The Total Economic Impact Of Dell's Foglight For Virtualization, Enterprise Edition

Cost Savings And Business Benefits Attributed To Dell's Foglight For Virtualization, Enterprise Edition

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Executive Summary

In the fall of 2013, Dell commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study to examine the potential return on investment (ROI) enterprises may realize by deploying Dell's Foglight for Virtualization, Enterprise Edition solution (formerly vFoglight). The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Dell's Foglight for Virtualization, Enterprise Edition solution within their organizations.

To better understand the benefits, costs, and risks associated with an investment in Dell's Foglight for Virtualization, Enterprise Edition, Forrester interviewed an existing customer (referred to as the *Organization* as anonymity was requested) that had experience using Dell's Foglight for Virtualization, Enterprise Edition solution. Dell's solution provides enterprise-class infrastructure and virtualization operations management across virtual, physical, and cloud environments. For more details on the Dell solution, see the section titled: About Dell's Foglight For Virtualization, Enterprise Edition solution: Overview.

Prior to investing in Dell's Foglight for Virtualization, Enterprise Edition solution, the *Organization* was using another tool set which lacked the ability to create what-if scenarios for capacity planning. It also lacked the ability to create baseline and dynamic thresholds from normal operations data which would have alerted IT staff to exception conditions.

Dell's Foglight for Virtualization, Enterprise Edition solution helped the Organization achieve the following benefits (risk- and present value [PV] adjusted) over three years:

- **Productivity of server administrators — improve admin-to-VM ratio — $209,617.**
- **Capacity planning labor savings — $70,999.**
- **Optimization of VM densities — server cost avoidance — $8,520.**
- **Chargeback or showback benefits — server cost avoidance — $4,260.**

DELL'S SOLUTION OPTIMIZED VM DENSITIES AND REDUCED CAPEX AND LABOR ADMINISTRATION COSTS

Our interviews and subsequent financial analysis found that the *Organization* experienced the risk-adjusted ROI, benefits, and costs shown in Figure 1.

The analysis points to risk-adjusted benefits of $293,396 over three years versus implementation costs of $149,860, equating to a net present value (NPV) of $143,536. The risk-adjusted ROI was a very favorable 96%.

FIGURE 1
Financial Summary Showing Three-Year Risk-Adjusted Results

ROI:	Benefits PV:	Costs PV:	NPV:
96%	$293,396	$149,860	$143,536

Source: Forrester Research, Inc.

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› **Benefits associated with Dell's Foglight for Virtualization, Enterprise Edition solution.** The *Organization* experienced the following benefits (risk- and present value adjusted) over three years (further described in the Benefits: Quantified section).

- **Optimization of VM densities — server cost avoidance — $8,520.** The *Organization* anticipates the ability to avoid replenishing four blade servers (and associated maintenance and operating system licenses).

- **Capacity planning labor savings — $70,999.** The solution will allow the *Organization* to avoid a half-time capacity planner.

- **Productivity of server administrators — improve administrator-to-VM ratio — $209,617.** The *Organization* anticipates savings of 1.5 FTEs; 0.5 FTEs beginning in Year 2, and an additional 1.0 FTE beginning in Year 3 of our analysis for a total of 1.5 FTEs in Year 3.

- **Chargeback or showback benefits — server cost avoidance — $4,260.** The *Organization* anticipates the ability to avoid purchasing two blade servers (and associated maintenance and operating system licenses).

› **Costs associated with Dell's Foglight for Virtualization, Enterprise Edition solution.** The *Organization* experienced the following costs (present value adjusted) over three years (further described in the Costs section).

- **Planning the implementation — $2,320.** The labor associated with planning and installing the solution.

- **Software license including first year's maintenance — $55,440.** Dell's fee for the software license and included software maintenance for Year 1.

- **Annual maintenance costs — $17,494.** Dell's fee was 20% of the software license cost in Years 2 and 3.

- **Ongoing management of the solution — $74,606.** The labor associated with managing the solution is 10 hours per week (one-quarter an FTE).

If risk-adjusted NPV of costs and benefits still demonstrate a compelling business case, it raises confidence that the investment is likely to succeed because the risks that threaten the project have been taken into consideration and quantified. The risk-adjusted numbers should be taken as "realistic" expectations, as they represent the expected value considering risk. Assuming normal success at mitigating risk, the risk-adjusted numbers should more closely reflect the expected outcome of the investment.

Disclosures

The reader should be aware of the following:

› The study is commissioned by Dell and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

› Forrester makes no assumptions as to the potential return on investment that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the study to determine the appropriateness of an investment in Dell's Foglight for Virtualization, Enterprise Edition solution.

› Dell reviewed and provided feedback to Forrester, but Forrester maintained editorial control over the study and its findings and did not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.

› The customer name for the interviews was provided by Dell. Dell did not participate in the customer interviews.

TEI Framework And Methodology

INTRODUCTION

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering investing in Dell's Foglight for Virtualization, Enterprise Edition solution. The objective of the framework is to identify the benefits, costs, flexibility, and risk factors that affect the investment decision.

APPROACH AND METHODOLOGY

Forrester employed four fundamental elements of TEI in modeling Dell's Foglight for Virtualization, Enterprise Edition solution: benefits, costs, flexibility, and risks.

Forrester took a multistep approach to evaluate the impact that Dell's Foglight for Virtualization, Enterprise Edition solution can have on the interviewed *Organization* (see Figure 2). Specifically, we:

› Interviewed Dell marketing, sales, and product management personnel, along with Forrester analysts, to better understand the value proposition for Dell's Foglight for Virtualization, Enterprise Edition solution.

› Conducted in-depth interviews with an IT staff member of the *Organization* to obtain data with respect to costs, benefits, and risks.

› Constructed a financial model representative of the interviews using the TEI methodology. The financial model is populated with the cost and benefit data obtained from the interviews.

› Risk adjustment is a key part of the TEI methodology. While the interviewed *Organization* provided cost and benefit estimates, some categories included future projections, or a broad range of responses, or had a number of internal forces that might have impacted costs and benefits higher or lower. For that reason, each benefit has been risk-adjusted, and are detailed in each relevant section.

Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

FIGURE 2
TEI Approach

Source: Forrester Research, Inc.

Analysis

THE INTERVIEWED ORGANIZATION

For this study, we conducted interviews with an IT staff member of the *Organization*.

› The *Organization* is a large educational institution located in the US. It has more than 30,000 undergraduate and graduate students, 10,000 faculty and staff, and over 200 fields of study. It currently has about 1,000 virtual machines (VMs) running on mostly VMware.

› The *Organization* has been using Dell's Foglight for Virtualization, Enterprise Edition since April 2013 (9 months as of this case study date). Its future plans include upgrading to version 7.0 of Dell Foglight for Virtualization, Enterprise Edition.

INTERVIEW HIGHLIGHTS

After an extensive review process evaluating multiple vendors, the *Organization* selected Dell's Foglight for Virtualization, Enterprise Edition solution. The *Organization* wanted to address issues of scalability, alerting, trending, reporting, defect management, and capacity planning. And Dell's Foglight for Virtualization, Enterprise Edition solution satisfied each of these topics.

The *Organization's* high-level goals and objectives with the Dell solution were as follows:

› Automate capacity planning and avoid hiring or allocating staff to perform that function.

› Alerting for exception conditions and avoiding unscheduled disruptions.

› Simplify chargebacks and showbacks to get insight into the true costs of virtualized workloads and improve utilization of virtual infrastructure. To enable full cost transparency and accountability for virtualization resource requests.

› To improve the density of its clusters within the virtual environment by using the reporting, alerting, and trending capabilities in Foglight.

› Improve the administrator-to-virtual machine ratio and avoid having to hire additional server administrators.

› To produce intelligence reports based on clients' individual virtual machines.

› To avoid downtime and disruptions in its private cloud.

› Prior to investing in Dell's Foglight for Virtualization, Enterprise Edition solution, the *Organization* was using another tool set which lacked the ability to create what-if scenarios for capacity planning. It also lacked the ability to create baseline and dynamic thresholds from normal operations data which would have alerted IT staff to exception conditions.

> *"We can monitor and visualize virtual assets and provide drill capability into performance health real time. We improve availability through bottleneck determination and isolation, root cause analysis and remedy."*
>
> ~The *Organization's* IT staff member

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BENEFITS: QUANTIFIED

The *Organization* experienced four quantified benefits in this case study:

> Optimization of VM densities — server cost avoidance.

> Capacity planning labor savings.

> Productivity of server administrators — more VMs per administrator.

> Chargeback or showback benefits — server cost avoidance.

⊕ Optimization Of VM Densities — Server Cost Avoidance

The *Organization* achieved improved VM densities as a result of its use of Dell's Foglight for Virtualization, Enterprise Edition solution. With Foglight, the *Organization* is able to continue to increase the density of its clusters within the virtual environment due to the reporting, alerting, and trending capabilities in Foglight. And Foglight allows the *Organization* to be proactive in and around improving density within an individual cluster of blade server. The *Organization* has an ongoing consolidation initiative which includes continuing to bring in physical machines and workloads into the virtual environment in Years 2 and 3. It anticipates the ability to avoid replenishing a total of four blade servers (and associated maintenance and operating system licenses) at a cost avoidance savings of $3,600 per server. See Table 1 for benefit calculations.

Server cost avoidance benefits are dependent on how quickly the ongoing consolidation initiative allows for improving density within individual clusters of blade servers. Due to this uncertainty, this benefit was risk-adjusted (reduced) by 25% in Table 1. See the section on Risks for more detail.

TABLE 1
Optimization Of VM Densities — Server Cost Avoidance

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
A1	Number of physical servers avoided		0	2	2
A2	Cost per server	Vendor quote	$3,600	$3,600	$3,600
At	Total server cost avoidance savings (not risk-adjusted)		$0	$7,200	$7,200
	Risk adjustment	↓25%			
Atr	Total server cost avoidance savings (risk-adjusted)	At-25%	$0	$5,400	$5,400

Source: Forrester Research, Inc.

♻ Capacity Planning Labor Savings

The *Organization* indicated that Dell's Foglight for Virtualization, Enterprise Edition solution optimized management of capital expenditures with accurate capacity planning, scenario modeling, and resource utilization management. It performs physical operating system (OS) monitoring, including memory, CPU, disk I/O and network I/O, to help capacity planners easily understand key performance and capacity issues in the physical infrastructure and isolate the root cause of problems. Foglight's intelligent analysis and automation capabilities help predict future hardware resource requirements, reserve capacity for planned VM deployments, and autodeploy VMs into reserved slots. Dynamic capacity planning helps determine how to accommodate future workloads and allows what-if scenario modeling to accurately forecast capital requirements. The

Organization's interviewee gave credit to the self-learning IntelliProfile analytics engine, which creates baseline and dynamic thresholds from normal operations data and alerts IT staff to exception conditions. The interviewee stated: "The analytics engine almost immediately produces a baseline and it's like having a capacity planner on-site doing statistical baselining, establishing minimum/maximum and standard deviation of performance thresholds. The Foglight solution will allow us to avoid allocating or hiring a half-time capacity planner."

For this study, we assume that the *Organization* will avoid the need to allocate a half-time (50% of FTE) capacity planner with associated savings in both in Year 2 and Year 3 (see Table 2).

The *Organization* has not yet achieved this future benefit, therefore we have risk-adjusted this benefit downward by 25%. See the section on Risks for more detail.

TABLE 2
Capacity Planning Labor Savings

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
B1	Fully loaded annual cost of capacity planner		$120,000	$120,000	$120,000
B2	Number of FTEs saved		0	0.5	0.5
Bt	Capacity planning labor savings (non-risk-adjusted)	B1*B2	$0	$60,000	$60,000
	Risk adjustment	↓25%			
Btr	Capacity planning labor savings (risk-adjusted)		$0	$45,000	$45,000

Source: Forrester Research, Inc.

✪ Productivity Of Server Administrators — Improve Administrator-To-VM Ratio

At the time of Forrester's interview, the *Organization* had a significant number of physical machines it still needed to consolidate into its virtual environment. It's anticipating a cost reduction and avoidance of 2.0 FTE headcount (one reduction through attrition and one avoided future new hire) as a result of that consolidation and the use of Dell's Foglight for Virtualization, Enterprise Edition solution. After consolidation it will continue to increase the density of its clusters within the virtual environment by virtue of the reporting, alerting, and trending capabilities in Foglight. In addition, Dell's Foglight for Virtualization, Enterprise Edition solution will assist with the following productivity improvements: deliver on current and future SLAs to reduce MTTR and align to business goals, more effectively manage and troubleshoot the performance of the VDI environment, more easily resize VMs, and be more proficient in everyday tasks by using the full topology of the Foglight tool set. The *Organization* anticipates saving 2.0 FTEs at a $120,000 fully loaded annual cost each; 1.0 FTEs beginning in Year 2, and an additional 1.0 FTE beginning in Year 3 of our analysis for a total of 2.0 FTEs in Year 3. See Table 3 for details.

The *Organization* has not yet achieved this future benefit, therefore we have risk-adjusted this benefit downward by 25%. See the section on Risks for more detail.

TABLE 3
Productivity Of Server Administrators

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
C1	Fully loaded annual cost of server administrator		$120,000	$120,000	$120,000
C2	Number of FTEs saved		0	1.0	2.0
Ct	Productivity savings of server administrators (non-risk-adjusted	C1*C2	$0	$120,000	$240,000
	Risk adjustment	↓25%			
Ctr	Productivity savings of server administrators (risk-adjusted)	Ct-25%	$0	$90,000	$180,000

Source: Forrester Research, Inc.

♲ Chargeback Or Showback Benefits

The *Organization* uses Dell's Foglight for Virtualization, Enterprise Edition reporting system to administer annual subsidized chargebacks to its customers. The *Organization* has an online service catalog where it offers virtual machines to its customers. Standard configurations and support tiers along with various systems management options are included in the offerings and subsequent chargebacks. A chargeback model reminds customers of the value of a VM. On a quarterly basis, the *Organization's* IT staff reviews VM compute profiles with customers to decide what actions will be taken, i.e., reduce, expand, or terminate VM capacity. Often during the quarterly reviews customers realize they are not using the full VM capacity, or not using the VM at all, and the VM and chargebacks are adjusted. This allows the *Organization* to more effectively manage capacity, thereby avoiding the acquisition of future new server hardware and operating system licenses. Accounting for virtual machine resource consumption helps to convey the ongoing cost savings being achieved through virtualization and to justify its expansion by way of future capital purchases.

Based on the success of its chargeback model, the *Organization* anticipates avoiding the purchase of one blade server (and associated maintenance and operating system licenses) at a cost avoidance savings of $3,600 per year. See Table 4 for details.

Server cost avoidance benefits are dependent on the ability of the *Organization* to more effectively managing capacity and hopefully avoid the acquisition of future new server hardware and operating system licenses. Due to the uncertainty of this future benefit, it was risk-adjusted (reduced) by 25% in Table 4. See the section on Risks for more detail.

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TABLE 4

Chargeback Or Showback Benefits — Server Cost Avoidance

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
D1	Number of physical servers avoided		0	1	1
D2	Cost per server	Vendor quote	$3,600	$3,600	$3,600
Dt	Total server cost avoidance savings (not risk-adjusted)		$0	$3,600	$3,600
	Risk adjustment	↓25%			
Dtr	Total server cost avoidance savings (risk-adjusted)	Dt-25%	$0	$2,700	$2,700

Source: Forrester Research, Inc.

Total Benefits

Table 5 shows the total of all benefits as well as present values (PVs) discounted at 10%. Over three years, the *Organization* expects risk-adjusted total benefits to be a PV of $293,396.

TABLE 5

The *Organization* — Total Quantified Benefits (Risk-Adjusted)

Benefit	Year 1	Year 2	Year 3	Total	Present Value
Optimization of VM densities (servers)	$0	$5,400	$5,400	$10,800	$8,520
Capacity planning labor savings	$0	$45,000	$45,000	$90,000	$70,999
Optimization of server administrators	$0	$90,000	$180,000	$270,000	$209,617
Chargeback or showback benefits (servers)	$0	$2,700	$2,700	$5,400	$4,260
Total quantified benefits	**$0**	**$143,100**	**$233,100**	**$376,200**	**$293,396**

Source: Forrester Research, Inc.

BENEFITS: UNQUANTIFIED

The *Organization* identified the following additional benefits of using Dell's Foglight for Virtualization, Enterprise Edition, but it was not able to quantify the benefits at the present time:

› With early warning alerts from Foglight, the *Organization* is able to avoid the embarrassment of costly downtime and disruptions in its private cloud. During fundraising periods, downtime could cause a reduction in revenues (contributions) for this educational institution.

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COSTS

The *Organization* incurred costs in four categories associated with Dell's Foglight for Virtualization, Enterprise Edition solution:

› Planning the implementation — the labor associated with planning and installing the solution was 40 hours at a cost of $58 per hour (fully loaded cost) or $2,320 for the initial investment period.

› Software license including first year's maintenance — Dell's fee for the software license was $55,440 for the initial investment period and included software maintenance for Year 1.

› Annual maintenance costs — Dell's fee was 20% of the software license cost or $11,088 in Years 2 and 3.

› Ongoing management of the solution — the labor associated with managing the solution is 10 hours per week (one-quarter an FTE) or $30,000 annually.

Table 6 represents the costs experienced by the *Organization* for Dell's Foglight for Virtualization, Enterprise Edition.

"Dell came on-site, did the installation, and trained the teams in use of the Foglight solution. It's been an excellent experience for us in that we were able to get up and running relatively quickly and are fully supported by Dell."

~The *Organization's* IT staff member

Ⓢ Costs Associated With Dell's Foglight For Virtualization, Enterprise Edition

TABLE 6
The *Organization* — Total Costs Associated With Dell's Foglight For Virtualization, Enterprise Edition

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
E1	Pre-planning activities	Interview	$2,320	$0	$0	$0
E2	Software license including first year's maintenance	Dell quote	$55,440	$0	$0	$0
E3	Annual maintenance costs	20% of software license	$0	$0	$11,088	$11,088
E4	Ongoing labor to manage solution	One-quarter FTE	$0	$30,000	$30,000	$30,000
Et	Total costs		$57,760	$30,000	$41,088	$41,088

Source: Forrester Research, Inc.

Total Costs

Table 7 shows the total of all costs as well as associated present values, discounted at 10%. Over three years, the *Organization* expects costs to total $169,936 with a present value of $149,860. Forrester chose to not risk-adjust costs because the *Organization* had received fixed price quotes for a majority of the costs.

TABLE 7

Total Costs Associated With Dell's Foglight For Virtualization, Enterprise Edition

Cost	Initial	Year 1	Year 2	Year 3	Total	Present Value
Pre-planning activities	$2,320	$0	$0	$0	$2,320	$2,320
Software license including first year's maintenance	$55,440	$0	$0	$0	$55,440	$55,440
Annual maintenance costs	$0	$0	$11,088	$11,088	$22,176	$17,494
Ongoing labor to manage solution	$0	$30,000	$30,000	$30,000	$90,000	$74,606
Total costs	**$57,760**	**$30,000**	**$41,088**	**$41,088**	**$169,936**	**$149,860**

Source: Forrester Research, Inc.

FLEXIBILITY OPTIONS

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for some future additional investment. This provides an organization with the "right" or the ability (or option) to engage in future initiatives but not the obligation to do so.

The *Organization* is in the early stages of adoption of the solution; therefore, it was unable to articulate future flexibility options. It has near-term future plans to upgrade to version 7.0 of Dell's Foglight for Virtualization, Enterprise Edition solution and to add the Foglight for Storage Management module. For our *Organization,* possible future flexibility option scenarios include:

› **Upgrade to version 7.0 of Dell's Foglight for Virtualization, Enterprise Edition.** According to Dell, V7.0 has the ability to increase consolidation ratios with improved visibility and analytics geared toward right-sizing CPU, memory, and storage. Effectively manage virtual machine (VM) sprawl by reclaiming resources through new optimization insight into such waste as powered off VMs, zombie VMs, abandoned images, and unused templates and snapshots.V7.0 includes upgraded optimization functionality (Optimizer module) to better consolidate data center resources and optimize the CPU, memory, and storage through improved visibility and analytics that will help find waste and get rid of it.

› **Add Foglight for Storage Management module.** According to Dell, Foglight for Storage Management is a monitoring solution for virtual environments utilizing physical storage to provide metrics and alerts for performance, capacity, and topology. With Foglight for Storage Management, virtualization administrators can visualize their entire virtual to physical storage environment through detailed architectural representations.

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RISKS

Forrester defines two types of risk associated with this analysis: "implementation risk" and "impact risk." Implementation risk is the risk that a proposed investment in Dell's Foglight for Virtualization, Enterprise Edition solution may deviate from the original or expected requirements, resulting in higher costs than anticipated. "Impact risk" refers to the risk that the business or technology needs of the organization may not be met by the investment in Dell's Foglight for Virtualization, Enterprise Edition solution, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates. Note: Forrester chose to not risk-adjust costs because the *Organization* had received fixed price quotes for a majority of the costs.

TABLE 8
Benefit And Cost Risk Adjustments

Benefits	Adjustment
Optimization of VM densities (servers)	↓25%
Capacity planning labor savings	↓25%
Productivity of server administrators	↓25%
Chargeback or showback benefits (servers)	↓25%

Costs	Adjustment
(Costs were not risk-adjusted)	↑0%

Source: Forrester Research, Inc.

Highlighting investment risk and impact risk by adjusting the costs and benefits results in more-meaningful and accurate estimates, and a more accurate projection of the ROI. In general, risks affect costs by raising the original estimates, and they affect benefits by reducing the original estimates. The risk-adjusted numbers should be taken as "realistic" expectations since they represent the expected values considering risk.

The following implementation risk that affects costs is identified as part of this analysis:

› **Licensing and maintenance.** Although Forrester did not risk-adjust licensing and maintenance fees, other organizations' costs may vary due to discounts.

The following impact risks that affect benefits are identified as part of the analysis:

› **Optimization of VM densities (servers).** Server cost avoidance benefits are dependent on how quickly the ongoing consolidation initiative allows for improving density within individual clusters of blade servers. Due to this uncertainty, this benefit was risk-adjusted (reduced) by 25% in Table 1.

› **Capacity planning labor savings.** The *Organization* has not yet achieved the full benefit of avoiding one-half FTE capacity planner, therefore we have risk-adjusted this future benefit downward by 25% in Table 2.

› **Productivity of server administrators.** The *Organization* has not yet achieved the full benefit, therefore we have risk-adjusted this future benefit downward by 25% in Table 3.

› **Chargeback or showback benefits (servers).** Server cost avoidance benefits are dependent on the ability of the *Organization* to more effectively manage capacity and hopefully avoid the acquisition of future new server hardware and operating system licenses. Due to this uncertainty, this benefit was risk-adjusted (reduced) by 25% in Table 4.

Table 8 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates. The TEI model uses a triangular distribution method to calculate risk-adjusted values. To construct the distribution, it is necessary to first estimate the low, most likely, and high values that could occur within the current environment. The risk-adjusted value is the mean of the distribution of those points. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

"I've got Foglight on every VM on every ESXi host in every blade. And it's been very scalable, very cost-effective, and I've had zero problems. Dell's support has been excellent."

~The *Organization's* IT staff member

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Financial Summary

The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the *Organization's* investment in Dell's Foglight for Virtualization, Enterprise Edition solution.

Table 9 below shows the risk-adjusted ROI, NPV, and payback period values. These values are determined by applying the risk-adjustment values from Table 8 in the Risks section to the total benefit and cost numbers in Table 5 and Table 7.

TABLE 9

Cash Flow: Risk-Adjusted

	Initial	Year 1	Year 2	Year 3	Total	Present value
Costs	($57,760)	($30,000)	($41,088)	($41,088)	($169,936)	($149,860)
Benefits	0	0	$143,100	$233,100	$376,200	$293,396
Net benefits	($57,760)	($30,000)	$102,012	$192,012	$206,264	$143,536
ROI	96%					
Payback period	21 months					

Source: Forrester Research, Inc.

The ROI was a very favorable 96%. If risk-adjusted costs, benefits, and ROI still demonstrate a compelling business case, it raises confidence that the investment is likely to succeed because the risks that threaten the project have been taken into consideration and quantified. The risk-adjusted numbers should be taken as "realistic" expectations, as they represent the expected value considering risk. Assuming normal success at mitigating risk, the risk-adjusted numbers should more closely reflect the expected outcome of the investment.

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About Dell's Foglight For Virtualization, Enterprise Edition Solution: Overview

The following information is provided by Dell. Forrester has not validated any claims and does not endorse Dell or its offerings.

Optimize performance, plan for growth, and allocate costs across virtual, physical, and cloud environments with Foglight for Virtualization, Enterprise Edition (formerly vFoglight). With a single-pane-of-glass view into heterogeneous environments, customers can have dynamic visualization of their entire virtual environment infrastructure and be able to proactively resolve problems before they impact customer and end user satisfaction.

Customers are able to go beyond one dimensional performance monitoring with expert optimization, capacity and resource utilization, and configuration management. Take control of your dynamic virtual workloads and:

> Achieve cost efficiency to improve VM density and administrator-to-VM ratios.

> Reduce operational expenditures (opex) through optimization of inefficiencies and waste caused by VM sprawl and zombie VMs.

> Optimize management of capital expenditures (capex) with accurate capacity planning, scenario modeling, and resource utilization management.

> Save time on routine IT administrative tasks with user-controlled automation.

> Reduce risk and manage compliance with detailed change management and cost analysis.

> Deliver on current and future SLAs to reduce MTTR and align to business goals.

> Support business growth with a highly scalable solution that allows monitoring of thousands of VMs.

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Appendix A: Total Economic Impact™ Overview

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

The TEI methodology consists of four components to evaluate investment value: benefits, costs, flexibility, and risks.

BENEFITS

Benefits represent the value delivered to the user organization — IT and/or business units — by the proposed product or project. Often, product or project justification exercises focus just on IT cost and cost reduction, leaving little room to analyze the effect of the technology on the entire organization. The TEI methodology and the resulting financial model place equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization. Calculation of benefit estimates involves a clear dialogue with the user organization to understand the specific value that is created. In addition, Forrester also requires that there be a clear line of accountability established between the measurement and justification of benefit estimates after the project has been completed. This ensures that benefit estimates tie back directly to the bottom line.

COSTS

Costs represent the investment necessary to capture the value, or benefits, of the proposed project. IT or the business units may incur costs in the form of fully burdened labor, subcontractors, or materials. Costs consider all the investments and expenses necessary to deliver the proposed value. In addition, the cost category within TEI captures any incremental costs over the existing environment for ongoing costs associated with the solution. All costs must be tied to the benefits that are created.

FLEXIBILITY

Within the TEI methodology, direct benefits represent one part of the investment value. While direct benefits can typically be the primary way to justify a project, Forrester believes that organizations should be able to measure the strategic value of an investment. Flexibility represents the value that can be obtained for some future additional investment building on top of the initial investment already made. For instance, an investment in an enterprisewide upgrade of an office productivity suite can potentially increase standardization (to increase efficiency) and reduce licensing costs. However, an embedded collaboration feature may translate to greater worker productivity if activated. The collaboration can only be used with additional investment in training at some future point. However, having the ability to capture that benefit has a PV that can be estimated. The flexibility component of TEI captures that value.

RISKS

Risks measure the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections, and 2) the likelihood that the estimates will be measured and tracked over time. TEI applies a probability density function known as "triangular distribution" to the values entered. At a minimum, three values are calculated to estimate the underlying range around each cost and benefit.

Appendix B: Glossary

Discount rate: The interest rate used in cash flow analysis to take into account the time value of money. Although the Federal Reserve Bank sets a discount rate, companies often set a discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult their respective organizations to determine the most appropriate discount rate to use in their own environment.

Net present value (NPV): The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.

Present value (PV): The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.

Payback period: The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.

Return on investment (ROI): A measure of a project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits minus costs) by costs.

A NOTE ON CASH FLOW TABLES

The following is a note on the cash flow tables used in this study (see the example table below). The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1. Those costs are not discounted. All other cash flows in Years 1 through 3 are discounted using the discount rate (shown in Framework Assumptions section) at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations are not calculated until the summary tables are the sum of the initial investment and the discounted cash flows in each year.

TABLE [EXAMPLE]
Example Table

Ref.	Metric	Calculation	Year 1	Year 2	Year 3

Source: Forrester Research, Inc.

FRAMEWORK ASSUMPTIONS

Table 10 provides the model assumptions that Forrester used in this analysis.

The discount rate used in the PV and NPV calculations is 10% and time horizon used for the financial modeling is 3 years. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult with their respective company's finance department to determine the most appropriate discount rate to use within their own organizations.

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TABLE 10
Model And Case Study Assumptions

Ref.	Metric	Calculation	Value
F1	Hours per week		40
F2	Weeks per year		52
F3	Hours per year (M-F, 9-5)		2,080
F4	Hours per year (24x7)		8,736
F5	Average fully loaded annual salary		$120,000
F6	Hourly	(C5/C3)	$58

Source: Forrester Research, Inc.