Performance Benchmark for Microsoft Dynamics CRM Online 2016 Update 1

Microsoft Dynamics CRM

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Contents

This performance paper provides a benchmark for performance of a Dynamics CRM organization instance running Microsoft Dynamics CRM Online 2016 Update 1.

Applies to

- Microsoft Dynamics CRM Online 2016 Update 1 (Version 8.1)

Overview

Microsoft Dynamics CRM delivers intelligent customer engagement to the market, helping companies create customer experiences that are personalized, proactive, and predictive. Dynamics CRM provides data anywhere, across a wide array of devices, ranging from phones and tablets to PCs, and through a number of popular client types, such as smartphone apps, tablet apps, and Microsoft Dynamics CRM for Outlook. This paper highlights the scalability and performance that can be achieved in terms of concurrent users and feature functionality with the release of Dynamics CRM Online 2016 Update 1.

Objective

This white paper benchmarks the performance and demonstrates the scalability and performance of Dynamics CRM Online 2016 Update 1.

Results summary

Performance testing was conducted for an organization that was set up in a standard Dynamics CRM Online environment. The client PCs used in the test infrastructure were standard Microsoft Azure virtual machines. Testing was carried out to benchmark the performance of Dynamics CRM Online 2016 Update 1 serving 17,868 concurrent users, performing tasks with a think time of 10 minutes. In this environment, Dynamics CRM Online 2016 Update 1 demonstrated the following performance characteristics.

Concurrent Users[+]	Total Record Count	Web Requests per Hour	Average Page Response Time	Average Business Transaction Time	Business Transactions*
17K	656,549,587	594K	0.58 secs	0.91 secs	679,963

[+]17,868 users, each performing a business transaction once every 10 minutes.

*A business transaction is a full user scenario, which is simulated by the various steps in a test case. This test case is not a measure of system capacity or throughput, but reflects the total number of business transactions that completed successfully during the more than two-hour test run.

⊖ **Important**

These results reflect the scalability and performance achieved on a specific Microsoft Dynamics CRM Online 2016 Update 1 implementation running in a Dynamics CRM Online environment. Factors like specific customizations, solutions, and features imported by enterprise organizations, and geographic distribution of users can affect how enterprise organizations use the CRM system. Therefore, results will vary for each implementation.

This benchmark focuses on server-side performance and metrics. The response times reported here are for clients in a test environment, running Azure Virtual Machines. As a result, response times here are in no way indicative of exact client responsiveness that might be seen when rendering in a browser from a client located somewhere else.

Data load

User load was modeled to reproduce 15,040 concurrent users, in a model similar to an enterprise-class deployment of a Microsoft Dynamics CRM organization. The actual load generated was 17,868 users. The increase in the number of users occurred because some test cases executed on more than one virtual machine for the same virtual user.

The target load was determined after reviewing the baseline from previous releases and the capacity (memory, compute power) of the Dynamics CRM Online servers.

The organization database size was 1.024 TB.

Organization structure

To test the scale of a business unit (BU) defined security model, a complicated business unit hierarchy with 47 sectors (4 BUs per sector for a total of 188 BUs) was created. The depth of business units was set to four. To test the performance of a CRM system in a realistic manner, each of the business units was assigned users of different security roles. Nine security roles were selected for all users in the Dynamics CRM organization, of which eight were security roles that come "out-of-the-box" with Microsoft Dynamics CRM; one role, named Sales Associate, was a custom security role. The security roles were:

- System Administrator
- Sales Manager
- Marketing Manager
- Customer Service Representative Manager
- Scheduler
- Marketing Professional
- Salesperson
- Customer Service Representative
- Sales Associate

This diagram showcases the distribution of users and teams in each of the business units.
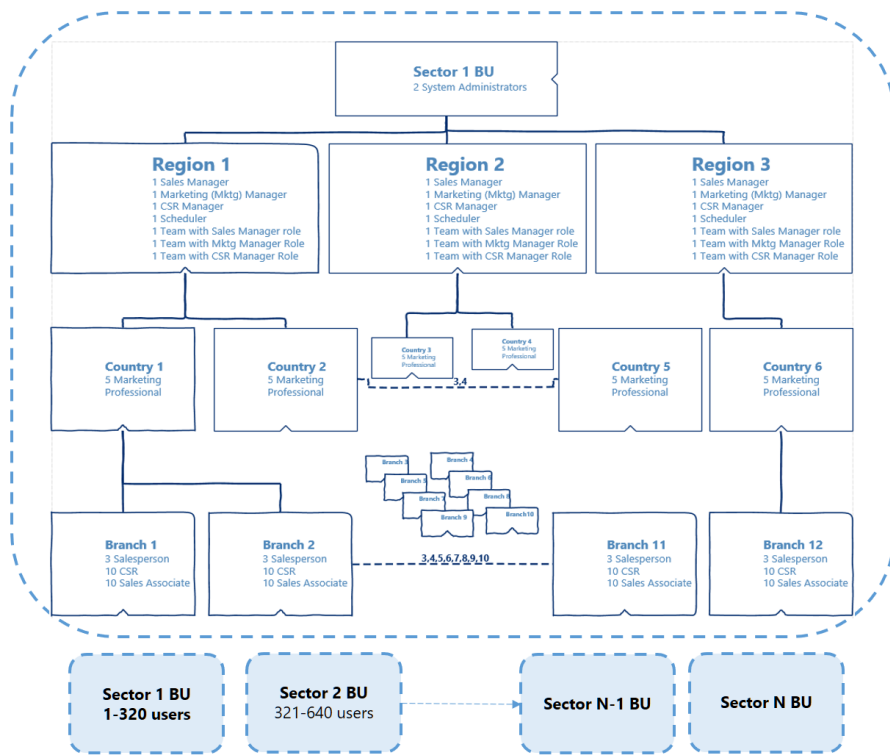
User Organization Structure

User Count in 1 Sector	320
System Administrator	2
Sales Managers	3
Marketing Managers	3
CSR Managers	3
Schedulers	3
Marketing Professionals	30
Salespersons	36
CSR	120
Sales Associates	120

In order to have incremental way of populating data, we will add more sector BU hierarchies to increase the size of the organization until we get the required size.

Customizations

To model a realistic enterprise, the organization was configured with four customizations. Commonly-used entities like account, contact, lead, and task were modeled with custom attributes. Field-level security was also enabled on custom attributes to reflect a realistic enterprise organization.

User data

Based on customer research, each user of a specific role was assigned a realistic set of data. The data that the user would own was based on the user's role. Before the test, the total data in the test database included more than 656,549,587 business records with a total database size of 1.024 TB.

This table provides a summary of the record count, which shows the top 51 entity tables by row count

Table Name	Row Count
ActivityPartyBase	184,652,344
PostRoleBase	83,441,322
ActivityPointerBase	59,481,420
PostBase	50,213,237
PostCommentBase	44,538,712
PostRegardingBase	26,455,649
AnnotationBase	25,710,513

TaskBase	24,108,341
LeadAddressBase	22,344,376
PrincipalObjectAccess	20,609,782
CustomerAddressBase	19,195,039
EmailSearchBase	18,896,180
ImageDescriptor	18,730,149
BusinessProcessFlowInstanceBase	15,536,906
LeadBase	11,172,188
IncidentBase	4,895,570
KnowledgeArticleBase	4,028,276
AccountBase	4,005,329
ContactBase	3,728,127
PostFollowBase	2,555,946
DocumentIndex	2,014,138
InvoiceBase	859,624
InvoiceDetailBase	859,540
SalesOrderDetailBase	856,622
SalesOrderBase	855,039
OpportunityBase	625,519
OpportunityProductBase	607,093
new_imBase	538,159
QuoteBase	532,208
PrincipalEntityMap	471,777
PrincipalAttributeAccessMap	447,886
QuoteDetailBase	402,299
ConnectionBase	393,280
ListMemberBase	365,361
SystemUserBusinessUnitEntityMap	258,718
ResourceGroupExpansionBase	188,446
ListBase	162,972
SystemUserPrincipals	157,415
MailboxBase	116,211
QueueMembership	93,409
UserEntityUISettingsBase	90,809
DependencyBase	87,522
QueueBase	84,208
RecurrenceRuleBase	82,180
CampaignBase	77,211

DependencyNodeBase	71,249
InternalAddressBase	68,144
CalendarBase	64,327
CalendarRuleBase	64,326
TeamMembership	61,406

Test environment configuration

Four test client PCs (virtual machines), hosted in Azure, were used to simulate concurrent user load. Here is an overview of the environment configuration.
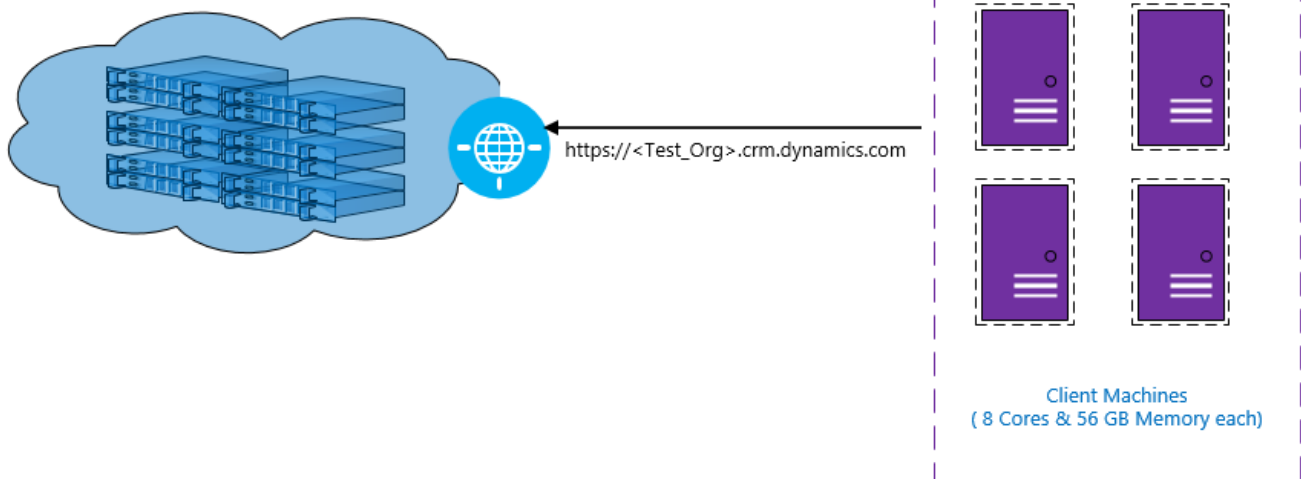
Testing method

Test scenarios were based on customer research and were created using the Microsoft Dynamics CRM Performance and Stress Toolkit (Performance Toolkit), which is designed to formalize performance testing of Microsoft Dynamics CRM by facilitating load testing of simulated customer environments.

Setup configuration

- A batch of 17,868 concurrent users performed create, update, and delete (CRUD) operations within Dynamics CRM Online.
- A warm-up time of 30 minutes was needed to get each client to load all the users.
- Performance data was captured every five seconds.

- A think time of 10 minutes was used per user to simulate a real-world scenario. Therefore, virtual users were running tests continuously with a lag time of 10 minutes between each test run.
- Every test run carried additional overhead of authenticating the virtual users before initiating the test run. The authentication was cached for subsequent test runs.
- A single virtual user performed all the test cases sequentially before moving to the next test run, repeating all the tests.
- Internet Explorer 11 was used to render the pages.

Tuning and optimizations

- Standard optimization techniques that are part of the Dynamics CRM Online optimization process, such as adding recommended indexes, were included with the Dynamics CRM Online organization used in this benchmark.

Test run details

Metric	Value
Duration	2 hours
Max User Load	17,868
Tests/Sec	26.72
Average Test Time	2.47 seconds (test included several pages, web test plugin executions, and an additional SQL Server connection to randomly select records)
Average Page Time	0.58 seconds
Total Records	656,549,587
Web Requests/Sec	165

Conclusion

The results reflect the scalability and performance achieved in a standard Dynamics CRM Online organization running Dynamics CRM Online 2016 Update 1. Actual performance observed by customers may vary based on factors like customizations, solutions, other features, geographic distribution of users, and network latency.

These results demonstrate the robustness of Dynamics CRM Online 2016 Update 1 and its capability to handle concurrent user activities with ease for enterprise CRM scenarios.