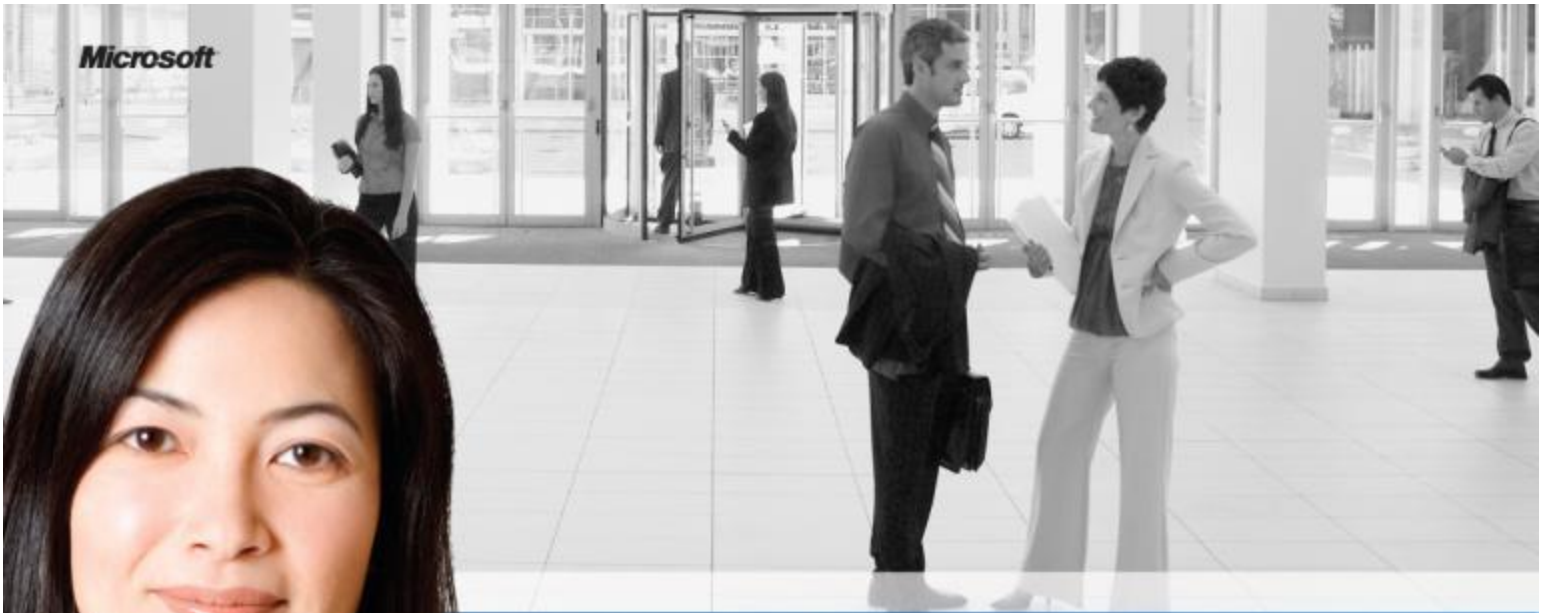


Microsoft



PERFORMANCE AND SCALABILITY

Bandwidth Utilization
Improvements

Microsoft Dynamics CRM 4.0

March 2008

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Bandwidth Utilization Improvements

Executive Summary

Microsoft Dynamics™ CRM business software is designed to help enterprise organizations achieve a 360-degree view of their customers across marketing, sales, and service. Engineered to deliver performance that meets the needs of the largest global deployments, Microsoft Dynamics CRM has been tested for user scalability, data scalability, and network performance. This white paper focuses on network scalability improvements.

Microsoft has made significant enhancements to the architecture of Microsoft Dynamics CRM 4.0 to improve network performance. Test results demonstrate network bandwidth utilization improvements of up to 94%. Improvements were evaluated in the number of round trips, bytes sent, and bytes received. Because the bandwidth utilization associated with a page can change after the first time the page is loaded, both initial (cold) and subsequent (warm) page loads were tested.

RESULTS SUMMARY

This table summarizes the findings from the network bandwidth utilization comparison:

Table 1: Benchmark Test Results Summary

| | Network Traffic Reduction | | | | | |
|----------------------|---------------------------|---------|--------------|------|------------------|------|
| | Round Trips* | | Bytes Sent** | | Bytes Received** | |
| | Cold*** | Warm*** | Cold | Warm | Cold | Warm |
| Homepage | 46% | 22% | 82% | 48% | 61% | 70% |
| Sales History Report | 8% | 40% | 33% | 48% | 42% | 63% |
| Lead Form | 29% | - | 80% | 61% | 59% | 74% |
| Contact Form | 27% | 33% | 81% | 61% | 64% | 76% |
| Marketing Tab | 50% | 33% | 84% | 59% | 73% | 73% |
| Campaign Form | 30% | 90% | 84% | 94% | 66% | 91% |
| Settings Tab | 41% | 17% | 81% | 56% | 52% | 49% |
| Advanced Find | 32% | 6% | 77% | 35% | 69% | 73% |

* % decrease in round trips = (CRM 3.0 round trips - CRM 4.0 round trips) / CRM 3.0 round trips * 100

** % decrease in bytes = (CRM 3.0 bytes - CRM 4.0 bytes) / CRM 3.0 bytes * 100

*** Cold = results during first load of page; warm = results during subsequent page loads

MICROSOFT
DYNAMICS CRM 4.0
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MICROSOFT
DYNAMICS CRM CAN
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GLOBAL ENTERPRISE
DEPLOYMENTS.

Overview

Microsoft Dynamics CRM 4.0 addresses the stringent requirements of the enterprise in the areas of performance and scalability, application flexibility, efficient manageability, and network configurability.

- **Performance and scalability:** Microsoft Dynamics CRM takes unique advantage of the Microsoft® Windows® operating system and Microsoft SQL Server® database platforms to provide enterprise levels of performance and scalability while keeping costs under control. Application tuning can be carried out using commonly-available skills and tools sets, and the application is designed for easy horizontal scaling through standard network load balancing methods.
- **Application flexibility:** Microsoft Dynamics CRM is engineered for change with point-and-click customization and a metadata-driven portable application model. The application is built on a highly flexible architecture based on industry standards such as Microsoft .NET, XML, and Web services.
- **Efficient manageability:** Microsoft Dynamics CRM helps improve application manageability through integration with enterprise systems management products such as Microsoft System Center Essentials. Multiple deployment models are available, including on-premise, hosted, and hybrid, and customers can change between deployment models seamlessly as their needs change.
- **Network configurability:** Microsoft Dynamics CRM 4.0 allows customers to provide a streamlined and high performance experience to users in global enterprise deployments. Microsoft Dynamics CRM components can be customized based on an organization's business model and bandwidth requirements to provide efficient bandwidth utilization for their environment.

Testing Methodology

The Microsoft team performed manual testing using 19 scenarios that represent a broad range of application functionality. The tests were run on the released versions of Microsoft Dynamics CRM 3.0 and Microsoft Dynamics CRM 4.0, and no customizations or optimizations were applied. The team used Fiddler, a network monitoring tool, to monitor network traffic and to capture traffic measurements for each page, measuring the amount of data that is sent and received.

Test scenarios were selected based on areas of the application that are heavily used across industries. Because the enhancements were made at the architecture level, similar levels of performance improvement can be expected in all areas of the application.

TUNING AND OPTIMIZATION

Both versions of the Microsoft Dynamics CRM application were installed without customizations or optimizations. Customers commonly optimize the application to deliver only the data that their users need to streamline the user experience and reduce the amount of data that is transferred. In these instances, customers may experience even greater improvements in network bandwidth utilization.

Test Results

The following tables show detailed results for the bandwidth utilization testing:

Table 2: Round trip bandwidth utilization comparison, cold

| | Round trips | | |
|----------------------|-------------|-----|---------------|
| | v3 | v4 | % improvement |
| Homepage | 221 | 120 | (46%) |
| OpenEmailForm | 148 | 101 | (32%) |
| ClickReports | 14 | 9 | (36%) |
| ClickSalesHistory | 104 | 67 | (36%) |
| ClickRunReport | 50 | 46 | (8%) |
| ClickOnSalesTab | 20 | 11 | (45%) |
| OpenLeadForm | 112 | 80 | (29%) |
| ClickOnContacts | 6 | 6 | -- |
| OpenContactForm | 124 | 90 | (27%) |
| ClickOnMarketingTab | 24 | 12 | (50%) |
| ClickOnCampaigns | 8 | 7 | (13%) |
| OpenCampaignForm | 86 | 60 | (30%) |
| ClickOnServiceTab | 80 | 52 | (35%) |
| ClickOnSettingsTab | 32 | 19 | (41%) |
| ClickOnSecurityRoles | 14 | 7 | (50%) |
| OpenSalesperson | 58 | 41 | (29%) |
| ClickOnAdvancedFind | 114 | 77 | (32%) |
| SelectContacts | 10 | 10 | -- |
| ClickFind | 18 | 9 | (50%) |

Table 3: Bytes sent bandwidth utilization comparison, cold

| | Bytes sent | | |
|----------------------|------------|-------|---------------|
| | v3 | v4 | % improvement |
| Homepage | 457321 | 83977 | (82%) |
| OpenEmailForm | 310774 | 61545 | (80%) |
| ClickReports | 29191 | 6934 | (76%) |
| ClickSalesHistory | 219774 | 46987 | (79%) |
| ClickRunReport | 98814 | 66655 | (33%) |
| ClickOnSalesTab | 41774 | 7705 | (82%) |
| OpenLeadForm | 234106 | 46823 | (80%) |
| ClickOnContacts | 12519 | 4022 | (68%) |
| OpenContactForm | 259422 | 50465 | (81%) |
| ClickOnMarketingTab | 50090 | 8047 | (84%) |
| ClickOnCampaigns | 16630 | 4325 | (74%) |
| OpenCampaignForm | 179685 | 28295 | (84%) |
| ClickOnServiceTab | 174892 | 42243 | (76%) |
| ClickOnSettingsTab | 66804 | 12375 | (81%) |
| ClickOnSecurityRoles | 29317 | 6280 | (79%) |
| OpenSalesperson | 120739 | 19890 | (84%) |
| ClickOnAdvancedFind | 247165 | 57829 | (77%) |
| SelectContacts | 27389 | 20379 | (26%) |
| ClickFind | 40789 | 7728 | (81%) |

Table 4: Bytes received bandwidth utilization comparison, cold

| | Bytes received | | % improvement |
|----------------------|----------------|--------|---------------|
| | v3 | v4 | |
| Homepage | 713030 | 277312 | (61%) |
| OpenEmailForm | 474013 | 166089 | (65%) |
| ClickReports | 51848 | 25995 | (50%) |
| ClickSalesHistory | 486243 | 152325 | (69%) |
| ClickRunReport | 201519 | 117751 | (42%) |
| ClickOnSalesTab | 81489 | 23239 | (71%) |
| OpenLeadForm | 409807 | 169077 | (59%) |
| ClickOnContacts | 59913 | 17132 | (71%) |
| OpenContactForm | 443495 | 157810 | (64%) |
| ClickOnMarketingTab | 86161 | 23371 | (73%) |
| ClickOnCampaigns | 51140 | 15114 | (70%) |
| OpenCampaignForm | 321820 | 108928 | (66%) |
| ClickOnServiceTab | 278223 | 119535 | (57%) |
| ClickOnSettingsTab | 75608 | 36005 | (52%) |
| ClickOnSecurityRoles | 41262 | 14543 | (65%) |
| OpenSalesperson | 238415 | 102214 | (57%) |
| ClickOnAdvancedFind | 515208 | 160251 | (69%) |
| SelectContacts | 41171 | 10793 | (74%) |
| ClickFind | 67673 | 17221 | (75%) |

Table 5: Round trip bandwidth utilization comparison, warm

| | Round trips | | % improvement |
|----------------------|-------------|----|---------------|
| | v3 | v4 | |
| Homepage | 18 | 14 | (22%) |
| OpenEmailForm | 4 | 6 | 50% |
| ClickReports | 2 | 3 | 50% |
| ClickSalesHistory | 14 | 10 | (29%) |
| ClickRunReport | 20 | 12 | (40%) |
| ClickOnSalesTab | 4 | 4 | -- |
| OpenLeadForm | 6 | 4 | (33%) |
| ClickOnContacts | 2 | 4 | 100% |
| OpenContactForm | 6 | 4 | (33%) |
| ClickOnMarketingTab | 6 | 4 | (33%) |
| ClickOnCampaigns | 8 | 3 | (63%) |
| OpenCampaignForm | 42 | 4 | (90%) |
| ClickOnServiceTab | 6 | 10 | 67% |
| ClickOnSettingsTab | 6 | 5 | (17%) |
| ClickOnSecurityRoles | 4 | 4 | -- |
| OpenSalesperson | 2 | 2 | -- |
| ClickOnAdvancedFind | 18 | 17 | (6%) |
| SelectContacts | 10 | 10 | -- |
| ClickFind | 4 | 2 | (50%) |

Table 6: Bytes sent bandwidth utilization comparison, warm

| | Bytes sent | | % improvement |
|----------------------|------------|-------|---------------|
| | v3 | v4 | |
| Homepage | 34656 | 17953 | (48%) |
| OpenEmailForm | 8582 | 7957 | (7%) |
| ClickReports | 4239 | 2993 | (29%) |
| ClickSalesHistory | 32997 | 17149 | (48%) |
| ClickRunReport | 41565 | 21558 | (48%) |
| ClickOnSalesTab | 8586 | 5290 | (38%) |
| OpenLeadForm | 12907 | 5092 | (61%) |
| ClickOnContacts | 4233 | 5170 | 22% |
| OpenContactForm | 12907 | 5092 | (61%) |
| ClickOnMarketingTab | 12743 | 5288 | (59%) |
| ClickOnCampaigns | 16630 | 2963 | (82%) |
| OpenCampaignForm | 88407 | 5094 | (94%) |
| ClickOnServiceTab | 13497 | 17825 | 32% |
| ClickOnSettingsTab | 12759 | 5647 | (56%) |
| ClickOnSecurityRoles | 8518 | 5222 | (39%) |
| OpenSalesperson | 4123 | 2439 | (41%) |
| ClickOnAdvancedFind | 46795 | 30644 | (35%) |
| SelectContacts | 27389 | 20379 | (26%) |
| ClickFind | 10644 | 4849 | (54%) |

Table 7: Bytes received bandwidth utilization comparison, warm

| | Bytes received | | % improvement |
|----------------------|----------------|-------|---------------|
| | v3 | v4 | |
| Homepage | 136503 | 40817 | (70%) |
| OpenEmailForm | 68673 | 20123 | (71%) |
| ClickReports | 33287 | 10491 | (68%) |
| ClickSalesHistory | 64543 | 17811 | (72%) |
| ClickRunReport | 97116 | 35780 | (63%) |
| ClickOnSalesTab | 54693 | 15502 | (72%) |
| OpenLeadForm | 70040 | 17920 | (74%) |
| ClickOnContacts | 52963 | 25212 | (52%) |
| OpenContactForm | 86633 | 21068 | (76%) |
| ClickOnMarketingTab | 56870 | 15356 | (73%) |
| ClickOnCampaigns | 51140 | 10521 | (79%) |
| OpenCampaignForm | 158419 | 14583 | (91%) |
| ClickOnServiceTab | 85853 | 26638 | (69%) |
| ClickOnSettingsTab | 19983 | 10117 | (49%) |
| ClickOnSecurityRoles | 26077 | 11488 | (56%) |
| OpenSalesperson | 83627 | 29807 | (64%) |
| ClickOnAdvancedFind | 91056 | 24613 | (73%) |
| SelectContacts | 41171 | 10793 | (74%) |
| ClickFind | 43353 | 10352 | (76%) |

IN ITS CONTINUING
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IMPROVE NETWORK
PERFORMANCE
ACROSS THE
APPLICATION.

Conclusion

In its continuing commitment to supporting global enterprises, Microsoft has made significant investments to improve network performance across the application. Global organizations must deliver CRM applications over network links of varying capability, and Microsoft Dynamics CRM made architectural changes to improve network performance across all areas of the application. Microsoft Dynamics CRM can be easily optimized to deliver only the data that each user group needs, reducing network traffic while providing a more streamlined experience for users. The performance improvements demonstrated by the testing show that Microsoft Dynamics CRM can scale to meet the needs of dynamic and geographically dispersed business environments.

Resources

Resources related to Microsoft Dynamics CRM 4.0 in the enterprise:

- [Microsoft Dynamics CRM User Scalability for the Enterprise white paper](#)
- [Microsoft Dynamics CRM Bandwidth Utilization Improvements white paper](#)
- [Microsoft Dynamics CRM Database Scalability for the Enterprise white paper](#)
- [Microsoft Dynamics CRM Tuning and Optimization white paper](#)
- [Microsoft Dynamics CRM Performance and Scalability Toolkit](#)
- [Microsoft Dynamics CRM in the Enterprise brochure](#)
- [Microsoft Dynamics CRM Web Site](#)

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