, this will help to provide high connectivity and achieve high availability, and also configure and place firewall at the top of application tier and data tier to protect against any SQL injection of hacking attacks.

It is also possible that we could enhance our clustering strategy by using De-Militarised Zone (DMZ) [6] approach to protect our servers against any outside attacks, it is not always 100 percent secure but it adds an extra layer of security to the internal network infrastructure.

At bottom tier data layer, implementing failover [7] feature would improve availability and make our strategy more fault tolerance [8].

And last element to be implemented is using RAID 10 across the four discs of data storage, this is done through mirroring and stripping of the data. This will provide a good combination of performance and redundancy [7].



RAID 10 diagram

Conclusion

In conclusion, satisfying tight specifications conditions to create an ideal Web hosting clustering strategy is not an easy task. The dependence of multi-tier web system tends to offer relief since the needs are spread out to realize parallel processing using multiple systems. Despite this, the clustering strategy must meet certain level of satisfaction on both sides, users and webhosts. It is always important to have high availability, robust security and more scalability for future growth.

References

- [1] Heather Kreger et al, "Cloud Customer Architecture for Web Application Hosting, Version 2.0," 2016.
- [2] jinfont.com, "3-Tier Architecture: A Complete Overview - JReport," 2018. [Online]. Available: <https://www.jinfont.com/resources/bi-defined/3-tier-architecture-complete-overview/>. [Accessed: 05-Feb-2018].
- [3] Cardisoft.gr, "3 tier architecture," 209AD. [Online]. Available: <http://www.cardisoft.gr/frontend/article.php?aid=87&cid=96>. [Accessed: 05-Feb-2018].
- [4] Arokiait.com, "3-Tier Web Architecture, 3 Tier Web Application Architecture – Arokia IT." [Online]. Available: <http://www.arokiait.com/3-tier-web-architecture.htm>. [Accessed: 10-Feb-2018].
- [5] IBM, "IBM Knowledge Center - Load balancing and clustering," 2017. [Online]. Available: https://www.ibm.com/support/knowledgecenter/en/SS9JLE_8.2.0/com.ibm.itamesso.doc/concepts/dep_loadbalancing.html. [Accessed: 10-Feb-2018].
- [6] Oracle, "Fusion Middleware Administering Clusters for Oracle WebLogic Server 12.1.3," 2017. [Online]. Available: <https://docs.oracle.com/middleware/1213/wls/CLUST/planning.htm#CLUST382>. [Accessed: 10-Feb-2018].
- [7] Dr Tim Bashford, "Course: L5 - Network Services/NOSS/Serv Man & Vert (M5X01050 & M2X8522 & ACCA5003)," 2018. [Online]. Available: <https://moodle.uwtsd.ac.uk/course/view.php?id=3239>. [Accessed: 10-Feb-2018].
- [8] Microsoft, "Failover Clustering | Microsoft Docs," 2016. [Online]. Available: <https://docs.microsoft.com/en-us/windows-server/failover-clustering/failover-clustering-overview>. [Accessed: 10-Feb-2018].

FINAL GRADE

GENERAL COMMENTS

Instructor

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GRADING FORM: SMU GENERIC_GJ

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RESEARCH-INFORMED LITERATURE



A reasonable number of sources used, many of good quality, though heavily from the web, many being non-authoritative. Some web sources can be acceptable - e.g. you've used Microsoft's

6.5

documentation. Microsoft can be considered authoritative, though not necessarily objective on their technologies - fine to cite, though caution must be taken when talking about anything potentially subjective.

KNOWLEDGE AND UNDERSTANDING

 Very good evidence of knowledge and understanding - work completed to a very high standard, demonstrating robust further reading. Well done, Nabil. **15**

ANALYSIS

 Good evidence of analysis - reasonable synthesis, and some appropriate conclusions derived. You may want to consider some interim conclusions where appropriate. **14**

PRACTICAL APPLICATION AND DEP.

 Worksheets complete to a good standard. A good level of technical description throughout. A lot of work clearly went in to this. **32**

SKILLS FOR PROFESSIONAL PRAC.

 A well-written report. A few minor issues with use of articles, and similar grammar errors, but overall this doesn't detract from a good piece of work. Document is very nicely-presented. **7.5**

