



## Standardization of Stress Test Protocol for successful implementation of Agricultural Applications – A Study at ICRISAT

VV Sumanthkumar<sup>1</sup>

<sup>1</sup>Scientist from International Crops Research Institute for Semi-Arid Tropics, Patancheru,  
Hyderabad.

### Introduction

The new Sustainable Development Goals have once again underlined the importance of agriculture development if want to achieve global food & nutrition security and end poverty. On one side the agriculture is effected with myriad of challenges like climate change which is effecting agricultural production and productivity. To mitigate the major challenges and making the farmer resilient to these negative forces, provision of knowledge and services directly to the farmers is one of the important aspect which certainly cannot be ignored. The advances in computing hardware and ICT infrastructure really allowing to implement knowledge as well as services directly to the farmers. The current ICT infrastructure in rural village is improving with advancement of National Optic Fibre Network (NOFN). NOFN which is popularly called as Bharat Broadband to connecting all revenue villages (Gram Panchayats) of India with 100 Mbps band width. Infrastructure in villages is improving but still there are challenges with respect to network in rural areas. It is ideal to keep optimal resources at server side so that farmer gets response quickly which keeps him attached and attracted to the application and thus the adoption of application increases. ICRISAT is in the process of designing many spatial applications to different clients. As a process of building successful applications, there is need to standardize and optimize computing resources at server side. An attempt has been made towards this direction by developing a protocol for stress test which can be used to optimize the resources while developing agricultural applications for masses.

### Discussion:

The paper especially discusses about following key initiatives and learning from it: When any organization builds huge application which requires a data center typically follows setup so as to serve the millions of small holder farmers. The below is the generic layout followed.



But there are instances where requirements may vary based on the data stored, processed and accessed by the end user. One important factor is whether the application stores spatial data or non-spatial data. GIS applications which processes spatial data generally requires more resources when compared to MIS applications which deals with non-spatial data. The protocol is developed to finalize the ideal resources required for a GIS application which hosts spatial data. Generally, the GIS project intends to support in the planning process through characterization of natural resources, establishment of a digital library thus enabling all spatial and non-spatial data related to Micro watershed and agricultural fields to all stakeholders through role based access over web. Land information being critical for above, it is to proposed to develop a dynamic state-of-art GIS based Land Resource Inventory (LRI) Geoportal which can ingest, organize, manage and disseminate data from multiple sources (spatial and non-spatial) for enhancing decision support to the stakeholders including planning and sustainable development of land resources for various applications. The proposed system shall serve as a common operational platform providing actionable intelligence and situational awareness to all its stakeholders. The proposed system is also expected to meet the national / state level objectives in regard to sustainable development of agriculture, disaster planning and recovery, infrastructure planning and natural resources assessment and allocation, rural development, education, etc. As this application involves intensive data transmission from central database to end user, it is essential to make sure that data retrieved quickly without delay. This is essential for making the application adopted by different stakeholders of the project successfully.

To make sure that sufficient computing resources are available at cloud, we have conducted a stress test with the following server configurations for different servers like Open Source Geo Server and Server that generates Load.

Description	Processor	RAM	Storage	OS / Software
Open Source Geoserver	2 Xeon (4 Cores) 2.5 GHz	16 GB	1.9 TB	JBOSS Application Server
Load Generator Server	Dual Xeon 3.16 GHz	4 GB	500 GB	JMeter Load Generator

There are so many load generators are available like Tsung and JMeter are available. The Apache JMeter™ application is open source software, a pure Java application designed to load test functional behavior and measure performance. JMeter has been widely adopted and is now a popular open-source alternative to proprietary solutions like Silk Performer and LoadRunner. It is a cross platform and can run on any platform with Java.

### Key features of JMeter

- ✓ Load and performance test various server/protocol types including http/https, SOAP/RESTful Webservices, FTP, DB via JDBC, LDAP, Mail, MongoDB, Native commands/shell scripts and TCP.
- ✓ Cross-platform – can run on any OS with Java
- ✓ Multithreading framework – allows concurrent sampling
- ✓ Faster test plan building and debugging – can be integrated with the test plan; ability to create a functional test plan
- ✓ User-friendly UI
- ✓ Easy integration with major Build and Continuous Integration systems – this makes Jmeter a well-fitted part of whole Software Development Life Cycle

### Methodology and Bechmark:

The JMeter Load Runner controller was configured to increase by 25 users every 90 seconds until there were 500 users, and then run at that user load for 10 minutes. The Server instance



deployed is of two 4-core, 64-bit server nodes and a 10/100/1000 switch, 1800-24G Ethernet Switch was used to connect all hardware to the performance test subnet.

### Result:

Server generated 88,576 maps and 500 concurrent users was constantly contacted. All WMS requests took less than 1 second and Average transaction time is 0.46 seconds, thus finalizing the server config using load testing.

### Conclusion:

With these initiatives over the years it is established fact that although the pre-configured server side computing resources may not be the sole solution to all agricultural related applications but it definitely has the potential to bring right configuration required at that time and bridge the gap between required resources and actually ordered. Many stress tests were organized based on the requirements from the strategic partners and web applications. Having ideal configuration in the server side is very important for the adoption and the success of the application. It is proved that proper load tests based on the application requirements are very important for the success and adoption of the agricultural applications.

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