



An Oracle Best Practice Guide
April 2012

Best Practices for Measuring the Return on Investment of Online Communities

Introduction	1
Challenges in Measuring Return on Investment	2
Best Practices: ROI Methodology	3
ROI Use Cases	3
Service-and-Support Use Cases	4
Call/E-Mail Deflection	4
Knowledgebase Ownership	7
Insights and Innovation Use Cases	8
Research	8
Incremental Improvement	9
Time to Market	10
Loyalty Use Cases.....	10
Customer Satisfaction	10
Customer Loyalty/Brand Affinity.....	11
Awareness Use Cases	12
SEO Lift.....	12
Reach.....	13
Lead Generation (Business to Business).....	13
Brand/PR Management	14
Commerce Use Cases	14
Advertising.....	14
Subscriptions.....	15
Sales	15
Conclusion	16

Introduction

This best practice guide for measuring the ROI of online communities provides a method you can use to assess your community's effectiveness. Your online community is part of your business. Your company's social experience depends on user-generated content, but you still own the social component of your brand. It's important to learn how to effectively define and measure your community's ROI.

Intended for Oracle RightNow Social Experience customers, this paper will help you devise a framework for measuring the business value of your online communities. It offers an ROI method derived from real community experience, and it discusses best practices for setting attainable and measurable community goals. It also presents a methodology for getting business results and quantifiable ROI from Oracle RightNow Support Community Cloud Service and Oracle RightNow Innovation Community Cloud Service on the Oracle RightNow Social Experience platform, addressing business goals and strategy, success metrics, and methods of ensuring that the community delivers the desired business results.

Challenges in Measuring Return on Investment

The ideal is to be able to determine quantifiable business results that are directly attributable to the community. In reality, this is a challenging task, for several reasons:

- **Planning and preparation.** Failure to set realistic and attainable business objectives at the start of the project makes it difficult to know what to measure.
- **Data from multiple sources.** Calculating ROI depends on combining data from multiple sources. Some metrics (such as the number of answers marked as best answers during a given period of time) come directly from the community database, whereas others (such as the month-over-month change in call center incidents) come from the company's contact center database. Other datasources, such as third-party analytics systems, may also be in the mix, adding to the complexity.
- **Attribution.** Cause and effect may not always be clear. A change in metrics is often due to a variety of factors. If a company measures a decrease in call center volume, for example, it may be due to the launch of a peer-to-peer community (or the introduction of a new application within an existing community), seasonal variations, the release of a product fix, or something else. When calculating the ROI from the community, it is important to take these other factors into consideration. Connecting the dots when it comes to innovation communities, in particular, is less clear than with other types of communities throughout the industry.
- **Client responsibilities.** Because determining ROI requires accessing data sets and information inside the client's organization, the success of ROI calculations ultimately depends on the actions taken by the community's business sponsor and the community team. For example, although user-generated content, ideas, and insights originate in the community, their destinations are the various business units within the company that can benefit from this information. Measuring the effect that product ideas have on a company's release cycle, for example, falls to the community's business sponsor and that person's ability to track down relevant internal data wherever it may lie. Through community analytics, the Oracle customer success manager can help the business sponsor measure the number of submitted ideas, the number of ideas ranked above a certain threshold, and so on, but these are not business metrics. Only by working with the internal teams that are on the receiving end of these ideas, in whatever business unit they may sit, can you determine the business benefits.

Meeting these challenges requires

- **Attention from the business sponsor.** Because determining community ROI depends so much on data and effort on the client side, it is important for the business sponsor to be deeply involved in the ROI effort.
- **Iteration.** The work is only beginning when the community launches. The weeks and months after launch are when the hypotheses and benchmarks should be tested. Determining community ROI is an iterative process in which metrics are compiled and analyzed and hypotheses and assumptions are evaluated and adjusted over time.
- **Anecdotal information (customer stories).** Qualitative information has value too. Customer stories don't provide qualitative data to measure against business goals, but they can emphasize

factors that are contributing to the success of the business. Quotes pulled from community conversations can illustrate customer satisfaction and loyalty, for example, in ways that raw numbers cannot.

Best Practices: ROI Methodology

Many things in an online community can be measured. ROI methodology focuses on measuring items that can be directly or indirectly connected to the business goals they define for the community. The following methodology is an iterative process that can help community sponsors measure the impact the community has on things that matter to the business:

- **Identify business goals.** Are you looking to reduce the cost of customer service and support? Is one of your goals to increase customer satisfaction? Are you trying to generate awareness of new products and services? This is the starting point not only for determining ROI but also for developing and deploying the community itself.
- **Select ROI use cases.** Focus and pragmatism are important here. Online communities can have a large impact on the business, but they can't do everything. It is advisable, then, to choose only two to four use cases.
- **Define success metrics.** If you want to reduce service-and-support costs, what range of cost reduction would you consider successful: 5 percent, 25 percent? Defining realistic success metrics puts a tangible objective in place.
- **Track, measure, correlate, and adjust.** These are the iterative steps that occur after the community launches, once real-world data—from both the community side and the business side (as laid out below)—is available for analysis.

ROI Use Cases

Table 1 shows the five primary business goals of sponsors of service-and-support and innovation communities, with a listing of several common and relevant ROI use cases for each.

TABLE 1. ONLINE COMMUNITY BUSINESS GOALS AND ROI USE CASES

BUSINESS GOALS	ROI USE CASES
Service and Support	<p>Call deflection. Gaining cost savings from all forms of contact center incident avoidance and reduction, including telephone calls, e-mails, and chat sessions</p> <p>Knowledgebase ownership. Improving the quality while decreasing the cost of building and maintaining support knowledgebases</p>
Insights and Innovation	<p>Research. Leveraging consumer/customer insights; performing low-cost market and product research</p> <p>Incremental improvement. Creating a pipeline for ongoing customer input</p> <p>Time to market. Decreasing time to market through customer input</p>

Loyalty	<p>Customer satisfaction. Increasing customer satisfaction</p> <p>Customer loyalty/brand affinity. Increasing lifetime customer value, share of wallet, brand identification</p>
Awareness	<p>Search engine optimization (SEO) lift. Achieving improved ranking on search engine results pages</p> <p>Reach. Seeing an increase in word of mouth and viral marketing</p> <p>Lead generation (business to business). Having more prospects in the customer pipeline</p> <p>Brand/public relations management. Decreasing lead time in identifying potential brand and PR problems</p>
Commerce	<p>Advertising. Gaining revenue from advertising within the community</p> <p>Subscriptions. Lining up subscription sales for community access or other properties, with the community as a feeder</p> <p>Sales. Seeing higher revenues from direct and indirect sales, including user cross-sell and up-sell</p>

Service-and-Support Use Cases

The community can streamline service and support. Questions answered within community resources reduce the need for contact center action and, if formalized, provide built-in knowledgebases.

Call/Email Deflection

Call/email deflection from an online community is similar to that from Web-based customer self-service. The reasoning is that questions that might have generated a contact center incident are instead answered within the community, through discussion forums, question and answer pairs, and community resources.

Several methods for determining deflection are discussed here. Be sure to test out all the methods with several different clients to determine which are most relevant to the Oracle RightNow Social Experience platform and give the most-accurate results.

Community-Side Metrics

(Metric) x (Multiplier) = # Deflections

(# Deflections) x (Cost/Incident) = Cost Savings from Deflections

Best Answer (BA)

Metric: Best answer

Formula: (# BA) x (BA Multiplier) = # Deflections from Best Answers Benchmark: Best Answers Multiplier = 1

Rationale: Best answers, whether marked as such by the poster of the original question or by a community moderator, administrator, or other officially designated person, are posts that have been deemed to have correctly answered the question. There is a very high likelihood that the person who posted the original question will not create an incident for the contact center.

Example: In a given month, there were 64 answers marked as best answers. The average cost per incident is \$10.

Using the formulas above, for that month ...

$(64) \times (1) = 64$ Deflections due to Best Answers

$(64 \text{ Deflections}) \times (\$10/\text{Call}) = \$640$ saved in deflected calls

Views of Best Answers (BA Views)

Metric: Page views of best answers

Formula: $(\# \text{ BA Views}) \times (\text{BA Views Multiplier}) = \# \text{ Deflections from Best Answer Views}$

Benchmark: BA Views Multiplier ranges from 0.1 (10 percent) to 0.3 (30 percent).

Rationale: Not every time a best answer is viewed is a call to the contact center averted. But some of the time, people who read a best answer will find their answer there instead of making a call.

Example: In a given month, there were 1,243 views of answers marked as best answers.

The average cost per incident is \$10.

Using the formulas above, taking the conservative 10 percent multiplier, for that month ...

$(1,243) \times (0.1) = 124$ Deflections due to Views of Best Answers

$(124 \text{ Deflections}) \times (\$10/\text{Deflection}) = \$1,240$ saved in deflected calls

Views of Community Resources (Resource Views)

Metric: Page views of Community Resources

Formula: $(\# \text{ Resource Views}) \times (\text{Resource Views Multiplier}) = \# \text{ Deflections from Resources}$

Benchmark: Resource Views Multiplier ranges from 0.1 (10 percent) to 0.3 (30 percent).

Rationale: Not every time a resource is viewed is a call to the contact center averted. But some of the time, people who read a community resource will find their answer there instead of making a call.

Example: In a given month, there were 519 views of community resources.

The average cost per incident is \$10.

Using the formulas above, taking the conservative 10 percent multiplier, for that month ...

$(519) \times (0.1) = 51.9$ Deflections due to Views of Resources

$(51.9 \text{ Deflections}) \times (\$10/\text{Deflection}) = \519 saved in deflected calls

Note: Resources' impact on deflection depends greatly on the specific use within the community of this application. In some communities, resources are an important component in the overall service-and-support strategy and will therefore have a large impact on call deflection. In other communities, resources may not be geared toward providing service-and-support solutions and may therefore have

limited or no bearing on deflections. Depending on the community, then, resource views may not factor into deflections at all (that is, the multiplier becomes 0).

Examples of resources:

- User guides
- Tutorials

Other Service-and-Support Metrics

Depending on the community, there may be other activities that cause call center deflections. For these cases, the same general formula given above applies:

(Metric) x (Multiplier) = # Deflections

The challenge here is to estimate the multiplier for each case.

Among the other service-and-support metrics that may be tied to call deflection:

- Number of posts and comments in particular discussion forums
- Number of questions and answers (even answers not specifically marked as best answers) in particular Q&A areas
- Page views of particular forums
- Page views of particular Q&A areas
- Number of downloads of particular content

Deflections via Surveys

Metric: Success Rate (from surveys)

Formula: (# User Sessions) x (Success Rate) = Deflections Benchmark: N/A

Rationale: This technique, based on asking users on a limited and random basis (through surveys) if they found the information/solution they were looking for in the community, ascertains the number of deflections. The number of positive responses compared to the total number of surveys given is the success rate.

Example: In a given month, random surveys of users gave a success rate of 5 percent (that is, 5 percent of the users surveyed said that their problem was solved).

During this period, there were 10,000 sessions. Using the formulas above, for that month ...

$(10,000) \times (0.05) = 500$ Deflections

Note: This method typically undercounts the number of successful visits, because most users do not complete the survey (so, therefore, many successful sessions do not factor into the equation). There is, therefore, typically a high confidence level in the determination of the success rate. Because there is not always as high a level of confidence in the number of sessions, some adjustment/normalization may be required.

Business-Side Metrics

A correlation between data on the community side and data on the business side is expected. If, for example, the community-side calculations show that there were 500 deflected calls during a given month, the business-side metrics should show similar results.

- **Call center incidents.** The number of call center incidents can be measured on the call center side. When other factors are taken into consideration (see below), a decrease in incidents seen from the call center side can be tied back to the number of deflections seen from the community side.

It is likely that the first time the community- and business-side analysis is performed, there will not be exact agreement on the number of deflections. This is where the correlation part comes into play. The multipliers in the community-side calculations can then be adjusted to make the results align. In this way, these multipliers, and the equations in which they appear, will be based on real business data, as opposed to estimates.

The number of call center incidents should be normalized, so that any change in call volume can be attributed to the community. The following items might be taken into consideration during the analysis:

- Seasonal variations
 - Important industry or corporate news
 - Product releases
 - Website/technology upgrades
 - Local and global technical problems (on the internet, with internal systems, due to data anomalies, and so on)
 - In-person and virtual events (such as customer conferences)
- **Agent hours.** A reduction in the number of contact center incidents will likely result in a corresponding change in the number of agent hours over a given period of time.
 - **First-contact resolution.**

Knowledgebase Ownership

Content created within the community can stream into formalized knowledgebases, helping reduce cost and improve knowledgebase quality.

Community-Side Metrics

Community-side metrics for knowledgebase ownership include

- The number of user-generated resources
- The number of user-generated resources ranked above a particular threshold, such as the highest-ranked user-generated resources

Business-Side Metrics

Business-side metrics for knowledgebase ownership include

- **Cost of authorship.** Customer-facing knowledgebases take dollars and resources to build and maintain. Feeding user-generated content—perhaps through discussions or resources—into the knowledgebase workflow can reduce the cost of authorship.
 - The number of new knowledgebase articles that come directly from user-generated content (for example, “We see an average of 27 new articles per month as the result of community input.”)
 - The number of existing knowledgebase articles that have been modified due to user input
 - The time saved in the development and editing of such content
 - The cost savings due to time saved
- **Quality of knowledgebase.** No knowledgebase is perfect. Quality can be improved by filling in gaps (increasing knowledgebase breadth), keeping it up to date with solutions to the most-recent customer problems, and making existing content better.
- **Agent productivity.** One result of improving the quality and breadth of the knowledgebase is that contact center agents have not only better content to work with but also have content that is more and more up to date.

Insights and Innovation Use Cases

The ways ROI can be calculated from the use cases discussed here depend a lot on the ability of the business sponsor, the community manager, and others to track down necessary data from other business units and data repositories. The community-side metrics can speak to participation—sometimes a very high degree of participation (hundreds or thousands of ideas)—but these raw numbers don’t have an impact on the client’s bottom line; actions taken based on these ideas do.

Research

Online communities can feed into a variety of initiatives that require or benefit from customer input. These include market research, marketing communications feedback, concept testing, input into product and service development and delivery, voice of the customer (VoC) programs, and so on.

Other forms of VoC input can cost more and take longer to prepare than online communities. Focus groups typically take weeks or months to plan, prepare, and assemble; tapping into members of an existing community, on the other hand, can be done in days, allowing for more-frequent interaction and more-timely feedback.

Community-Side Metrics

The community-side metrics can include

- Number of ideas, feature requests, and so on

- Number of ideas (feature requests and so on) above a certain threshold (highly rated ideas, feature requests, and the like)
- Qualitative input
- Results from surveys, questionnaires, and polls

Business-Side Metrics

The business-side metrics can include

- Number of ideas that validated existing plans and decisions
- Number of ideas that were implemented
- Cost savings (how much less expensive is the same level and quality of customer input acquired through the community than through other customer research channels such as focus groups, surveys, and questionnaires?)
- Shorter feedback loop (how much more quickly is the same level of customer input acquired than through other channels such as focus groups, surveys, and questionnaires?)
- Process improvements that can be attributed to community insights and ideas

Incremental Improvement

The most common application of incremental improvement within online communities is software bug fixes. For a variety of factors (customer satisfaction, impact on the call center, word of mouth, and sales), it is important for companies to identify actual bugs as quickly as possible, so the engineering team can create and deploy a fix. The use case here is based on the ability of the community to identify and validate software bugs more quickly than would be the case through other channels.

Community-Side Metrics

The community-side metrics can include

- Number of reported bugs
- Number of validated bugs
- Number of users who claim to have the bug

Business-Side Metrics

The business-side metrics can include

- Time between product release and awareness of the bug (versus through other channels)
- Time to resolution
- Cost savings from decrease in time to resolution

Time to Market

Products and services whose development included customer input—ideas, or affirmation and validation of features—are often brought to market faster, because of the high confidence level such input provides.

Community-Side Metrics

The community-side metrics for time to market include

- Number of ideas
- Number of ideas above a certain threshold (highly rated ideas)
- Number of ideas with the most comments

Business-Side Metrics:

The business-side metrics for time to market include

- Number of user-generated ideas that validate existing ideas and/or direction
- Number of user-generated ideas that are implemented
- Change in time to market due to customer input and prioritization (such as modifying or affirming a course of action)

Loyalty Use Cases

Several studies have shown that members of customer communities—individuals who have made the effort to register and participate, even to a small degree—are more loyal and have a deeper connection to the sponsoring company and its brand than do nonmembers. They tend to purchase more over time and recommend the company and its products and services to others, and they are less likely to defect to competitors.

Customer Satisfaction

Because they can amplify the voice of the customer, provide an additional (and often effective) service-and-support channel, and highlight the insights and expertise of members, online communities can have a positive effect on customer satisfaction.

By dint of their participation in the community, community members may already be more satisfied than most customers. It is important, then, when ascertaining the impact the community has on customer satisfaction, to take into account this potential pre-existing bias. As discussed above, it can be challenging to determine cause and affect. The analysis needs to answer the following question satisfactorily: if it is shown that community members have a higher level of customer satisfaction than noncommunity members, is that because the community has improved their level of satisfaction or because people who join such communities tend to be more satisfied customers in any case?

What is to be measured here is the change in customer satisfaction (ideally, of course, an increase in customer satisfaction) due to the presence and operation of the community. It is left to the business to calculate the effect on ROI of this change. Businesses for which customer satisfaction is a key performance indicator (KPI) have this data on hand.

Community-Side Metrics

The community-side metrics for customer satisfaction include

- Time on site
- Repeat visits
- Results from community polls
- Results from surveys or questionnaires presented to community members (or select groups of members)
- Response to calls to action
- Sentiment analysis from the SmartSense feature of Oracle RightNow CX Cloud Service (available with integration into Oracle RightNow Social Experience)
- Customer quotations (qualitative)

Business-Side Metrics

The business-side metrics for customer satisfaction include

- Results from feedback methods such as surveys and questionnaires
- Results from feedback management systems such as MarketTools CustomerSat
- Sentiment analysis from third-party systems
- ROI impact of increase in customer satisfaction

Customer Loyalty/Brand Affinity

Different organizations measure loyalty and affinity in different ways. Qualitative and quantitative information can come from the community side, but the best route to measuring ROI is to use metrics, systems, and processes the client already uses for determining loyalty and affinity. This is most commonly done via the Satmetrix Net Promoter Score (NPS).

Community-Side Metrics

The community-side metrics for customer loyalty include

- Number of invitations sent by members
- Number of referrals/send-to-a-friend messages
- Customer quotations (qualitative)

Business-Side Metrics

The business-side metrics for customer loyalty include

- Loyalty measurement systems such as Satmetrix Systems NPS
- Customer lifetime value (CLV) analysis
- Sales to community members
- Sentiment analysis or polarity of message (positive, negative, or neutral)

Awareness Use Cases

The social community is a great asset in the business's need to keep a finger on the pulse of what is going on within the customer base—for a head start on resolving problems—as well as keeping the community aware of the business through word of mouth.

SEO Lift

Online communities can create massive amounts of user-generated content, which is then indexed by search engines. This “organic” content can have a positive impact—for important and relevant keywords—on placement on search engine results pages. The goals are to show that (1) the community is effectively generating traffic from search engines and (2) the cost of generating this traffic from community content (via SEO) is less than with other methods.

Community-Side Metrics

The community-side metrics for SEO lift include

- Referrer pages – What are the top 10 search engines visitors are using?
- Referral keywords – What are the top 20 keywords that brought them?
- Community content – What are the top 20 community URLs for search engine traffic (broken down by search engine, such as the top 20 community URLs for Google or Bing searches)?
- Traffic (page views) and other metrics (such as time on the site) generated by visitors who reached the community from a search engine

Business-Side Metrics

The business-side metrics for SEO lift include

- Results page placement for relevant keywords
- Dollar value of increased placement
- Number of pages indexed in search engines
- Cost of traffic from search engines with other methods
- Cost savings from reduction of paid SEO initiatives

Reach

Communities can be sources for word-of-mouth marketing initiatives. Reach is typically campaign-driven and therefore time-bound. This can help with the ROI analysis, as can the use of campaign-specific tracking codes, because attribution is clearer and easier to determine.

Community-Side Metrics

The community-side metrics for reach include

- Amount of viral/shared content, such as send-to-a-friend messages
- Number of invitations, such as for others to join the community
- Community mentions across the social Web (such as blogs and Twitter), measured by use of Oracle RightNow Social Monitor Cloud Service or other methods
- Customer quotations (qualitative)

Business-Side Metrics

The business-side metrics for reach include

- Analysis of clicks on links and tracking codes
- Satmetrix NPS or similar
- Sales to community members

Lead Generation (Business to Business)

Communities can be an effective feeder into the sales pipeline. The challenge is to provide attribution to the community. This typically involves tracking customers' paths from registering in the community to participating in it, to moving into the sales pipeline, and to becoming a customer. Connecting the dots to the community, then, requires that a prospective customer can be identified along the way. If lead generation is a business goal, the registration process should ensure that new members enter information (such as company name and e-mail address) that will make them easy to track from the community to the customer relationship management (CRM) system (and/or other sales applications).

Community-Side Metrics

The community-side metrics for lead generation include

- Registrations by e-mail address, by company name, and so on
- The number of information downloads, promotions, event attendance, and so on by user (to be able to connect participation to particular users)

Business-Side Metrics

The business-side metrics for lead generation include the pipeline and deal metrics (such as the dollar value of leads and opportunities) per channel:

- Lead volume
- Cost per lead
- Lead value
- Conversion rate
- Transaction/account value
- Comparison of deal metrics by channel

Brand/PR Management

Having enough lead time if a PR issue arises can make all the difference in navigating image-related difficulties. Because community members tend to be more engaged and aware of company-related issues than most other customers, the community can act as a canary in a coal mine to help identify causes for concern more quickly than through other channels, enabling the corporate communications, PR, and legal teams to create and implement strategies more quickly and effectively.

Community-Side Metrics

The community-side metrics for brand management include

- Number of issues brought to the attention of the brand marketing, PR, corporate communications, and legal departments
- Customer quotations (qualitative)

Business-Side Metrics

The business-side metrics for brand management include

- Decreased lead time from learning about issues via the community before learning of them via other channels
- Number of PR problems averted
- Cost savings from averting PR problems

Commerce Use Cases

Online communities can also have a direct impact on commerce and revenue.

Advertising

Some organizations have a revenue stream from ads displayed on community pages. This revenue frequently stems not only from the number of ad views and clicks but also from the community demographics (such as the value of advertising to these particular people, due to whatever information is known about them).

Community-Side Metrics

The community-side metrics for advertising include

- Pages served
- Time on site
- Sessions

Business-Side Metrics

The business-side metrics for advertising include

- Ads served
- Cost per mille (CPM)

Subscriptions

Some organizations charge fees for community membership. Others offer subscription-based services, into which the community can feed paying subscribers.

Community-Side Metrics

The community-side metrics for subscriptions include

- Links to subscription pages
- Registrations

Business-Side Metrics

The business-side metrics for subscriptions include

- Community subscriptions—if paid access is required for some or all community content
- Other subscriptions (such as print newspapers or magazines and online access to content), broken down by source, for comparing subscription revenue via the community with subscription revenue from other channels

Sales

Online communities can increase direct sales, up-sell, and cross-sell of products and services to community members.

Community-Side Metrics

The community-side metrics for customer loyalty include

- Click-throughs from the community to promotions
- Click-throughs from the community to shopping carts

Business-Side Metrics

The community-side metrics for customer loyalty include cross-sell and up-sell. Look at sales from community members versus sales from nonmembers (potentially tracked via clickstream data and/or username).

Conclusion

Applying the ROI use cases outlined in this best practice guide will help you optimize your online communities. Set attainable and measurable goals for both the community and the business, and see how Oracle RightNow Social Experience will provide quantifiable ROI, ensuring that the community delivers your desired business results.



Best Practices for Measuring the Return on
Investment of Online Communities

April 2012

Author: Matthew Lees

Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200

oracle.com



Oracle is committed to developing practices and products that help protect the environment

Copyright © 2012, Oracle and/or its affiliates. All rights reserved. This document is provided for information purposes only and the contents hereof are subject to change without notice. This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document and no contractual obligations are formed either directly or indirectly by this document. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark licensed through X/Open Company, Ltd. 0312

Hardware and Software, Engineered to Work Together