BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-2, Sub 1167
DOCKET NO. E-7, Sub 1166

In the Matter of: Application of Duke Energy Progress, LLC, and Duke Energy Carolinas, LLC Requesting Approval of Solar Rebate Program Pursuant to N.C. Gen. Stat. § 62-155(f)	)	**DUKE ENERGY PROGRESS, LLC AND DUKE ENERGY CAROLINAS, LLC'S INITIAL COMMENTS**

NOW COME Duke Energy Progress, LLC, ("DEP") and Duke Energy Carolinas, LLC ("DEC") (collectively "Duke Energy" or "the Companies"), pursuant to the Commission's Order on November 6, 2020, *Order Modifying Fourth Year of Solar Rebate Program and Requesting Additional Comments* ("Commission's Order"), and respectfully submit these initial comments pertaining to (1) the results of the Companies' "stress test," (2) the characteristics of residential, commercial and nonprofit installations, and (3) appropriate modifications to current incentive amounts.

I. Results of the Stress Test

In its February 14, 2020 *Joint Update on the Solar Rebate Program and Joint Response Opposing NCSEA's Request for Hearing*, the Companies committed to building a new application that would not have the same technology architecture that was used in previous solar rebate application windows. The Companies began testing the new application in July. Since then, Duke Energy has been fine tuning the details of the application. Most recently, the Companies ran the NC Solar Rebate Baseline Performance Test on November 23, 2020, and the Companies ran the NC Solar Rebate

Stress Test on November 25, 2020. The Baseline Performance Test and the Stress Test are attached to these comments as Attachment 1 and Attachment 2, respectively.

The Baseline Performance Test tested the servers' endurance to expected high traffic circumstances to ensure the application would be able to handle the load properly. The established baseline included nearly double the amount of applications that were received by the Companies in the first twenty minutes of the 2020 application window opening. With a doubled baseline, the Baseline Performance Test only had one error when trying to load the home page. Thus, the Baseline Performance Test had a 99.99% success rate.

The Stress Test was designed to stress the system in order to determine if the application could reasonably process an extremely high volume of rebate submissions over a short period of time. The Stress Test drastically increased the number of applications being sent to the system. The success rate was 99.90%.

The variances in the response times between the baseline test and stress test were limited. Response times were one second or less. Therefore, the Companies are confident the application's technology architecture will have a successful launch when the application period opens on Wednesday, January 6, 2021.

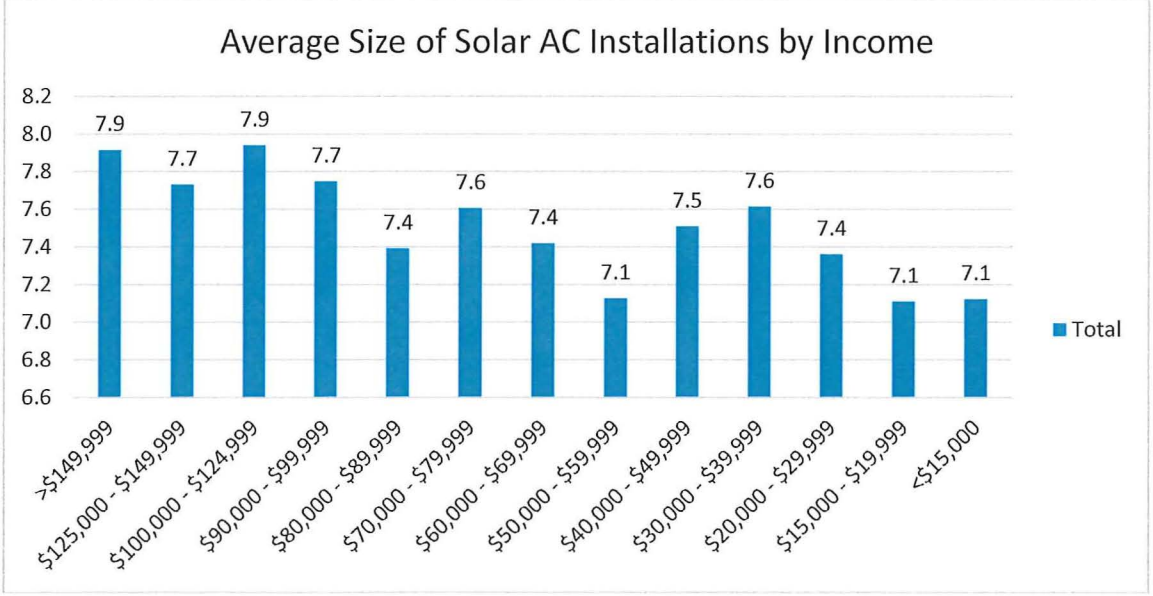
II. Characteristics of Installations Receiving Rebates

Pursuant to the Commission's Order, the Companies have gathered detailed information regarding the characteristics of installations receiving rebates, including the distribution and average capacity of applications and installations for each customer group. In its Order, the Commission requested proposals to change the rebate amount in

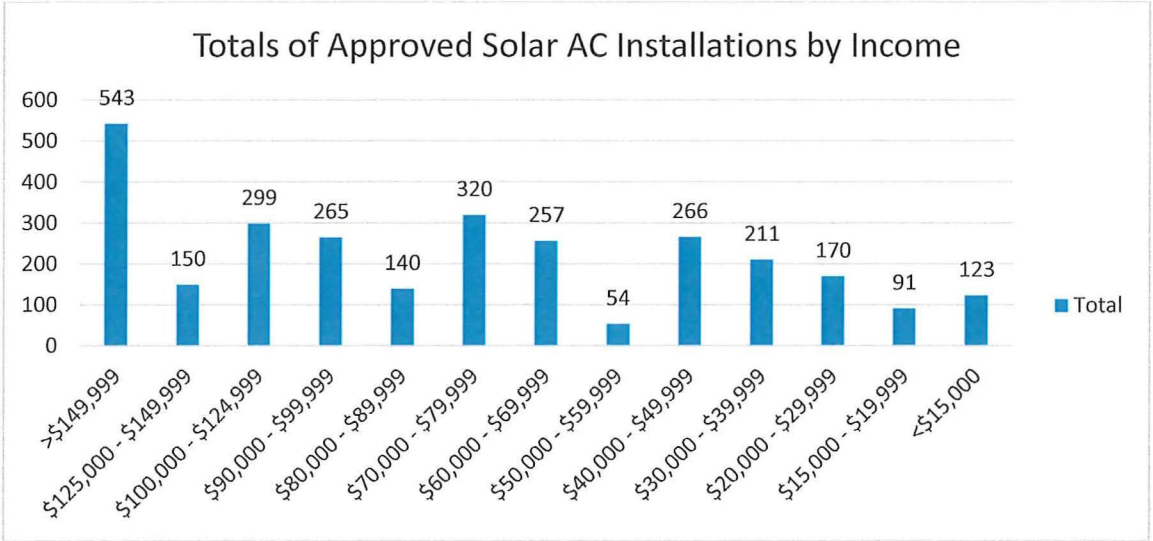
an effort to bring customers with more moderate budgets into the program and to reflect declining equipment costs since the program started in 2018.

Residential

For residential customers, the Companies have determined that there is not a significant difference in the kW-AC size of the rebate applications based on income. In 2020, rebate participants with income of less than $20,000.00 had an average system size of 7.1 kW-AC. Rebate participants with incomes of more than $150,000.00 had an average system size of 7.9 kW-AC. The following chart shows the distribution of unit size among income groups.



Notably, half of the applications received in 2020 were from households with incomes of $80.000.00 or more. As the following chart shows, residential customers with higher incomes received a greater share of rebates.



While intuition might suggest that smaller systems are more likely to be installed by customers with greater budget constraints, the data paints a different picture. For residential customers, the sizing of an installation averages 7.6 kW. This is due primarily to the fact that a popular inverter used by installers in the Company's service territories is 7.6 kW. More than three quarters of residential installations that receive a rebate have limited their installation size to less than 10 kW.

Commercial Including Nonprofit

More than 75% of commercial installations are sized at less than half of the 100 kW capacity. As shown in the chart below, the average rebate requested for nonresidential rebate participants in 2020 was 34.89 kW.

Rebate Requested (kW)	Number of Rebate Applications Received
0-25	46
25.01-50	21
50.01-75	4
75.01-100	16

Average Rebate Requested (kW)	Number of Rebate Applications
34.89	87

Nearly 84% of commercial installations that receive a rebate have limited their installation size to less than 100 kW, and almost 90% of non-profit installations that receive have limited their installation size to less than 100 kW.

III. Rebate Amount Modification

In its Order, the Commission proposed that modifications to the program are necessary to provide more customers the opportunity to participate. The Commission requested proposals for revising the existing incentives to better accomplish the program's goal of creating a program that will offer "reasonable incentives to residential and nonresidential customers for the installation of small customer owned or leased solar energy facilities participating in a public utility's net metering tariff." N.C. Gen. Stat. § 62-155(f). Notably, the Order also concluded the General Assembly determined the appropriate size of facilities to incentivize for residential and nonresidential customers. Rather than concluding that the size limitations in the statute constituted a ceiling, the Commission concluded that the plain language of the statute limited the incentive to 10 kW for residential customer installations and 100 kW for nonresidential customer installations. The Commission determined that it was precluded from adopting a limit on incentive eligibility that is less than the capacity amounts set forth in the statute. Additionally, the Commission found persuasive the Public Staff's observations that solar installation costs are dropping and further noted that rebates, which are funded by customers, should reflect true and reasonable costs.

The Companies sought data from outside sources to determine current pricing for small solar installations, including from the NCSEA who graciously provided assistance. Based on historical and forecasted solar price data, the Companies were able to calculate the difference between 2018 prices and 2020 prices for solar installations. For the period, residential pricing decreased by 35%. Reducing the rebate amount by the same percentage would reduce the price per watt to $0.40. Over the same period, commercial pricing decreased by 45%. Reducing the rebate amount for commercial customers by the same percentage would reduce the price per watt to $0.30.

As the Commission is aware, N. C. Gen. Stat. § 62-155(f) specifically sets aside capacity for non-profit customers, and non-profit customers have not participated in the solar rebate program to the same extent as residential and commercial customers, in part because non-profits are not able to take advantage of available tax credits.[1] However, as the Companies stated in their April 1, 2020 Annual Report, the Companies have received indications that more non-profits have secured funding to move forward on projects and that local governments may also begin to utilize the rebates program. As such, the Companies do not recommend reducing the rebates for the non-profit classification.

As for the viability of using a tiered system with a declining incentive structure up to 10 kW for residential customers installations and 100 kW for nonresidential customer installations, the Companies do not think this will encourage smaller solar installations or incentivize customers with more modest incomes. Residential customers typically install systems between 7 and 8 kW-AC, regardless of income, and more than half of commercial installations are already sized at less than one-quarter capacity. Therefore,

[1] If tax credits expire to 2021, rebate incentives may need to be modified to provide a reasonable incentive for residential and commercial customers.

the Companies submits that a preferable approach would be to decrease the residential rebate to $0.40 per watt and reduce the commercial rebate to $0.30 per watt, keeping the non-profit rebate at $0.75, without a tier structure.

Customer Class	Current Rebate ($/W)	Modified Rebate ($/W)	Max. Capacity Eligible	Maximum Modified Rebate
Residential	0.60	0.40	10 kW	$4,000.00
Commercial	0.50	0.30	100 kW	$30,000.00
Non-Profit	0.75	0.75	100 kW	$75,000.00

If the Commission is opts to adopt a tiered system, the Companies would recommend a simple tier for residential customers to receive $0.50 per watt for 0-5 kW and $0.40 per watt for 5.01-10 kW. The Companies believe the best way to incentivize moderate income customers to participate is based on income, not system size. However, the Companies do not believe that this is a viable option. This option would require installers and Duke Energy to verify customer incomes, which is too cumbersome for the customers, installers and for those managing the program at Duke Energy. The Companies could reengineer the process to verify income and provide the customer with certificate of their rebate level at the onset of the application process, but this would be a costly modification for a program that only has two remaining years and not necessarily increase participation of income targeted customers.

Conclusion

The Companies are receptive to changes in the final two years of the program and look forwarding to reviewing the proposals of the Public Staff, NCSEA and SACE. The program has proven to be extremely popular, and the Companies expect the enthusiasm

to continue in the remaining two years of the program. Therefore, pending reply comments, the Companies respectfully request the Commission to decrease the rebate incentive amount per watt for residential customers to $0.40 and for commercial customers to $0.30, while retaining the rebate incentive amount for non-profit customers at $0.75.

Respectfully submitted this 4th day of December, 2020.

By: _____

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of Duke Energy Progress, LLC and Duke Energy Carolinas, LLC's Initial Comments has been served by electronic mail (e-mail), hand delivery, or by depositing a copy in the United States Mail, first class postage prepaid, properly addressed to parties of record.

This, the 4th day of December, 2020.

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ATTACHMENT 1

NC Solar Rebate Baseline Performance Test

30/11/2020

Author Details	
First Name	Bradley
Surname	Carter
Job Title	
Organization	

General Details

Scenario Name	Scenario1
Run Name	res2452.lrr
Run Date	23/11/2020 13:04:33
Period	23/11/2020 13:04:33 - 23/11/2020 14:18:13
Run Duration	1 hour and 13 minutes and 40 seconds
PC Project Name	res2452.lrr

Executive Summary

A baseline performance test was executed against the NC Solar Rebate application. This was to test the servers' endurance to expected high traffic circumstances and ensure the application would be able to handle the load properly. This test had the following specifications:

Duration 1 Hour

Total Volume: Expected 18,000 Solar Rebate Submissions

Volume Rate: 3,000 Submissions every 10 minutes

Actual Volume Rate:
- 1,516 during the first 10 mins
- 2,963 during the first 15 mins
- 4,412 during the first 20 mins
- 19,192 for the entire test

Observations:
- There was a single error during the test. An SSL error occurred during the first 10 minutes of the test.
- The majority of the response times were less than a second.

Response Times Compared to Previous Tests:

HTTP	Average		
Transaction Name	7/20/2020	11/17/2020	11/23/2020
NCSolar_000_Home	0.334	0.618	0.730
NCSolarCustomer_001_EnterProjectID	0.160	0.206	0.305
NCSolarCustomer_002_SubmitSolarRebate	0.610	0.981	1.358
NCSolarInstaller_001_EnterProjectID	0.159	0.210	0.290
NCSolarInstaller_002_SubmitSolarRequest	0.613	0.728	1.021

Chrome Browser	Average		
Transaction Name	8/4/2020	11/17/2020	11/23/2020
NC_Solar_Customer_Chrome_000_Home	0.709	0.988	1.080
NC_Solar_Customer_Chrome_001_ChooseCustomer	0.162	0.249	0.212
NC_Solar_Customer_Chrome_002_EnterProjectID	0.135	0.190	0.374
NC_Solar_Customer_Chrome_003_FillDetails	0.021	0.030	0.030
NC_Solar_Customer_Chrome_004_FillAddressDetails	0.020	0.029	0.031
NC_Solar_Customer_Chrome_005_SelectAddressType	0.060	0.089	0.080
NC_Solar_Customer_Chrome_006_SelectHomeType	0.022	0.031	0.031
NC_Solar_Customer_Chrome_007_SelectRebateQuantity	0.020	0.032	0.031
NC_Solar_Customer_Chrome_008_SubmitRebate	0.585	1.099	1.621
NC_Solar_Installer_Chrome_000_Home	0.725	1.025	1.035
NC_Solar_Installer_Chrome_001_ChooseCustomer	0.166	0.223	0.212
NC_Solar_Installer_Chrome_002_EnterProjectID	0.150	0.192	0.252
NC_Solar_Installer_Chrome_003_FillDetails	0.024	0.030	0.034
NC_Solar_Installer_Chrome_004_FillAddressDetails	0.036	0.029	0.031
NC_Solar_Installer_Chrome_005_SelectAddressType	0.069	0.088	0.080
NC_Solar_Installer_Chrome_006_SelectHomeType	0.027	0.031	0.031
NC_Solar_Installer_Chrome_007_SelectRebateQuantity	0.025	0.030	0.030

NC_Solar_Installer_Chrome_008_SubmitRebate	0.592	0.828	1.124

IE Browser	Average		
Transaction Name	**8/4/2020**	**11/17/2020**	**11/23/2020**
NC_Solar_Customer_IE_000_Home	1.940	2.235	2.461
NC_Solar_Customer_IE_001_ChooseCustomer	0.317	0.383	0.395
NC_Solar_Customer_IE_002_EnterProjectID	0.277	0.431	0.499
NC_Solar_Customer_IE_003_FillDetails	0.137	0.199	0.203
NC_Solar_Customer_IE_004_FillAddressDetails	0.121	0.170	0.176
NC_Solar_Customer_IE_005_SelectAddressType	0.106	0.087	0.092
NC_Solar_Customer_IE_006_SelectHomeType	0.119	0.114	0.112
NC_Solar_Customer_IE_007_SelectRebateQuantity	0.131	0.162	0.166
NC_Solar_Customer_IE_008_SubmitRebate	0.656	1.241	1.512
NC_Solar_Installer_IE_000_Home	2.004	2.252	2.409
NC_Solar_Installer_IE_001_ChooseCustomer	0.333	0.392	0.405
NC_Solar_Installer_IE_002_EnterProjectID	0.265	0.410	0.480
NC_Solar_Installer_IE_003_FillDetails	0.110	0.196	0.207
NC_Solar_Installer_IE_004_FillAddressDetails	0.146	0.168	0.174
NC_Solar_Installer_IE_005_SelectAddressType	0.110	0.090	0.096
NC_Solar_Installer_IE_006_SelectHomeType	0.125	0.108	0.112
NC_Solar_Installer_IE_007_SelectRebateQuantity	0.124	0.157	0.164
NC_Solar_Installer_IE_008_SubmitRebate	0.651	0.916	1.209

Business Process

Group Name	Script Name	Concurrent Vusers	% of Total Vusers	Transactions per Hour	Start Time	Think Time	Pacing	Browser Cache
nc_solar_customerqa_1120	NC_Solar_CustomerQA_1120_1	266	88.7	43066.8	23/11/2020 13:04:33	Replay as recorded	Fixed intervals every 60.000 sec	
ncsolar_customer_tc_chromium_1120	NCSolar_Customer_TC_Chromium_1120_1	5	1.7	1105.2	23/11/2020 13:04:33		Fixed intervals every 60.000 sec	
ncsolar_customer_tc_ie_1120	NCSolar_Customer_TC_IE_1120_1	5	1.7	1281.6	23/11/2020 13:04:33		Fixed intervals every 60.000 sec	
ncsolar_installer_tc_chromium_1120	NCSolar_Installer_TC_Chromium_1120_1	5	1.7	1144.8	23/11/2020 13:04:33		Fixed intervals every 60.000 sec	
ncsolar_installer_tc_ie_1120	NCSolar_Installer_TC_IE_1120_1	5	1.7	1144.8	23/11/2020 13:04:33		Fixed intervals every 60.000 sec	
ncsolar_installerqa_1120	NCSolar_InstallerQA_1120_1	14	4.7	2260.8	23/11/2020 13:04:33	Replay as recorded	Fixed intervals every 60.000 sec	
	Total:	300	100%					

Script: NC_Solar_CustomerQA_1120_1

Description:

#	Transaction
1	NCSolar_000_Home
2	NCSolarCustomer_001_EnterProjectID
3	NCSolarCustomer_002_SubmitSolarRebate

Script: NCSolar_Customer_TC_Chromium_1120_1

Description:

#	Transaction
1	NC_Solar_Customer_Chrome_000_Home

2	NC_Solar_Customer_Chrome_001_ChooseCustomer
3	NC_Solar_Customer_Chrome_002_EnterProjectID
4	NC_Solar_Customer_Chrome_003_FillDetails
5	NC_Solar_Customer_Chrome_004_FillAddressDetails
6	NC_Solar_Customer_Chrome_005_SelectAddressType
7	NC_Solar_Customer_Chrome_006_SelectHomeType
8	NC_Solar_Customer_Chrome_007_SelectRebateQuantity
9	NC_Solar_Customer_Chrome_008_SubmitRebate

Script: NCSolar_Customer_TC_IE_1120_1

Description:

#	Transaction
1	NC_Solar_Customer_IE_000_Home
2	NC_Solar_Customer_IE_001_ChooseCustomer
3	NC_Solar_Customer_IE_002_EnterProjectID
4	NC_Solar_Customer_IE_003_FillDetails
5	NC_Solar_Customer_IE_004_FillAddressDetails
6	NC_Solar_Customer_IE_005_SelectAddressType
7	NC_Solar_Customer_IE_006_SelectHomeType
8	NC_Solar_Customer_IE_007_SelectRebateQuantity
9	NC_Solar_Customer_IE_008_SubmitRebate

Script: NCSolar_Installer_TC_Chromium_1120_1

Description:

#	Transaction
1	NC_Solar_Installer_Chrome_000_Home
2	NC_Solar_Installer_Chrome_001_ChooseCustomer
3	NC_Solar_Installer_Chrome_002_EnterProjectID
4	NC_Solar_Installer_Chrome_003_FillDetails
5	NC_Solar_Installer_Chrome_004_FillAddressDetails
6	NC_Solar_Installer_Chrome_005_SelectAddressType
7	NC_Solar_Installer_Chrome_006_SelectHomeType
8	NC_Solar_Installer_Chrome_007_SelectRebateQuantity
9	NC_Solar_Installer_Chrome_008_SubmitRebate

Script: NCSolar_Installer_TC_IE_1120_1

Description:

#	Transaction
1	NC_Solar_Installer_IE_000_Home
2	NC_Solar_Installer_IE_001_ChooseCustomer
3	NC_Solar_Installer_IE_002_EnterProjectID
4	NC_Solar_Installer_IE_003_FillDetails
5	NC_Solar_Installer_IE_004_FillAddressDetails
6	NC_Solar_Installer_IE_005_SelectAddressType
7	NC_Solar_Installer_IE_006_SelectHomeType
8	NC_Solar_Installer_IE_007_SelectRebateQuantity
9	NC_Solar_Installer_IE_008_SubmitRebate

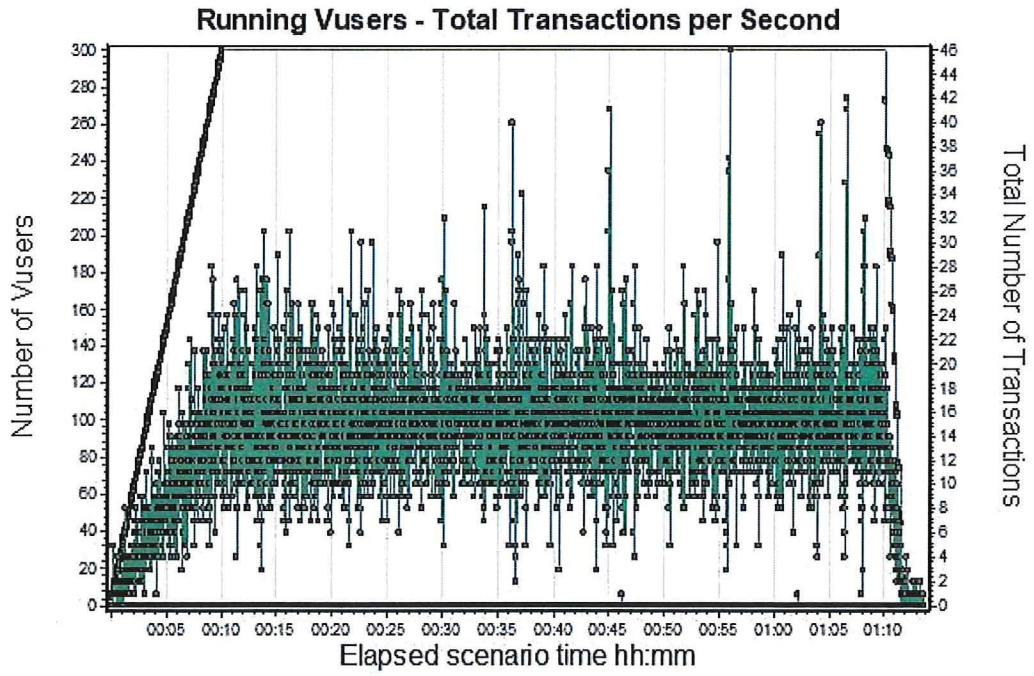
Script: NCSolar_InstallerQA_1120_1

Description:

#	Transaction
1	NCSolar_000_Home
2	NCSolarInstaller_001_EnterProjectID
3	NCSolarInstaller_002_SubmitSolarRequest

Workload Characteristics

Measurement	res2452.lrr
Max Running Vusers	300
Average Hits per Second	76.7
Total Hits	339013
Total Passed Transactions per Second	13.9
Total Passed Transactions per Minute	833.2
Total Transactions Number	41



Color	Graph	Scale	Measurement	Graph's Minimum	Graph's Average	Graph's Maximum	Graph's Median	Graph's Std. Deviation
	Running Vusers	1	Run	0.000	268.207	300.000	144.000	87.818
	Total Transactions per Second	1	Fail	0.000	0.000	1.000	0.000	0.021

Color	Graph	Scale	Measurement	Graph's Minimum	Graph's Average	Graph's Maximum	Graph's Median	Graph's Std. Deviation
	Total Transactions per Second	1	Pass	0.000	13.886	46.000	14.000	5.522

Performance Overview

Measurement	Value
Run Name	res2452.lrr
Weighted Average of Transaction Response Time	0.5
Total Passed Transactions	61404
Total Failed Transactions	2
Transactions Success Rate, %	100
Total Errors per Second	0
Total Errors	2

HTTP Responses Summary

HTTP Response Name	Total	Per Second
HTTP_200	339013	76.7

Transaction Summary

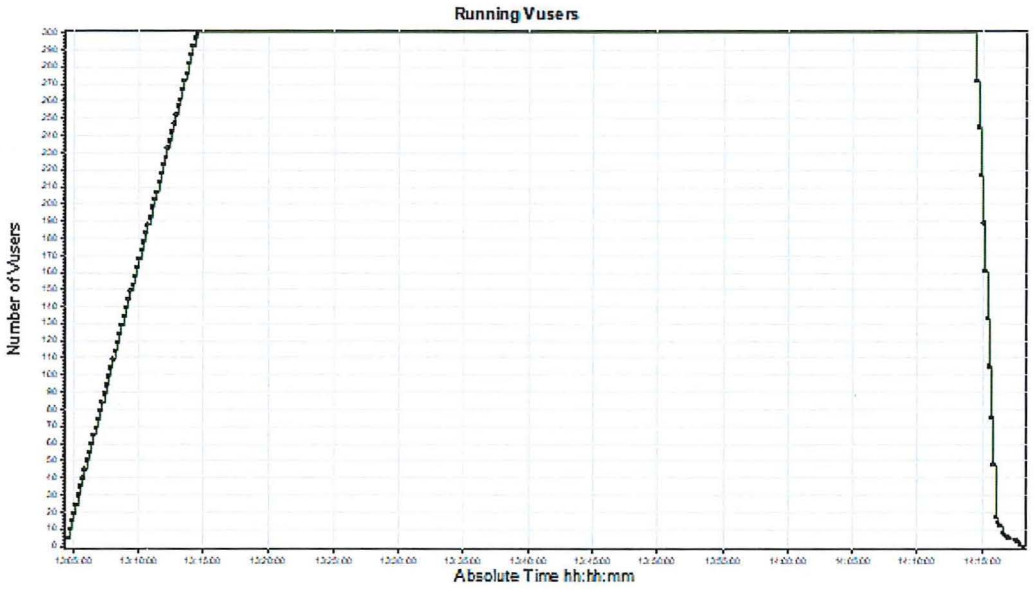
Filter Transaction End Status= (Pass)

Run Name	Transaction Name	Minimum	Average	Maximum	Std. Deviation	90%	Pass Count	Fail Count	Stop Count
res2452.lrr	NC_Solar_Customer_Chrome_000_Home	0.7	1.1	13	1.3	1.2	151	0	0
res2452.lrr	NC_Solar_Customer_Chrome_001_ChooseCustomer	0.1	0.2	0.3	0	0.2	151	0	0
res2452.lrr	NC_Solar_Customer_Chrome_002_EnterProjectID	0.2	0.4	6.2	0.6	0.6	151	0	0
res2452.lrr	NC_Solar_Customer_Chrome_003_FillDetails	0	0	0	0	0	151	0	0
res2452.lrr	NC_Solar_Customer_Chrome_004_FillAddressDetails	0	0	0	0	0	151	0	0
res2452.lrr	NC_Solar_Customer_Chrome_005_SelectAddressType	0.1	0.1	0.1	0	0.1	151	0	0
res2452.lrr	NC_Solar_Customer_Chrome_006_SelectHomeType	0	0	0.1	0	0	151	0	0
res2452.lrr	NC_Solar_Customer_Chrome_007_SelectRebateQuantity	0	0	0	0	0	151	0	0
res2452.lrr	NC_Solar_Customer_Chrome_008_SubmitRebate	0.9	1.6	11	1.2	2.6	151	0	0
res2452.lrr	NC_Solar_Customer_IE_000_Home	1.2	2.5	12.8	1	2.8	175	0	0
res2452.lrr	NC_Solar_Customer_IE_001_ChooseCustomer	0.2	0.4	0.5	0	0.4	175	0	0
res2452.lrr	NC_Solar_Customer_IE_002_EnterProjectID	0.3	0.5	2.3	0.2	0.6	175	0	0
res2452.lrr	NC_Solar_Customer_IE_003_FillDetails	0.2	0.2	0.3	0	0.2	175	0	0
res2452.lrr	NC_Solar_Customer_IE_004_FillAddressDetails	0.1	0.2	0.3	0	0.2	175	0	0
res2452.lrr	NC_Solar_Customer_IE_005_SelectAddressType	0.1	0.1	0.2	0	0.1	175	0	0
res2452.lrr	NC_Solar_Customer_IE_006_SelectHomeType	0.1	0.1	0.2	0	0.2	175	0	0
res2452.lrr	NC_Solar_Customer_IE_007_SelectRebateQuantity	0.1	0.2	0.3	0	0.2	175	0	0
res2452.lrr	NC_Solar_Customer_IE_008_SubmitRebate	0.9	1.5	13.1	1.1	2.1	175	0	0
res2452.lrr	NC_Solar_Installer_Chrome_000_Home	0.7	1	9.2	0.7	1.4	156	0	0

Run Name	Transaction Name	Minimum	Average	Maximum	Std. Deviation	90%	Pass Count	Fail Count	Stop Count
res2452.lrr	NC_Solar_Installer_Chrome_001_ChooseCustomer	0.1	0.2	0.3	0	0.2	156	0	0
res2452.lrr	NC_Solar_Installer_Chrome_002_EnterProjectID	0.2	0.3	0.8	0.1	0.4	156	0	0
res2452.lrr	NC_Solar_Installer_Chrome_003_FillDetails	0	0	0.1	0	0	156	0	0
res2452.lrr	NC_Solar_Installer_Chrome_004_FillAddressDetails	0	0	0	0	0	156	0	0
res2452.lrr	NC_Solar_Installer_Chrome_005_SelectAddressType	0.1	0.1	0.1	0	0.1	156	0	0
res2452.lrr	NC_Solar_Installer_Chrome_006_SelectHomeType	0	0	0.1	0	0	156	0	0
res2452.lrr	NC_Solar_Installer_Chrome_007_SelectRebateQuantity	0	0	0	0	0	156	0	0
res2452.lrr	NC_Solar_Installer_Chrome_008_SubmitRebate	0.7	1.1	5	0.6	1.9	156	0	0
res2452.lrr	NC_Solar_Installer_IE_000_Home	1.3	2.4	11.5	0.9	2.6	156	0	0
res2452.lrr	NC_Solar_Installer_IE_001_ChooseCustomer	0.4	0.4	0.5	0	0.4	156	0	0
res2452.lrr	NC_Solar_Installer_IE_002_EnterProjectID	0.3	0.5	2.1	0.2	0.6	156	0	0
res2452.lrr	NC_Solar_Installer_IE_003_FillDetails	0.2	0.2	0.3	0	0.2	156	0	0
res2452.lrr	NC_Solar_Installer_IE_004_FillAddressDetails	0.1	0.2	0.3	0	0.2	156	0	0
res2452.lrr	NC_Solar_Installer_IE_005_SelectAddressType	0.1	0.1	0.2	0	0.1	156	0	0
res2452.lrr	NC_Solar_Installer_IE_006_SelectHomeType	0.1	0.1	0.2	0	0.2	156	0	0
res2452.lrr	NC_Solar_Installer_IE_007_SelectRebateQuantity	0.1	0.2	0.2	0	0.2	156	0	0
res2452.lrr	NC_Solar_Installer_IE_008_SubmitRebate	0.8	1.2	4.2	0.5	1.9	156	0	0
res2452.lrr	NCSolar_000_Home	0.3	0.7	255.3	2.1	1.2	18554	0	0
res2452.lrr	NCSolarCustomer_001_EnterProjectID	0.1	0.3	13.4	0.4	0.4	17629	0	0
res2452.lrr	NCSolarCustomer_002_SubmitSolarRebate	0.7	1.4	22.2	0.9	2.1	17629	0	0
res2452.lrr	NCSolarInstaller_001_EnterProjectID	0.1	0.3	2	0.2	0.4	925	0	0
res2452.lrr	NCSolarInstaller_002_SubmitSolarRequest	0.5	1	12.4	0.7	1.5	925	0	0

Running Vusers

Title	Running Vusers
Current Results	G:\LRTests\2020\NC_Solar_Rebate\Results\20201123_baseline\RawResults_2452\res2452.lrr
Filters	Vuser Status = (Run)
Group By	
Granularity	10 Seconds

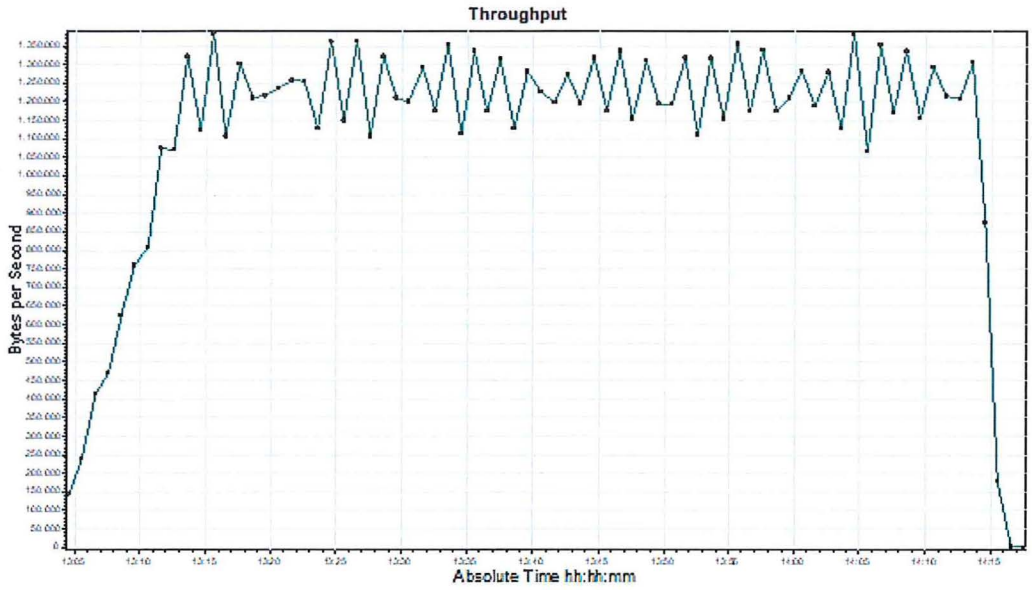


Color	Scale	Measurement	Graph Minimum	Graph Average	Graph Maximum	Graph Median	Graph Std. Deviation
	1	Run	0.000	268.173	300.000	133.000	94.541

Description: Displays the number of Vusers that executed Vuser scripts, and their status, during each second of a load test. This graph is useful for determining the Vuser load on your server at any given moment.

Throughput

Title	Throughput
Current Results	G:\LRTests\2020\NC_Solar_Rebate\Results\20201123_baseline\RawResults_2452\res2452.lrr
Filters	None
Group By	
Granularity	60 Seconds

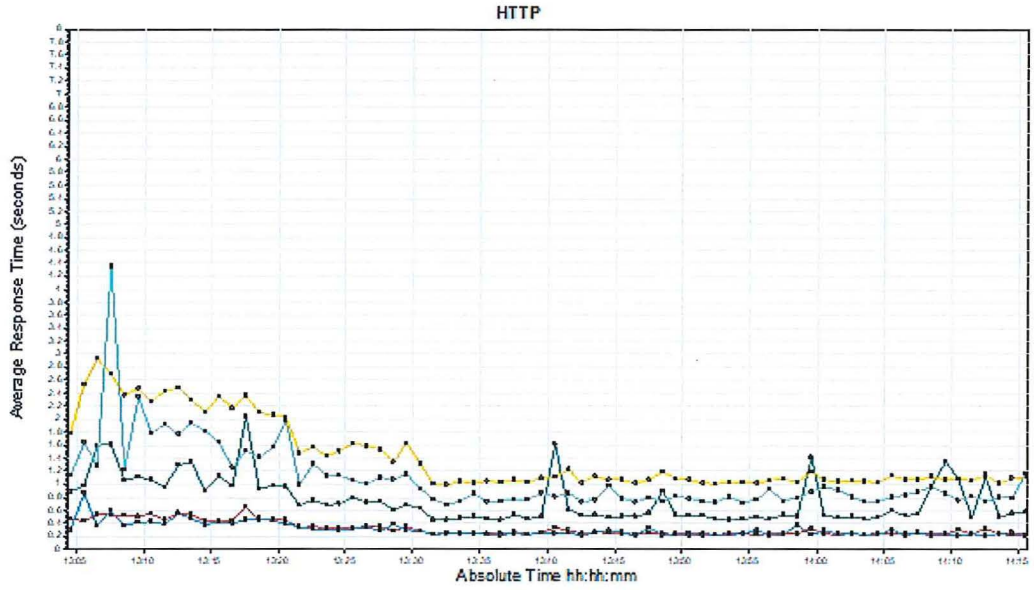


Color	Scale	Measurement	Graph Minimum	Average	Graph Maximum	Graph Median	Graph Std. Deviation
	1	Throughput	857.780	1,115,432.136	1,384,631.183	1,199,957.317	325,673.223

Description: Displays the amount of throughput (in bytes) on the Web server during the load test. Throughput represents the amount of data that the Vusers received from the server at any given second. This graph helps you to evaluate the amount of load Vusers generate, in terms of server throughput.

HTTP

Title	HTTP
Current Results	G:\LRTests\2020\NC_Solar_Rebate\Results\20201123_baseline\RawResults_2452\res2452.lrr
Filters	Script Name = (NC_Solar_CustomerQA_1120_1NCSolar_InstallerQA_1120_1), Transaction End Status = (Pass), (do not Include Think Time)
Group By	
Granularity	60 Seconds,

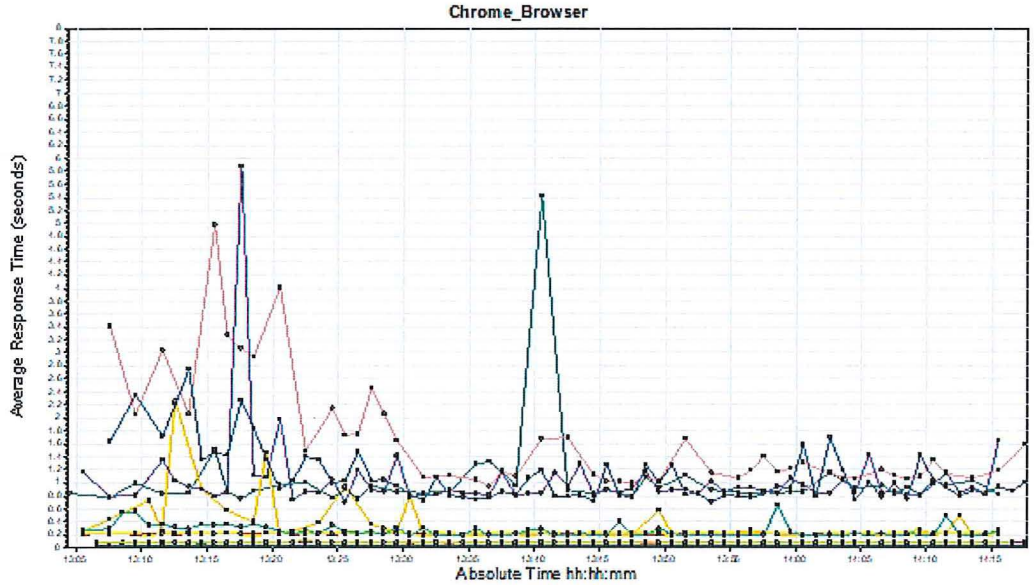


Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	NCSolar_000_Home	0.344	0.730	255.294	2.082
	1	NCSolarCustomer_001_EnterProjectID	0.109	0.305	13.439	0.388
	1	NCSolarCustomer_002_SubmitSolarRebate	0.703	1.358	22.203	0.883
	1	NCSolarInstaller_001_EnterProjectID	0.109	0.290	2.047	0.192
	1	NCSolarInstaller_002_SubmitSolarRequest	0.547	1.021	12.397	0.743

Description: Displays the average time taken to perform transactions during each second of the load test. This graph helps you determine whether the performance of the server is within acceptable minimum and maximum transaction performance time ranges defined for your system.

Chrome_Browser

Title	Chrome_Browser
Current Results	G:\LRTests\2020\NC_Solar_Rebate\Results\20201123_baseline\RawResults_2452\res2452.lrr
Filters	Script Name = (NCSolar_Customer_TC_Chromium_1120_1NCSolar_Installer_TC_Chromium_1120_1), Transaction End Status = (Pass), (do not Include Think Time)
Group By	
Granularity	60 Seconds,



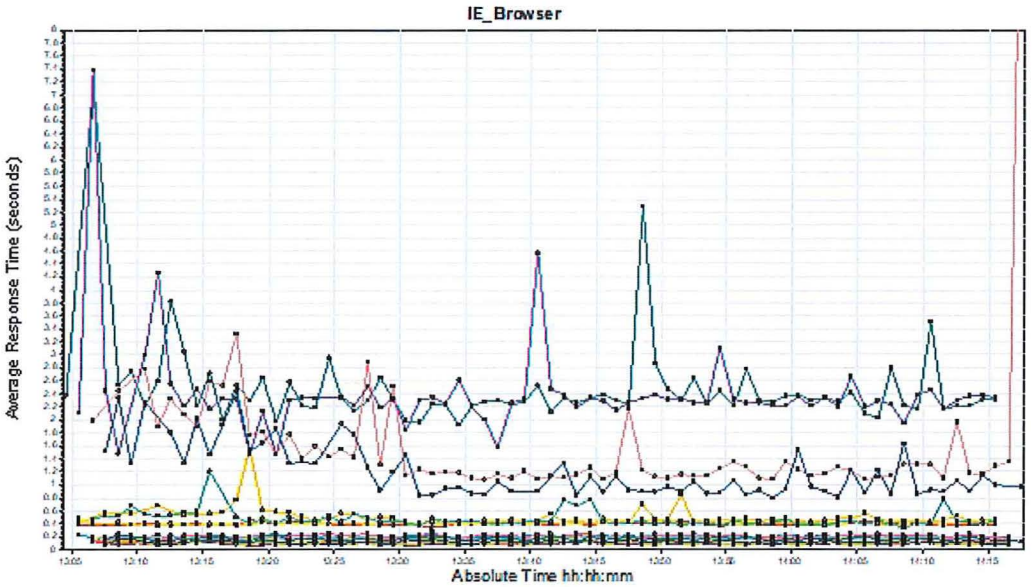
Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	NC_Solar_Customer_Chrome_000_Home	0.714	1.080	13.022	1.326
	1	NC_Solar_Customer_Chrome_001_ChooseCustomer	0.050	0.212	0.251	0.018
	1	NC_Solar_Customer_Chrome_002_EnterProjectID	0.170	0.374	6.185	0.618
	1	NC_Solar_Customer_Chrome_003_FillDetails	0.025	0.030	0.041	0.003
	1	NC_Solar_Customer_Chrome_004_FillAddressDetails	0.026	0.031	0.041	0.002
	1	NC_Solar_Customer_Chrome_005_SelectAddressType	0.070	0.080	0.116	0.007
	1	NC_Solar_Customer_Chrome_006_SelectHomeType	0.023	0.031	0.050	0.003
	1	NC_Solar_Customer_Chrome_007_SelectRebateQuantity	0.024	0.031	0.042	0.003
	1	NC_Solar_Customer_Chrome_008_SubmitRebate	0.853	1.621	10.971	1.217
	1	NC_Solar_Installer_Chrome_000_Home	0.705	1.035	9.188	0.744
	1	NC_Solar_Installer_Chrome_001_ChooseCustomer	0.051	0.212	0.254	0.021
	1	NC_Solar_Installer_Chrome_002_EnterProjectID	0.165	0.252	0.841	0.110
	1	NC_Solar_Installer_Chrome_003_FillDetails	0.025	0.034	0.062	0.006
	1	NC_Solar_Installer_Chrome_004_FillAddressDetails	0.025	0.031	0.041	0.003
	1	NC_Solar_Installer_Chrome_005_SelectAddressType	0.068	0.080	0.113	0.008

Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	NC_Solar_Installer_Chrome_006_SelectHomeType	0.026	0.031	0.052	0.003
	1	NC_Solar_Installer_Chrome_007_SelectRebateQuantity	0.025	0.030	0.039	0.003
	1	NC_Solar_Installer_Chrome_008_SubmitRebate	0.695	1.124	4.958	0.597

Description: Displays the average time taken to perform transactions during each second of the load test. This graph helps you determine whether the performance of the server is within acceptable minimum and maximum transaction performance time ranges defined for your system.

IE_Browser

Title	IE_Browser
Current Results	G:\LRTests\2020\NC_Solar_Rebate\Results\20201123_baseline\RawResults_2452\res2452.lrr
Filters	Script Name = (NCSolar_Customer_TC_IE_1120_1NCSolar_Installer_TC_IE_1120_1), Transaction End Status = (Pass), (do not Include Think Time)
Group By	
Granularity	60 Seconds,



Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	NC_Solar_Customer_IE_000_Home	1.235	2.461	12.808	1.046
	1	NC_Solar_Customer_IE_001_ChooseCustomer	0.247	0.395	0.496	0.030
	1	NC_Solar_Customer_IE_002_EnterProjectID	0.314	0.499	2.308	0.192
	1	NC_Solar_Customer_IE_003_FillDetails	0.151	0.203	0.300	0.030
	1	NC_Solar_Customer_IE_004_FillAddressDetails	0.069	0.176	0.275	0.029
	1	NC_Solar_Customer_IE_005_SelectAddressType	0.058	0.092	0.173	0.027
	1	NC_Solar_Customer_IE_006_SelectHomeType	0.075	0.112	0.230	0.030
	1	NC_Solar_Customer_IE_007_SelectRebateQuanti ty	0.111	0.166	0.283	0.036
	1	NC_Solar_Customer_IE_008_SubmitRebate	0.939	1.512	13.120	1.080
	1	NC_Solar_Installer_IE_000_Home	1.261	2.409	11.478	0.925
	1	NC_Solar_Installer_IE_001_ChooseCustomer	0.354	0.405	0.491	0.022
	1	NC_Solar_Installer_IE_002_EnterProjectID	0.308	0.480	2.073	0.225
	1	NC_Solar_Installer_IE_003_FillDetails	0.154	0.207	0.284	0.028
	1	NC_Solar_Installer_IE_004_FillAddressDetails	0.133	0.174	0.272	0.026
	1	NC_Solar_Installer_IE_005_SelectAddressType	0.063	0.096	0.228	0.028
	1	NC_Solar_Installer_IE_006_SelectHomeType	0.075	0.112	0.195	0.031
	1	NC_Solar_Installer_IE_007_SelectRebateQuantity	0.113	0.164	0.240	0.034
	1	NC_Solar_Installer_IE_008_SubmitRebate	0.760	1.209	4.206	0.541

Description: Displays the average time taken to perform transactions during each second of the load test. This graph helps you determine whether the performance of the server is within acceptable minimum and maximum transaction performance time ranges defined for your system.

Terminology

LoadRunner Objects

Term	Definition
Vuser Scripts	A Vuser script describes the actions that a Vuser performs during the scenario. Each Vuser executes a Vuser script during a scenario run. The Vuser scripts include functions that measure and record the performance of your application components.
Load Test	Tests a system's ability to handle a heavy workload. A load test simulates multiple transactions or users interacting with the computer at the same time and provides reports on response times and system behavior.
Run-Time Settings	Run-Time settings allow you to customize the way a Vuser script is executed. You configure the run-time settings from the Controller or VuGen before running a scenario. You can view information about the Vuser groups and scripts that were run in each scenario, as well as the run-time settings for each script in a scenario, in the Scenario Run-Time Settings dialog box.
Scenario	A scenario defines the events that occur during each testing session. For example, a scenario defines and controls the number of users to emulate, the actions that they perform, and the machines on which they run their emulations.
Scheduler	The Schedule Builder allows you to set the time that the scenario will start running, the duration time of the scenario or of the Vuser groups within the scenario, and to gradually run and stop the Vusers within the scenario or within a Vuser group. It also allows you to set the load behavior of Vusers in a scenario.
Session	When you work with the Analysis utility, you work within a session. An Analysis session contains at least one set of scenario results (lrr file). The Analysis utility processes the scenario result information and generates graphs and reports. The Analysis stores the display information and layout settings for the active graphs in a file with an .lra extension. Each session has a session name, result file name, database name, directory path, and type.
Transactions	A transaction represents an action or a set of actions used to measure the performance of the server. You define transactions within your Vuser script by enclosing the appropriate sections of the script with start and end transaction statement.
Vusers	Vusers or virtual users are used by LoadRunner as a replacement for human users. When you run a scenario, Vusers emulate the actions of human users working with your application. A scenario can contain tens, hundreds, or even thousands of Vusers running concurrently on a single workstation.

Graph Information

Term	Definition
Average	Average value of the graph measurement's.
Hits	The number of HTTP requests made by Vusers to the Web server.
Maximum	Maximum value of the graph measurement's.
Measurement	This is the type of resource being monitored
Median	Middle value of the graph measurement's.
Minimum	Minimum value of the graph measurement's.
Network Delay	The time it takes for a packet of data sent across the network to go to the requested node and return.
Network Path	The Network Path is the route data travels between the source machine and the destination machine.
Response time	The time taken to perform a transaction.
Scale (or granularity)	In order to display all the measurements on a single graph, thus making the graphs easier to read and analyze, you can change the scale or (granularity) of the x-axis. You can either set measurement scales manually, view measurement trends for all measurements in the graph, or let Analysis scale them automatically. The Legend tab indicates the scale factor for each resource.
Standard Deviation (SD)	The square root of the arithmetic mean value of the squares of the deviations from the arithmetic mean.
Throughput	Throughput is measured in bytes and represents the amount of data that the Vusers received from the server.
Vuser Load	When you run a scenario, the Vusers generate load or stress on the server. LoadRunner monitors the effect of this load on the performance of your application.

ATTACHMENT 2

NC Solar Rebate Stress Test

30/11/2020

Author Details	
First Name	Bradley
Surname	Carter
Job Title	
Organization	

General Details

Scenario Name	Scenario1
Run Name	res2457.lrr
Run Date	25/11/2020 10:08:21
Period	25/11/2020 10:08:21 - 25/11/2020 11:09:34
Run Duration	1 hour and 1 minute and 13 seconds
PC Project Name	res2457.lrr

Executive Summary

A stress test was executed against the NC Solar Rebate application. The test was designed to stress the system in order to determine if the application could resonably process a high volume of rebate submissions over a short period of time. The specifics were:

Duration: 1 Hour

Total Volume: Expected 48,000 during the first 10 minutes and 12,000 during the remaing 50 minutes (Total - 60,000)

Actual Volume Rate:
- 25,789 during the first 10 mins
- 48,946 during the first 15 mins
- 66,902 during the first 20 mins
- 79,279 for the entire test

Observations:
- There were 193 failed transactions during the test. All occurred during the first 20 minutes.
- The failed transactions were across several transactions
  - Unable to access the home page (16)
  - Unable to verify the Project ID (102)
  - Unable to successfully submit the rebate (75)
- Response times were consistent throughout the test

Response Times Compared to Previous Tests:

HTTP	Average		
Transaction Name	**7/20/2020**	**11/18/2020**	**11/25/2020**
NCSolar_000_Home	0.386	0.645	0.720
NCSolarCustomer_001_EnterProjectID	0.123	0.227	0.296
NCSolarCustomer_002_SubmitSolarRebate	0.654	1.121	1.274
NCSolarInstaller_001_EnterProjectID	0.124	0.224	0.274
NCSolarInstaller_002_SubmitSolarRequest	0.654	0.799	0.956

Chrome Browser	Average	
Transaction Name	**11/18/2020**	**11/25/2020**
NC_Solar_Customer_Chrome_000_Home	1.028	1.053
NC_Solar_Customer_Chrome_001_ChooseCustomer	0.217	0.200
NC_Solar_Customer_Chrome_002_EnterProjectID	0.170	0.249
NC_Solar_Customer_Chrome_003_FillDetails	0.030	0.030
NC_Solar_Customer_Chrome_004_FillAddressDetails	0.029	0.030
NC_Solar_Customer_Chrome_005_SelectAddressType	0.077	0.078
NC_Solar_Customer_Chrome_006_SelectHomeType	0.030	0.031
NC_Solar_Customer_Chrome_007_SelectRebateQuantity	0.031	0.029
NC_Solar_Customer_Chrome_008_SubmitRebate	1.199	1.296
NC_Solar_Installer_Chrome_000_Home	1.006	1.032
NC_Solar_Installer_Chrome_001_ChooseCustomer	0.207	0.202
NC_Solar_Installer_Chrome_002_EnterProjectID	0.259	0.249
NC_Solar_Installer_Chrome_003_FillDetails	0.029	0.030
NC_Solar_Installer_Chrome_004_FillAddressDetails	0.030	0.030
NC_Solar_Installer_Chrome_005_SelectAddressType	0.077	0.076
NC_Solar_Installer_Chrome_006_SelectHomeType	0.031	0.030

NC_Solar_Installer_Chrome_007_SelectRebateQuantity	0.029	0.030
NC_Solar_Installer_Chrome_008_SubmitRebate	0.998	0.996

IE Browser	Average	
Transaction Name	11/18/2020	11/25/2020
NC_Solar_Customer_IE_000_Home	2.163	2.343
NC_Solar_Customer_IE_001_ChooseCustomer	0.365	0.364
NC_Solar_Customer_IE_002_EnterProjectID	0.471	0.508
NC_Solar_Customer_IE_003_FillDetails	0.196	0.194
NC_Solar_Customer_IE_004_FillAddressDetails	0.167	0.183
NC_Solar_Customer_IE_005_SelectAddressType	0.093	0.102
NC_Solar_Customer_IE_006_SelectHomeType	0.113	0.149
NC_Solar_Customer_IE_007_SelectRebateQuantity	0.167	0.199
NC_Solar_Customer_IE_008_SubmitRebate	1.231	1.579
NC_Solar_Installer_IE_000_Home	2.109	2.368
NC_Solar_Installer_IE_001_ChooseCustomer	0.372	0.401
NC_Solar_Installer_IE_002_EnterProjectID	0.376	0.452
NC_Solar_Installer_IE_003_FillDetails	0.196	0.211
NC_Solar_Installer_IE_004_FillAddressDetails	0.170	0.176
NC_Solar_Installer_IE_005_SelectAddressType	0.097	0.099
NC_Solar_Installer_IE_006_SelectHomeType	0.122	0.114
NC_Solar_Installer_IE_007_SelectRebateQuantity	0.170	0.170
NC_Solar_Installer_IE_008_SubmitRebate	1.087	1.309

Business Process

Group Name	Script Name	Concurrent Vusers	% of Total Vusers	Transactions per Hour	Start Time	Think Time	Pacing	Browser Cache
nc_solar_customerqa_1120	NC_Solar_CustomerQA_1120_1	1520	91.7	191592	25/11/2020 10:08:21	Replay as recorded	Random intervals	
nc_solar_customerqa_1125	NC_Solar_CustomerQA_1125_1	60	3.6	35269.2	25/11/2020 10:08:21	Replay as recorded	Random intervals	
ncsolar_customer_tc_chromium_1120	NCSolar_Customer_TC_Chromium_1120_1	4	0.2	1771.2	25/11/2020 10:08:21		Random intervals	
ncsolar_customer_tc_ie_1120	NCSolar_Customer_TC_IE_1120_1	4	0.2	2073.6	25/11/2020 10:08:21		Random intervals	
ncsolar_installer_tc_chromium_1120	NCSolar_Installer_TC_Chromium_1120_1	4	0.2	1861.2	25/11/2020 10:08:21		Random intervals	
ncsolar_installer_tc_ie_1120	NCSolar_Installer_TC_IE_1120_1	4	0.2	0	25/11/2020 10:08:21		Random intervals	
ncsolar_installerqa_1120	NCSolar_InstallerQA_1120_1	64	3.9	2764.8	25/11/2020 10:08:21	Replay as recorded	Fixed intervals every 60.000 sec	
ncsolar_installerqa_1125	NCSolar_InstallerQA_1125_1	4	0.2	1764	25/11/2020 10:08:21	Replay as recorded	Random intervals	
	Total:	1664	100%					

Script: NC_Solar_CustomerQA_1120_1

Description:

#	Transaction
1	NCSolar_000_Home
2	NCSolarCustomer_001_EnterProjectID
3	NCSolarCustomer_002_SubmitSolarRebate

Script: NC_Solar_CustomerQA_1125_1

Description:

#	Transaction
1	NCSolar_000_Home
2	NCSolarCustomer_001_EnterProjectID
3	NCSolarCustomer_002_SubmitSolarRebate

Script: NCSolar_Customer_TC_Chromium_1120_1

Description:

#	Transaction
1	NC_Solar_Customer_Chrome_000_Home
2	NC_Solar_Customer_Chrome_001_ChooseCustomer
3	NC_Solar_Customer_Chrome_002_EnterProjectID
4	NC_Solar_Customer_Chrome_003_FillDetails
5	NC_Solar_Customer_Chrome_004_FillAddressDetails
6	NC_Solar_Customer_Chrome_005_SelectAddressType
7	NC_Solar_Customer_Chrome_006_SelectHomeType
8	NC_Solar_Customer_Chrome_007_SelectRebateQuantity
9	NC_Solar_Customer_Chrome_008_SubmitRebate

Script: NCSolar_Customer_TC_IE_1120_1

Description:

#	Transaction
1	NC_Solar_Customer_IE_000_Home
2	NC_Solar_Customer_IE_001_ChooseCustomer
3	NC_Solar_Customer_IE_002_EnterProjectID
4	NC_Solar_Customer_IE_003_FillDetails
5	NC_Solar_Customer_IE_004_FillAddressDetails
6	NC_Solar_Customer_IE_005_SelectAddressType
7	NC_Solar_Customer_IE_006_SelectHomeType
8	NC_Solar_Customer_IE_007_SelectRebateQuantity
9	NC_Solar_Customer_IE_008_SubmitRebate

Script: NCSolar_Installer_TC_Chromium_1120_1

Description:

#	Transaction
1	NC_Solar_Installer_Chrome_000_Home
2	NC_Solar_Installer_Chrome_001_ChooseCustomer
3	NC_Solar_Installer_Chrome_002_EnterProjectID
4	NC_Solar_Installer_Chrome_003_FillDetails
5	NC_Solar_Installer_Chrome_004_FillAddressDetails
6	NC_Solar_Installer_Chrome_005_SelectAddressType
7	NC_Solar_Installer_Chrome_006_SelectHomeType
8	NC_Solar_Installer_Chrome_007_SelectRebateQuantity
9	NC_Solar_Installer_Chrome_008_SubmitRebate

Script: NCSolar_InstallerQA_1120_1

Description:

#	Transaction
1	NCSolar_000_Home
2	NCSolarInstaller_001_EnterProjectID
3	NCSolarInstaller_002_SubmitSolarRequest

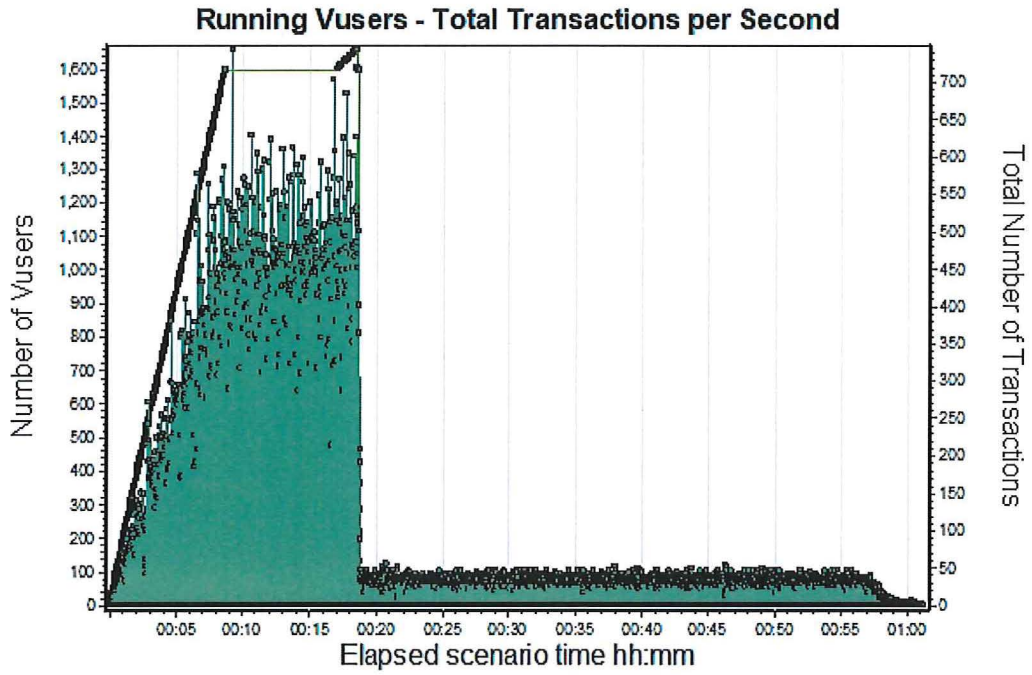
Script: NCSolar_InstallerQA_1125_1

Description:

#	Transaction
1	NCSolar_000_Home
2	NCSolarInstaller_001_EnterProjectID
3	NCSolarInstaller_002_SubmitSolarRequest

Workload Characteristics

Measurement	res2457.lrr
Max Running Vusers	1658
Average Hits per Second	371.1
Total Hits	1363921
Total Passed Transactions per Second	65.8
Total Passed Transactions per Minute	3950.5
Total Transactions Number	32



Color	Graph	Scale	Measurement	Graph's Minimum	Graph's Average	Graph's Maximum	Graph's Median	Graph's Std. Deviation
	Running Vusers	1	Run	0.000	428.232	1,658.000	745.000	521.078
	Total Transactions per Second	1	Fail	0.000	0.053	34.000	0.000	1.063

Color	Graph	Scale	Measurement	Graph's Minimum	Graph's Average	Graph's Maximum	Graph's Median	Graph's Std. Deviation
	Total Transactions per Second	1	Pass	0.000	65.842	744.000	0.000	140.068

Performance Overview

Measurement	Value
Run Name	res2457.lrr
Weighted Average of Transaction Response Time	0.5
Total Passed Transactions	241971
Total Failed Transactions	193
Transactions Success Rate, %	99.9
Total Errors per Second	0
Total Errors	139

HTTP Responses Summary

HTTP Response Name	Total	Per Second
HTTP_200	1363749	371.2
HTTP_502	139	0
HTTP_503	33	0

Transaction Summary

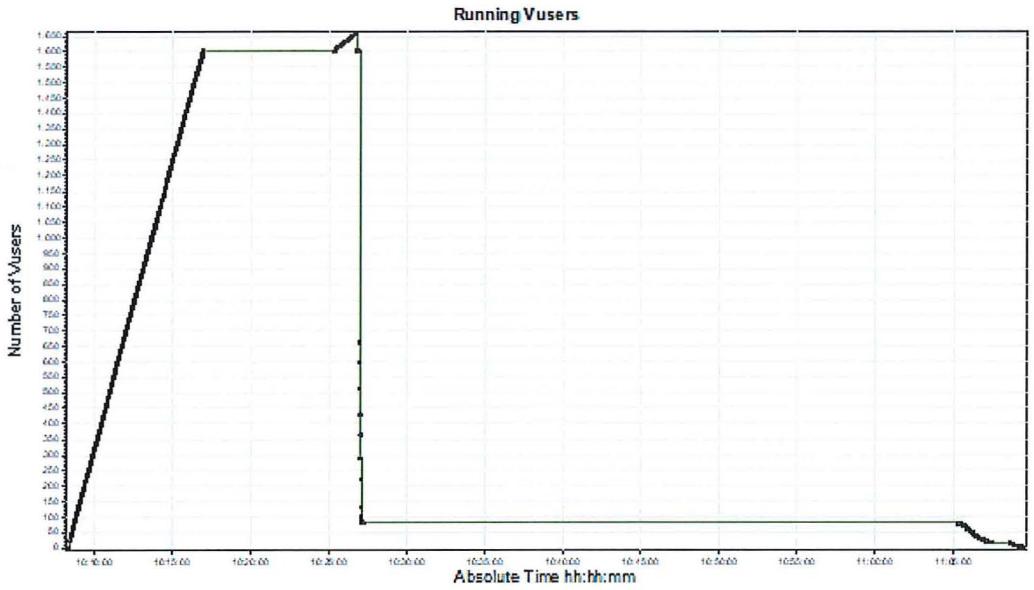
Filter Transaction End Status= (Pass)

Run Name	Transaction Name	Minimum	Average	Maximum	Std. Deviation	90%	Pass Count	Fail Count	Stop Count
res2457.lrr	NC_Solar_Customer_Chrome_000_Home	0.7	1.1	10.3	0.8	1.5	201	0	0
res2457.lrr	NC_Solar_Customer_Chrome_001_ChooseCustomer	0.1	0.2	0.3	0	0.2	201	0	0
res2457.lrr	NC_Solar_Customer_Chrome_002_EnterProjectID	0.2	0.2	3.4	0.2	0.2	201	0	0
res2457.lrr	NC_Solar_Customer_Chrome_003_FillDetails	0	0	0	0	0	201	0	0
res2457.lrr	NC_Solar_Customer_Chrome_004_FillAddressDetails	0	0	0	0	0	201	0	0
res2457.lrr	NC_Solar_Customer_Chrome_005_SelectAddressType	0.1	0.1	0.3	0	0.1	201	0	0
res2457.lrr	NC_Solar_Customer_Chrome_006_SelectHomeType	0	0	0.1	0	0	201	0	0
res2457.lrr	NC_Solar_Customer_Chrome_007_SelectRebateQuantity	0	0	0	0	0	201	0	0
res2457.lrr	NC_Solar_Customer_Chrome_008_SubmitRebate	0.9	1.3	3.8	0.5	1.8	201	0	0
res2457.lrr	NC_Solar_Customer_IE_000_Home	1.1	2.3	4.9	0.5	2.6	235	0	0
res2457.lrr	NC_Solar_Customer_IE_001_ChooseCustomer	0.3	0.4	0.5	0	0.4	235	0	0
res2457.lrr	NC_Solar_Customer_IE_002_EnterProjectID	0.3	0.5	2.1	0.2	0.6	235	0	0
res2457.lrr	NC_Solar_Customer_IE_003_FillDetails	0.1	0.2	0.3	0	0.2	235	0	0
res2457.lrr	NC_Solar_Customer_IE_004_FillAddressDetails	0.1	0.2	0.3	0	0.2	235	0	0
res2457.lrr	NC_Solar_Customer_IE_005_SelectAddressType	0.1	0.1	0.2	0	0.1	235	0	0
res2457.lrr	NC_Solar_Customer_IE_006_SelectHomeType	0.1	0.1	0.2	0	0.2	235	0	0
res2457.lrr	NC_Solar_Customer_IE_007_SelectRebateQuantity	0.1	0.2	0.3	0	0.2	235	0	0
res2457.lrr	NC_Solar_Customer_IE_008_SubmitRebate	1.1	1.6	10.2	0.9	2	235	0	0

Run Name	Transaction Name	Minimum	Average	Maximum	Std. Deviation	90%	Pass Count	Fail Count	Stop Count
res2457.lrr	NC_Solar_Installer_Chrome_000_Home	0.7	1	3.3	0.5	1.6	211	0	0
res2457.lrr	NC_Solar_Installer_Chrome_001_ChooseCustomer	0	0.2	0.2	0	0.2	211	0	0
res2457.lrr	NC_Solar_Installer_Chrome_002_EnterProjectID	0.2	0.2	2.5	0.3	0.3	211	0	0
res2457.lrr	NC_Solar_Installer_Chrome_003_FillDetails	0	0	0	0	0	211	0	0
res2457.lrr	NC_Solar_Installer_Chrome_004_FillAddressDetails	0	0	0.1	0	0	211	0	0
res2457.lrr	NC_Solar_Installer_Chrome_005_SelectAddressType	0.1	0.1	0.1	0	0.1	211	0	0
res2457.lrr	NC_Solar_Installer_Chrome_006_SelectHomeType	0	0	0	0	0	211	0	0
res2457.lrr	NC_Solar_Installer_Chrome_007_SelectRebateQuantity	0	0	0	0	0	211	0	0
res2457.lrr	NC_Solar_Installer_Chrome_008_SubmitRebate	0.7	1	5.4	0.5	1.2	211	0	0
res2457.lrr	NCSolar_000_Home	0.3	0.7	255.3	0.5	1.4	78809	0	0
res2457.lrr	NCSolarCustomer_001_EnterProjectID	0.1	0.3	11.9	0.2	0.4	77167	0	0
res2457.lrr	NCSolarCustomer_002_SubmitSolarRebate	0.7	1.3	16.5	0.4	1.6	77092	0	0
res2457.lrr	NCSolarInstaller_001_EnterProjectID	0.1	0.3	3.6	0.2	0.3	1540	0	0
res2457.lrr	NCSolarInstaller_002_SubmitSolarRequest	0.5	1	11.5	0.7	1.2	1540	0	0

Running Vusers

Title	Running Vusers
Current Results	G:\LRTests\2020\NC_Solar_Rebate\Results\20201125_stress\RawResults_2457\res2457.lrr
Filters	Vuser Status = (Run)(0 <= Scenario Elapsed Time) and (3673 >= Scenario Elapsed Time)
Group By	
Granularity	1 Second,

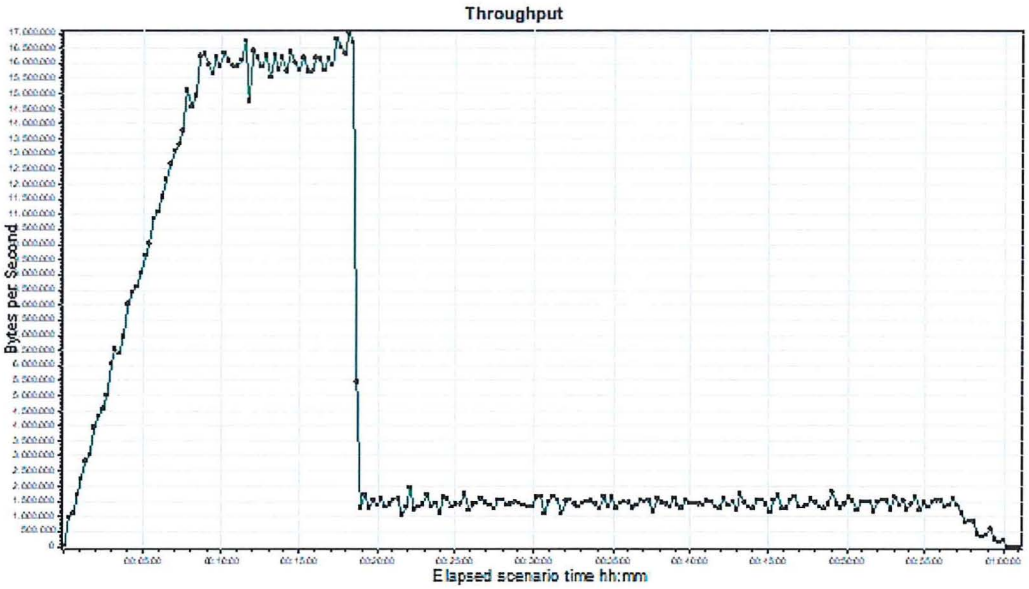


Color	Scale	Measurement	Graph Minimum	Graph Average	Graph Maximum	Graph Median	Graph Std. Deviation
	1	Run	0.000	428.349	1,658.000	749.000	520.595

Description: Displays the number of Vusers that executed Vuser scripts, and their status, during each second of a load test. This graph is useful for determining the Vuser load on your server at any given moment.

Throughput

Title	Throughput
Current Results	G:\LRTests\2020\NC_Solar_Rebate\Results\20201125_stress\RawResults_2457\res2457.lrr
Filters	(0 <= Scenario Elapsed Time) and (3673 >= Scenario Elapsed Time)
Group By	
Granularity	16 Seconds

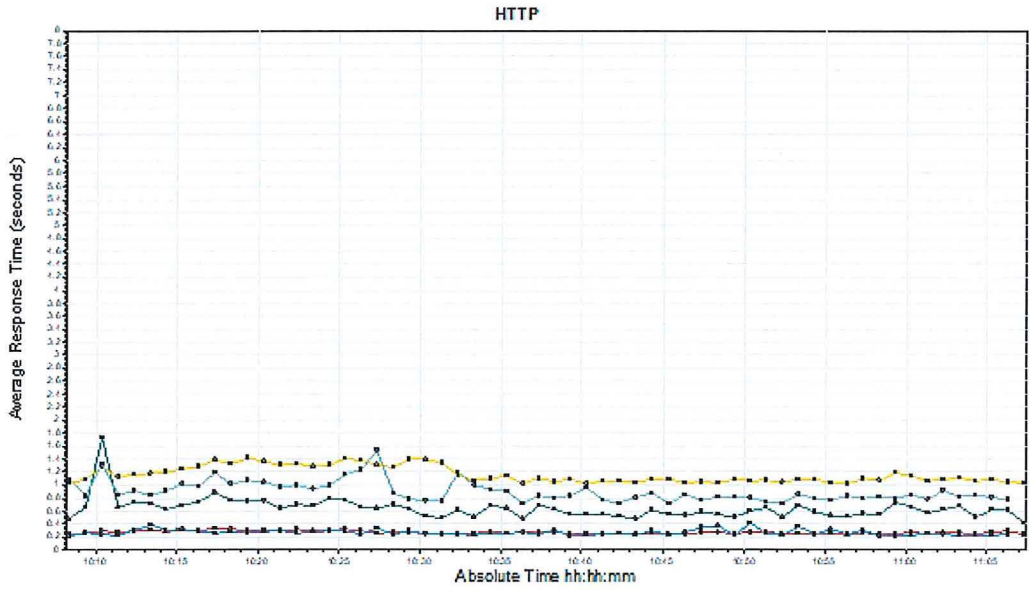


Color	Scale	Measurement	Graph Minimum	Average	Graph Maximum	Graph Median	Graph Std. Deviation
	1	Throughput	943.938	4,721,756.711	17,019,852.000	1,523,707.187	5,799,505.721

Description: Displays the amount of throughput (in bytes) on the Web server during the load test. Throughput represents the amount of data that the Vusers received from the server at any given second. This graph helps you to evaluate the amount of load Vusers generate, in terms of server throughput.

HTTP

Title	HTTP
Current Results	G:\LRTests\2020\NC_Solar_Rebate\Results\20201125_stress\RawResults_2457\res2457.lrr
Filters	(0 <= Scenario Elapsed Time) and (3673 >= Scenario Elapsed Time)Script Name = (NC_Solar_CustomerQA_1120_1, NC_Solar_CustomerQA_1125_1, NCSolar_InstallerQA_1120_1, NCSolar_InstallerQA_1125_1), Transaction End Status = (Pass), (do not Include Think Time)
Group By	
Granularity	60 Seconds,



Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	NCSolar_000_Home	0.352	0.720	9.342	0.528
	1	NCSolarCustomer_001_EnterProjectID	0.125	0.296	4.771	0.150
	1	NCSolarCustomer_002_SubmitSolarRebate	0.728	1.274	9.534	0.321
	1	NCSolarInstaller_001_EnterProjectID	0.123	0.274	3.609	0.207
	1	NCSolarInstaller_002_SubmitSolarRequest	0.544	0.956	11.489	0.607

Description: Displays the average time taken to perform transactions during each second of the load test. This graph helps you determine whether the performance of the server is within acceptable minimum and maximum transaction performance time ranges defined for your system.

Chome_Browser

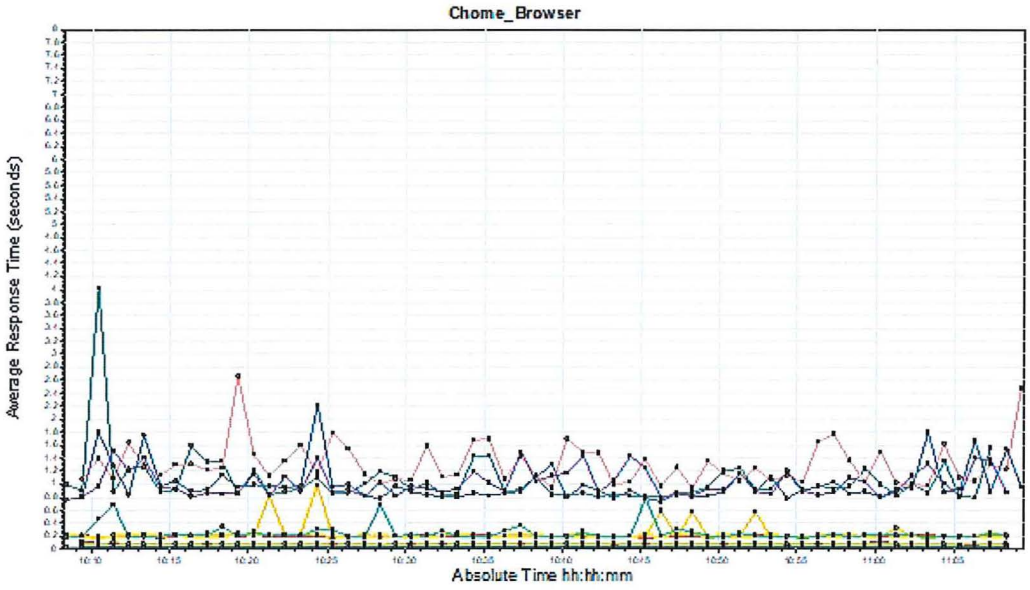
Title Chome_Browser

Current Results G:\LRTests\2020\NC_Solar_Rebate\Results\20201125_stress\RawResults_2457\res2457.lrr

Filters (0 <= Scenario Elapsed Time) and (3673 >= Scenario Elapsed Time)Script Name = (NCSolar_Customer_TC_Chromium_1120_1, NCSolar_Installer_TC_Chromium_1120_1), Transaction End Status = (Pass), (do not Include Think Time)

Group By

Granularity 60 Seconds,



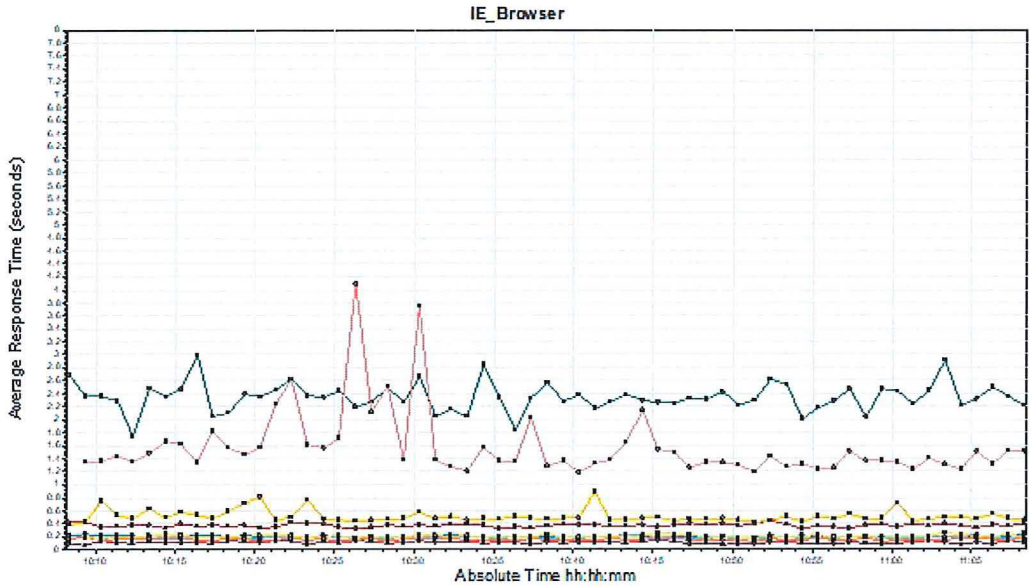
Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	NC_Solar_Customer_Chrome_000_Home	0.716	1.053	10.262	0.767
	1	NC_Solar_Customer_Chrome_001_ChooseCustomer	0.063	0.200	0.270	0.019
	1	NC_Solar_Customer_Chrome_002_EnterProjectID	0.166	0.249	1.789	0.257
	1	NC_Solar_Customer_Chrome_003_FillDetails	0.025	0.030	0.044	0.003
	1	NC_Solar_Customer_Chrome_004_FillAddressDetails	0.026	0.030	0.045	0.003
	1	NC_Solar_Customer_Chrome_005_SelectAddressType	0.068	0.078	0.266	0.016
	1	NC_Solar_Customer_Chrome_006_SelectHomeType	0.026	0.031	0.068	0.004
	1	NC_Solar_Customer_Chrome_007_SelectRebateQuantity	0.024	0.029	0.049	0.003
	1	NC_Solar_Customer_Chrome_008_SubmitRebate	0.857	1.296	3.835	0.507
	1	NC_Solar_Installer_Chrome_000_Home	0.706	1.032	3.299	0.453
	1	NC_Solar_Installer_Chrome_001_ChooseCustomer	0.049	0.202	0.243	0.020
	1	NC_Solar_Installer_Chrome_002_EnterProjectID	0.167	0.249	2.513	0.251
	1	NC_Solar_Installer_Chrome_003_FillDetails	0.023	0.030	0.048	0.004
	1	NC_Solar_Installer_Chrome_004_FillAddressDetails	0.024	0.030	0.053	0.003
	1	NC_Solar_Installer_Chrome_005_SelectAddressType	0.066	0.076	0.134	0.007

Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	NC_Solar_Installer_Chrome_006_SelectHomeType	0.024	0.030	0.045	0.003
	1	NC_Solar_Installer_Chrome_007_SelectRebateQuantity	0.024	0.030	0.044	0.003
	1	NC_Solar_Installer_Chrome_008_SubmitRebate	0.691	0.996	5.358	0.517

Description: Displays the average time taken to perform transactions during each second of the load test. This graph helps you determine whether the performance of the server is within acceptable minimum and maximum transaction performance time ranges defined for your system.

IE_Browser

Title	IE_Browser
Current Results	G:\LRTests\2020\NC_Solar_Rebate\Results\20201125_stress\RawResults_2457\res2457.lrr
Filters	(0 <= Scenario Elapsed Time) and (3673 >= Scenario Elapsed Time)Script Name = (NCSolar_Customer_TC_IE_1120_1, NCSolar_Installer_TC_IE_1120_1), Transaction End Status = (Pass), (do not Include Think Time)
Group By	
Granularity	60 Seconds,



Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	NC_Solar_Customer_IE_000_Home	1.119	2.343	4.903	0.448
	1	NC_Solar_Customer_IE_001_ChooseCustomer	0.287	0.364	0.500	0.038
	1	NC_Solar_Customer_IE_002_EnterProjectID	0.340	0.508	2.121	0.186
	1	NC_Solar_Customer_IE_003_FillDetails	0.146	0.194	0.301	0.025
	1	NC_Solar_Customer_IE_004_FillAddressDetails	0.133	0.183	0.280	0.027
	1	NC_Solar_Customer_IE_005_SelectAddressType	0.055	0.102	0.162	0.029
	1	NC_Solar_Customer_IE_006_SelectHomeType	0.085	0.149	0.212	0.026
	1	NC_Solar_Customer_IE_007_SelectRebateQuanti ty	0.116	0.199	0.294	0.031
	1	NC_Solar_Customer_IE_008_SubmitRebate	1.083	1.579	10.155	0.912

Description: Displays the average time taken to perform transactions during each second of the load test. This graph helps you determine whether the performance of the server is within acceptable minimum and maximum transaction performance time ranges defined for your system.

Terminology

LoadRunner Objects

Term	Definition
Vuser Scripts	A Vuser script describes the actions that a Vuser performs during the scenario. Each Vuser executes a Vuser script during a scenario run. The Vuser scripts include functions that measure and record the performance of your application components.
Load Test	Tests a system's ability to handle a heavy workload. A load test simulates multiple transactions or users interacting with the computer at the same time and provides reports on response times and system behavior.
Run-Time Settings	Run-Time settings allow you to customize the way a Vuser script is executed. You configure the run-time settings from the Controller or VuGen before running a scenario. You can view information about the Vuser groups and scripts that were run in each scenario, as well as the run-time settings for each script in a scenario, in the Scenario Run-Time Settings dialog box.
Scenario	A scenario defines the events that occur during each testing session. For example, a scenario defines and controls the number of users to emulate, the actions that they perform, and the machines on which they run their emulations.
Scheduler	The Schedule Builder allows you to set the time that the scenario will start running, the duration time of the scenario or of the Vuser groups within the scenario, and to gradually run and stop the Vusers within the scenario or within a Vuser group. It also allows you to set the load behavior of Vusers in a scenario.
Session	When you work with the Analysis utility, you work within a session. An Analysis session contains at least one set of scenario results (lrr file). The Analysis utility processes the scenario result information and generates graphs and reports. The Analysis stores the display information and layout settings for the active graphs in a file with an .lra extension. Each session has a session name, result file name, database name, directory path, and type.
Transactions	A transaction represents an action or a set of actions used to measure the performance of the server. You define transactions within your Vuser script by enclosing the appropriate sections of the script with start and end transaction statement.
Vusers	Vusers or virtual users are used by LoadRunner as a replacement for human users. When you run a scenario, Vusers emulate the actions of human users working with your application. A scenario can contain tens, hundreds, or even thousands of Vusers running concurrently on a single workstation.

Graph Information

Term	Definition
Average	Average value of the graph measurement's.
Hits	The number of HTTP requests made by Vusers to the Web server.
Maximum	Maximum value of the graph measurement's.
Measurement	This is the type of resource being monitored
Median	Middle value of the graph measurement's.
Minimum	Minimum value of the graph measurement's.
Network Delay	The time it takes for a packet of data sent across the network to go to the requested node and return.
Network Path	The Network Path is the route data travels between the source machine and the destination machine.
Response time	The time taken to perform a transaction.
Scale (or granularity)	In order to display all the measurements on a single graph, thus making the graphs easier to read and analyze, you can change the scale or (granularity) of the x-axis. You can either set measurement scales manually, view measurement trends for all measurements in the graph, or let Analysis scale them automatically. The Legend tab indicates the scale factor for each resource.
Standard Deviation (SD)	The square root of the arithmetic mean value of the squares of the deviations from the arithmetic mean.
Throughput	Throughput is measured in bytes and represents the amount of data that the Vusers received from the server.
Vuser Load	When you run a scenario, the Vusers generate load or stress on the server. LoadRunner monitors the effect of this load on the performance of your application.