



Attachment A

MASTER LICENSE SUBSCRIPTION AND SERVICES AGREEMENT

1. Scope of Agreement Definitions. This Agreement covers the (i) license and permitted use of the DL Software, (ii) access to DL Hosting and (iii) access to Ordering Activity Support. Unless otherwise defined in this Section 1, the capitalized terms used in this Agreement shall be defined in the context in which they are used. The following terms shall have the following meanings:

1.1. “Authorized User” means Your employee(s) (or other third-party consultants as authorized by You under Section 5.2 of this Agreement) who is authorized by You to access or use the DL Software, the DL Hosting or access the Ordering Activity Support in the manner authorized in this Agreement and within the scope identified in an Order Form.

1.2. “Basic Blueprint” means the generic decision models for a given substantive area of interest (e.g., hiring, research and development, etc.) created by Us based on generally available information that are made available (whether online or in hard copy format) to Ordering Activity and are designated as a “Basic Blueprint” by Us.

1.3. “Blueprints” means Basic Blueprints, Enhanced Blueprints and Published Blueprints.

1.4. “Confidential Information” shall have the meaning set forth in Section 10 of this Agreement.

1.5. “Content” means any presentations, photographs, illustrations, icons, articles, text, audio clips, video clips or Ordering Activity Data.

1.6. “Ordering Activity Data” means any and all proprietary business data relating to Your business, including, without limitation, any and all data and information furnished to Us in the course of or incident to performing hereunder.

1.7. “Ordering Activity Downtime” means downtime, failure, disruption or interruption in the DL Hosting caused by or attributable to You, including, without limitation, (x) failure, interruption or disruption attributable to the actual or attempted acts or omissions of Your (i) Authorized Users, (ii) employees or (iii) independent contractors or agents, or (y) technical failure of Your telephone, computer, connectivity or any other equipment needed to access and use the DL Software, Ordering Activity Support, documentation and DL Hosting, as applicable.

1.8. “Ordering Activity Hosted” means the right granted by Us during an Order Term for You to install and use the DL Software at Your location and the right to the technical support. An Order Form must designate that it is a Ordering Activity Hosted Subscription in order for You to have the right to install and use the DL Software. In the absence of a Ordering Activity Hosted Subscription designation on an Order Form, We will host the DL Software per Section 7 of this Agreement.

1.9. “Ordering Activity Support” means access to Decision Lens technical support as identified in Section 6 of this Agreement.

1.10. “Decision Lens Hosted Subscription” means an order where We will host the DL Software.

1.11. “DL Hosting” means the hosting services provided by Us under a Subscription. These services include the collection of managed services, including system administration, hardware management, software system management, network operations, public Internet bandwidth, backup and restoration activities, program management and crisis management activities, which are collectively used to make the DL Software available online via a Decision Lens provided login link. In cases where You host the DL Software at Your location, We do not have an obligation to provide DL Hosting.

1.12. “DL Software” means Our proprietary software and advanced framework in object code for group decision-making, and all updates, improvements, bug fixes, or other modifications.

1.13. “Documentation” means the user guides and training materials made available by Us (whether online or in hard copy format) that provide installation and/or operating instructions for use of the DL Software by You.

1.14. “Enhanced Blueprint” means a Basic Blueprint that has been further enhanced by Us based on (a) feedback from customers and experts, and (b) Anonymous Ordering Activity Blueprint Usage Data (as defined in Section 8.2 below and collected with Ordering Activity consent) created by Us and made available to You (whether online or in hard copy format) and is designated as an “Enhanced Blueprint” by Us in accordance with our then-current generally applicable practices and policies.

1.15. “Reserved.”

1.16. “Implementation Services” means installation, configuration and/or training services as specified in an Order Form or Statement of Work.

1.17. “Order Form” means the document by which You order Subscriptions from Us and includes a description and fee schedule of the applicable services (including specific deliverables and estimated time schedule, if any) as well as payment terms.

1.18. “Order Term” means the period of time as identified on a fully executed Order Form during which You may use or access the DL Software, Ordering Activity Support and DL Hosting, as applicable.

1.19. “Professional Services” means the services that we will provide to You, pursuant to an Order Form, and may include, as applicable, Implementation Services, educational services, facilitation, advance analytics, training and other professional services.

1.20. “Published Blueprint” means a Basic Blueprint that has been further refined and modified by You and designated by You as a Published Blueprint through the DL Software in accordance with Section 8.3.

1.21. “Scheduled Maintenance” means downtime to the DL Hosting during which We perform upgrades, bug fixes or other systems servicing to the DL Software or data center environment.

1.22. “Statement of Work” (SOW) is the document that describes the activities and deliverables to be provided by Our professional services team, and Our responsibilities and Your responsibilities under that document. The Initial Statement of Work, if applicable, is attached as Exhibit B to this Agreement.

1.23. “Subscription” means the combination of a license to use the DL Software, access to Our Ordering Activity Support, and, as applicable, access to DL Hosting.

1.24. “Term” shall have the meaning set forth in Section 11.1 of this Agreement.

2. Reserved.

3. License Grant. 3.1. Subject to the terms and conditions of this Agreement and in consideration for the payment of the applicable fees included in the Order Form, as part of a Subscription, We hereby grant to You, solely during the Order Term, a limited, nonexclusive, non-transferable term license (the “*License*”) to access and use the DL Software, as applicable, as well as any Documentation, solely for your internal business use, within the business or functional unit identified on an Order Form, limited to use within the scope defined on an Order Form and in accordance with the Documentation. If You elect to have Us provide DL Hosting, We will provide access to the DL Software to Authorized Users. Access means providing a way to use the DL Software where We operate and manage the DL Software on behalf of You via the DL Hosting. In the case of a Ordering Activity Hosted Subscription, Your installation of Our Software is subject to the technical requirements in Our then-current Technical and System Security Specifications document, a copy of which is attached as Exhibit A..

3.2. You acknowledge and agree that, as between the Parties, the DL Software (including any upgrades, updates or any modifications thereto and/or new versions thereof), the Documentation, and all computer programs, related documentation in whatever form, screen displays, images and other information contained therein or related thereto, and all patents, copyrights, trademarks and other intellectual property rights and other rights with respect thereto, are and shall remain the exclusive property of Decision Lens, and that no rights therein or thereto are granted or otherwise transferred under this Agreement except as expressly set forth herein. 3.3. If any of the DL Software is being licensed under the terms of a proposal or agreement with the U.S. Government or on the U.S. Government’s behalf, the DL Software is commercial computer software and both the DL Software and the Documentation are developed exclusively at private expense, and (a) if acquired by or on behalf of a civilian agency, shall be subject to the commercial computer software license terms set forth in this Agreement as specified in 48 C.F.R 12.212 of the Federal Acquisition Regulation and its successors; or (b) if acquired by or on behalf of units of the Department of Defense (“*DOD*”), shall be subject to the commercial computer software license terms set forth in this Agreement as specified in 48 C.F.R 227.7202 of the Defense Federal Acquisition Regulation Supplement and its successors.

3.4. As specified on an Order Form, the Parties may agree during the Term that We will host the DL Software for the benefit of You and/or your Authorized Users within a managed data center environment. You shall provide all reasonable assistance to Us in provisioning the DL Hosting, including, without limitation, providing all information required for setup and any branding materials, if applicable.

3.5. We reserve the right to charge an additional fee for add-in modules and for new version releases or upgrades that contain substantial additional functionality or substantially improved performance. These types of major version releases that include an additional fee will not be mandatory and are optional for You and not considered bug fixes or other modifications or updates to other DL Software that may have been licensed by You.

4. Content; Data.

4.1. License for Ordering Activity Data. In the event We are hosting the DL Software on behalf of You, You grant to Us a limited, non-exclusive, non-transferable license to store and use the Content to the extent necessary for Us to perform our obligations and exercise our rights hereunder subject to the administrative, physical and technical safeguards described in Section 7.

4.2. Ordering Activity Content. If, in the process of using the DL Software (whether hosted by Us or not), You, or any Authorized User, uploads, records or otherwise transmits any Content to Us, then You represent and warrant to Us that You: (a)

are the owner or authorized user of the Content; (b) are solely responsible for the Content; and (c) acknowledge and agree that We neither control nor guarantee the accuracy, integrity or quality of the Content. You further agree that You will not use the DL Software or upload, record or otherwise transmit any Content that: (i) infringes any third party's copyright, patent, trademark, trade secret or other proprietary rights or rights of publicity or privacy; (ii) violates any law, statute, ordinance or regulation (the "**Law**"); (iii) is defamatory, trade libelous, threatening, harassing, obscene, harmful, or pornographic; or (iv) contains any viruses or other software that is intended to damage or interfere with (or surreptitiously intercept or capture) any system, data or personal information. Because You and any Authorized Users will be in control of the Content displayed online as a part of use of the DL Software, You understand that by utilizing the DL Software that users may be exposed to Content that is improper, offensive or a violation of the Law and therefore, under no circumstances will We be liable to any person or entity for any alleged damages sustained by the distribution of the Content to any user. Upon termination of this Agreement, Content will be removed from Our website and You may request at termination to receive Ordering Activity Content in XML file format. Should You or an Authorized User submit technical support questions, comments, feedback or suggestions to Us, then You agree that We may edit and post those questions, comments, feedback or suggestions with the response, (without revealing personal information), on Our support website and that all such questions, comments, feedback and suggestions shall remain Our property.

4.3. **Anonymous Ordering Activity Blueprint Usage Data.** If You elect to gain access to Enhanced Blueprints, and We create Anonymous Ordering Activity Blueprint Usage Data as contemplated by [Section 8.2](#), then the Parties acknowledge and agree that We will own the Anonymous Ordering Activity Blueprint Usage Data (as defined in [Section 8.2](#)), but not any data that is identifiable uniquely or specifically to You ("**Ordering Activity Specific Data**"). You shall retain ownership of all Ordering Activity's Specific Data.

4.4. **Usage Data.** You acknowledge that We may monitor usage of Our Basic Blueprints and report such usage on a generic, aggregated and anonymous basis to other users of the Basic Blueprints.

5. Restrictions.

5.1. You can access and use the DL Software, DL Hosting, and Ordering Activity Support solely for Your internal use as permitted hereunder. You and each Authorized User may not access, distribute or use the DL Software, DL Hosting or Ordering Activity Support except as expressly permitted under this Agreement, or the terms of the Order Form, including the requirements provided by applicable U.S. intellectual property laws and U.S. copyright laws. Except as permitted by this Agreement, any distribution of any portion of the DL Software is expressly prohibited. Furthermore, You and any Authorized User shall not, nor shall You or they permit others to do any of the following: (a) sell, distribute, transmit or otherwise provide access or use of the DL Software, DL Hosting or Ordering Activity Support to any person not authorized by this Agreement; (b) unless agreed to in an Order Form, store any DL Software in any information storage and retrieval system which either (i) provides access to any person not authorized by this Agreement, or (ii) provides concurrent usage by more end users than those authorized by this Agreement; (c) rent, sublicense, lease, assign or grant any right to use DL Software, DL Hosting or Ordering Activity Support to any person other than You or an Authorized User; (d) copy, reproduce, create derivative works from, de-compile, disassemble or otherwise reverse-engineer the DL Software or DL Hosting or in any other way alter, translate, modify or adapt the DL Software or DL Hosting; (e) make use of the Internet or an Intranet to provide access to the DL Software, DL Hosting or Ordering Activity Support through any local or wide area networks, timesharing services, multiple site arrangements or other forums which permit multiple simultaneous access or distribution other than as permitted by this Agreement; or (f) use the DL Software or DL Hosting to process data or provide analytical services to any third party or for any purpose other than Your internal use. Any access to or use of the DL Software (or any part thereof), DL Hosting or Ordering Activity Support by persons or other users who are not an Authorized User and this Agreement is specifically prohibited.

5.2. You may allow your third-party consultants to access and use the DL Software, DL Hosting and Ordering Activity Support as Authorized Users solely for Your internal use permitted hereunder, provided that (a) such third-party consultant has signed an agreement with You protecting Our intellectual property rights with terms no less stringent than the terms and conditions contained in this Agreement; and (b) You ensure that such third-party consultant access to and use of the DL Software, DL Hosting and Ordering Activity Support complies with the terms of this Agreement.

6. **Ordering Activity Support.** During an Order Term, as part of a Subscription to the DL Software, We will provide You with access to Ordering Activity support for the DL Software in accordance with the Order Form and Our then-current Ordering Activity Support. Your access to Ordering Activity Support expires at the end of an Order Term. Ordering Activity Support is limited to technical support directly related to use of the DL Software included on the applicable Order Form. Ordering Activity Support may be provided remotely via telephone or web-based services or, at Your request, may be provided in person. In the event that Ordering Activity requests DL to travel to Customer's location, Ordering Activity agrees to pay any travel expenses in accordance with FTR/JTR, as applicable. Ordering Activity shall only be liable for such travel expenses as approved by Ordering Activity and funded under the applicable ordering document.

7. **DL Hosting.** This section does not apply to You when you install the DL Software at Your location. During an Order Term, as part of a Subscription to the DL Software, We will provide You with access to DL Hosting to enable You to access and

use the DL Software in accordance with this Agreement which shall be comprised of access to a web portal or the website with password protected access to our managed data center environment. We will use commercially reasonable efforts to make the DL Software available to the Internet for access by You 99.0% of the available time, excluding any outages on account of or caused by Ordering Activity Downtime, any maintenance updates of the DL Software or any Force Majeure event. We reserve the right to modify the DL Software or DL Hosting at any time and agree to use commercially reasonable efforts to notify You of any such modifications to the extent that such modifications affect functionality in a materially adverse manner. We will use commercially reasonable efforts to coordinate Scheduled Maintenance during off-hours of the normal workweek. We will use reasonable commercial efforts to coordinate with You regarding the scheduling of any emergency maintenance. We will maintain appropriate administrative, physical and technical safeguards designed to protect the security, confidentiality and integrity of Ordering Activity Data. As part of the DL Hosting, we will, during the hours of 8:30 a.m. to 5:00 p.m. Eastern Time Zone (ET) on weekdays (exclusive of holidays), make reasonable telephone or email based technical support available to Your personnel. When Our staff is unavailable, we will provide voice mail and email access that will be checked periodically.

8. Blueprints. 8.1. During an Order Term, as part of a Subscription to the DL Software, We will provide You with free access to Basic Blueprints. Basic Blueprints are the property of Decision Lens and use of the Basic Blueprints is subject to the same terms and conditions as the DL Software (including without limitation [Sections 5, 10, 11.5, and 12](#) as if it were DL Software). Basic Blueprints are provided as references to You and use of, or reliance on, Basic Blueprints is at Your sole discretion. The decision models in the Basic Blueprints are based on public domain sources, web searches, journal articles, texts and expert interviews. We do not guarantee that any Basic Blueprint will meet Your needs and the Basic Blueprints are only intended as a reference point for You to create Your own decision model. Basic Blueprints may only be used with the DL Software.

8.2. During an Order Term, as part of a Subscription to the DL Software, We will provide You with the **option** of accessing Enhanced Blueprints. If You elect the option to access the Enhanced Blueprints, that option will be noted on the Order Form and use of the Enhanced Blueprints will be subject to the same terms and conditions as the DL Software (including without limitation [Sections 5, 10, 11.5, and 12](#) as if it were DL Software), unless otherwise provided on the Order Form. If access to the Enhanced Blueprints is not noted on the Order Form, this [Section 8.2](#) will not apply to You. You do not need to access the Enhanced Blueprints and use of Enhanced Blueprints is not required to use the DL Software. Access to the Enhanced Blueprints is entirely at Your discretion. Enhanced Blueprints are developed and customized by Us based on the aggregation and analysis of Your use and customization (and other Ordering Activitys' use and customization) of an Enhanced Blueprint or a Basic Blueprint on an anonymous basis (the "*Anonymous Ordering Activity Blueprint Usage Data*"). The Anonymous Ordering Activity Blueprint Usage Data used to create Enhanced Blueprints is aggregated with other Ordering Activitys' data and neither the Anonymous Ordering Activity Blueprint Usage Data, nor the resulting Enhanced Blueprint, will identify You or Your decision modeling data, priorities or decisions. To view Enhanced Blueprints, You must make Your data available to Us to analyze to create the Anonymous Ordering Activity Blueprint Usage Data for use in Enhanced Blueprints.

8.3. From time-to-time, an officer of Decision Lens may inquire, through a letter or other written communication, about whether You want to make any of your decision models available as a "Published Blueprint." You will have the option to make Your own uniquely created decision model(s) available as a blueprint for all Our other current and future customers to use with the DL Software. For purposes of clarity, You and Decision Lens acknowledge that You are not required to make any of your own uniquely created decision models available as a Published Blueprint, and it is solely up to You as to whether you desire to make a decision model available as a Published Blueprint. To make a decision model available as a Published Blueprint, You must specifically elect to make your decision model a "Published Blueprint" in response to Our request. If You have made this election, We will review this election and then, if accepted for publication, We will publish this Published Blueprint in Our library of Published Blueprints. By uploading Published Blueprints to Us, You release all Your rights over the Published Blueprint and hereby grant a perpetual, irrevocable, royalty free, worldwide right and license to Us and all Our current and future customers to use, copy, modify, publicly display and otherwise commercially exploit the Published Blueprint. Published Blueprints may identify Your identity. We have the right to remove any Published Blueprint from Our library at any time. If You elect to use a Published Blueprint of one of our other clients, use of such Published Blueprint is subject to the same terms and conditions as the DL Software (including without limitation [Sections 5 and 12](#) as if it were DL Software). However, You expressly acknowledge and agree that [Section 13.1](#) does not apply to such Published Blueprints of Our other clients.

9. Reserved.

10. Reserved.

11. Reserved.

12. Licensor warrants that the DL Software will, for a period of sixty(60) days from the date of your receipt, perform substantially in accordance with DL Software written materials accompanying it. EXCEPT AS EXPRESSLY SET FORTH IN THE FOREGOING, WE MAKE NO WARRANTIES, EXPRESS OR IMPLIED, THAT ANY DATA, OUTPUT, SOLUTION OR RECOMMENDATION GENERATED OR IMPLIED FROM THE DL SOFTWARE, ORDERING ACTIVITY SUPPORT, DL HOSTING, OR PROFESSIONAL SERVICES (AS APPLICABLE) ARE ACCURATE, MEETS YOUR NEEDS, IS BETTER THAN ANY COMPETING PROPOSALS OR DECISIONS OR IS THE BEST SOLUTION AVAILABLE TO YOU

OR WILL ACCURATELY PREDICT OR IDENTIFY ALL POSSIBLE OUTCOMES. YOU ACKNOWLEDGE AND AGREE THAT THE PROFESSIONAL SERVICES, ORDERING ACTIVITY SUPPORT, DL HOSTING, DL SOFTWARE, AND DOCUMENTATION, AS APPLICABLE, ARE PROVIDED “AS IS” AND “AS AVAILABLE” WITH NO WARRANTY WHATSOEVER. WE DISCLAIM ANY AND ALL WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, RELATING IN ANY WAY TO THE DL HOSTING, DL SOFTWARE, ORDERING ACTIVITY SUPPORT, PROFESSIONAL SERVICES AND DOCUMENTATION, AS APPLICABLE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT AND FITNESS FOR A PARTICULAR PURPOSE.

12.1. YOU ACKNOWLEDGE THAT YOU ARE RESPONSIBLE FOR OBTAINING AND MAINTAINING ALL TELEPHONE, COMPUTER AND OTHER EQUIPMENT NEEDED TO ACCESS AND USE THE DL SOFTWARE AND THE DL HOSTING, AS APPLICABLE. YOU ACKNOWLEDGE AND AGREE THAT THE DL SOFTWARE AND ANY ORDERING ACTIVITY SUPPORT OR DL HOSTING ARE TOOLS TO ASSIST YOU IN EVALUATING DIFFERENT DECISION OUTCOMES BASED UPON THE SUBJECTIVE BELIEFS AND OPINIONS OF YOU AND YOUR AUTHORIZED USERS OF CRITERIA DEVELOPED AND CREATED BY SUCH AUTHORIZED USERS AND/OR YOU. YOU ARE SOLELY RESPONSIBLE AND LIABLE FOR VERIFYING THE ACCURACY AND ADEQUACY OF ANY OUTPUT FROM THE DL SOFTWARE OR THE INFORMATION CONTAINED IN ANY REPORT, AND FOR ANY RELIANCE OR DECISION THEREON.

13. Reserved.

14. Reserved.

Exhibit A

Technical & Security Specifications

Introduction

Decision Lens is a cloud-based portfolio prioritization and resource optimization software company that provides a solution to organizations’ critical decision-making in R&D, capital planning, IT portfolio planning, and budget allocation. Decision Lens combines experts’ judgments with data to establish priorities in an efficient, collaborative framework. Unlike static spreadsheets and unstructured boardroom table discussions, Decision Lens rapidly engages decision-makers to achieve better outcomes in a resource-constrained environment. Driven by sophisticated analytics, the software allows organizations to identify and prioritize criteria that tie directly to its strategic goals.

Decision Lens works with leading organizations to bring structure and quality to key decisions. Our comprehensive solutions manage the strategic alignment of goals, priorities, and investments. With each engagement, dedicated experts are assigned to ensure a successful implementation and decision outcome. The result is a more accurate, repeatable, and transparent process for decision making, even when the drivers and considerations are subjective and intangible.

Decision Lens Inc. is headquartered in Arlington, VA, and provides a family of desktop and Web-based software solutions designed to support group decision-making for planning, financial, IT and performance related decisions. By combining advanced decision-making techniques with world-class performance visualization capabilities, Decision Lens supports dynamic decision-making based on a well-structured, rational framework.

About This Document

This document summarizes technical information about the Decision Lens platform, including client hardware and software requirements, hosting infrastructure, and security. As Decision Lens improves the function, performance, and security of the Decision Lens platform, the information in this document is subject to change. This document will be revised as necessary to reflect such changes.

Decision Lens Algorithms

Analytic Hierarchy Process (AHP)

Decision-makers compare the relative importance of elements in a pairwise fashion, each one to each other one. These judgments are entered into a matrix of pairwise comparisons, where each entry of the matrix is a ratio of the relative importance of the row element to the column element.

The calculations under which AHP operates then derive the priorities for all of the elements, with some allowance for inevitable inconsistency.

If every judgment is consistent with every other judgment, it is easy to calculate the priorities for each element by simply adding across each row and normalizing. This vector of priorities is called the “Eigenvector”.

However, most judgments will have a certain amount of inconsistency. The way to deal with this is to raise the matrix to powers until the priorities implied by adding across each row converge. The Decision Lens methodology raises the matrix to the 32nd power, which is sufficient to create a convergence of priorities. We then add across each row and normalize as before.

To calculate the inconsistency of the matrix, we first add down each column of the matrix, then multiply each element of that by the corresponding element of the priority vector gained from raising the matrix to powers, then finally sum those values. If we call the result y , the consistency ratio is then:

$$(y - \text{\#elements in matrix}) / (\text{\#elements in matrix} - 1).$$

The consistency index is this value divided by the consistency ratio of a perfectly random matrix of the same size, and provides a measure of the consistency or lack thereof in judgments. Perfect consistency is not realistic to expect in the Decision Lens process, but the inconsistency index value generally should not be above 10%.

Alignment Index

The alignment index shows how similar a group’s thinking is when looking at their final priorities. If individuals’ priorities differ widely from the overall group, the alignment score will be low; if everybody voted exactly the same, the alignment score would be as high as possible, in this case 100.

To calculate the alignment index, we take each individual’s entire priority set and compare it to the group’s priority set by multiplying the transpose of the individual’s matrix (rows become columns, and vice versa) by the group’s matrix.

Suppose that an individual and a group both voted 9 on the same comparison. The matrix multiplication of the individual’s transpose matrix with the group’s matrix would be $(1/9) * 9 = 1$, because the individual’s matrix has been flipped on its diagonal. Therefore, if an individual’s judgment were in exact agreement with the group, the sum across each row would be $(N * 1) * N$, or N^2 . If any judgments are different, this will no longer be the case, and the total sum will be larger than N^2 .

To see this, consider that the multiplied matrix will contain two references to the same comparison, one with each element as the row element. The sum of these two references is: The group alignment index is calculated by taking all of the ratios between each matrix’s row sum and N^2 , averaging them, and then normalizing that to a 0 to 100 scale, where 100 is perfect alignment and 0 is what alignment would be if all voters were as far from the average as possible.

Ratings

Decision Lens ratings scores for the alternatives are acquired by multiplying scores on individual criteria by the weights assigned to those criteria, and then summing the total. Ratings on individual criteria are placed on a 0 to 1 scale by using rating scales. In a verbal scale, a given verbal rating corresponds to a score between 0 and 1; that numeric score then enters the calculation. With a numeric scale, a user can input as many pairs of a numeric score and the corresponding score between 0 and 1 as is desired; for a given input, the score will be based on the linear relationship of those pairs. For example, consider a scale in which a score of 50 receives a 0 and a score of 100 receives a 1. To determine which DL score to assign to a 75, find 75 on the line between the points (50,0) and (100,1). That occurs at (75, 0.5), so the DL score is 0.5

For the overall score calculation, consider a simple example. Suppose there are 3 criteria, with weights of 50%, 30%, and 20% respectively. An alternative receives grades that correspond on the 0-1 scale to 1, 0.25, and 0.5 respectively. Therefore, this alternative's total score will be $.50*1 + .30*.25 + .20*.5$, or .675. A score cannot be higher than 1 or lower than 0.

Genetic Algorithm

The optimization solution in Decision Lens has to account for the following challenges:

- Multiple alternatives requesting resources,
- Over multiple time periods,
- Where each alternative has the capability to “float” or move between time periods (the “sequencing”),
- Constrained by limiting factors such as:
 - Forced selection in specific time periods,
 - Logical dependencies,
 - Multiple types and pools of resources,
 - Matching rules between resource pools, and
 - Requirements to fully resource alternatives

For simple cases involving only one time period or not very many alternatives, a simple linear programming solution could be sufficient to find the optimal resource allocation. Linear programming on a larger scale is too slow to be useful - a portfolio involving 100 alternatives with funding over 5 years that allows alternatives to “float” between time periods can take hours to solve. Portfolios with 1000 alternatives take days, or even weeks.

The Genetic Algorithm (GA) solves this by mimicking evolutionary processes to create and evolve populations of solutions to find the best answer in a very short amount of time. Our GA has Chromosomes, Evolution, Fitness, Initial Population, and finally Termination that represents the best output.

Benefit-Cost Ratio: The simplest assessment of value that goes into the optimizer's calculations is the Cost-Benefit Ratio, which is the alternative's priority score divided into its cost. A higher benefit-cost ratio in general means that a project should have better “bang for the buck” and be more likely to be funded under an optimization scenario.

Decision Lens – Technical Specifications

Client Usage The Decision Lens user interface is accessed via a user's web browser. Decision Lens operates within all modern web browsers with the Flash Media Player plugin. The Decision Lens web

service API may be accessed directly by any SOAP or REST capable software client provided the proper authentication credentials.

Client Software Requirements

Recommended:

- Operating System: Microsoft Windows 7, Mac OSX 10.5 or later
- Web Browser: Chrome (latest version), Firefox (latest version), Internet Explorer 11 or later
- Flash Media Player (latest version)

Minimum:

- Operating System: Microsoft Windows® XP SP2, Microsoft Vista®, Mac OSX Version 10.5
- Web Browser: Chrome, Firefox, Internet Explorer 10
- Flash Media Player Version 11.1

Client Hardware Requirements Recommended:

- Processor: Intel Pentium® 4, 2 GHz or better
- Memory: 2 GB RAM or more
- Screen Resolution: 1280 x 800 or higher

Minimum:

- Processor: Intel Pentium 4, 1.2 GHz or equivalent
- Memory: 1 GB RAM
- Screen Resolution: 1024 x 768

Client Networking Requirements

- High speed Internet connectivity
- Allow for HTTP and HTTPS web traffic over ports 80 and 443

File Formats

Decision Lens provides decision portfolio import, export, and reporting functionality that utilizes various file formats.

- Decision portfolio import: Decision Lens can import decision portfolios in the XML-based Decision Lens model format (.cmf).
- Decision model export: Decision Lens can export decision models in the XML-based Decision Lens model format (.cmf).
- Data import: Decision Lens can import data into decision models from Excel spreadsheets (.xls, .xlsx).
- Reporting: Decision Lens can export decision data reports as Excel spreadsheets (.xls).

Web Service API

Decision Lens provides services to deliver decision process technology via a web service API. All web services are available in SOAP (XML) and REST (JSON) formats, and provide full authentication and authorization functionality. The web service API may be used to create and update data, perform calculations, output results to external systems, etc. All Decision Lens user interfaces communicate with the web service API to provide the full application functionality and experience.

Application Architecture

Decision Lens exposes our decision technology via a web service API and provides user interfaces for delivering the decision process within a rich user experience.

The user interfaces consist of standard web technologies, such as HTML, Javascript, CSS, and Flash. The user interfaces communicate with the web service API over the Internet to provide functionality to the end user.

The web service API, and other related services, are implemented as Java web applications. These applications are deployed in Tomcat Application Server and are exposed to the Internet through an Apache HTTP Server proxy. The proxy enforces authentication and authorization logic for all web services based on user roles and data ownership rules.

All application data is stored in a MySQL database. Application data is only accessible to web service API code and Decision Lens administrators via a secure, private network. All Ordering Activity data is logically separated for data integrity and security.

Hosting Infrastructure

Decision Lens utilizes Amazon Web Services IaaS* to provide a stable, reliable, scalable, and secure cloud-based SaaS platform. The multi-tenant architecture of the platform allows for Ordering Activity organizations to get up and running with Decision Lens quickly and easily.

Additionally, Decision Lens supports Ordering Activity-hosted, on-premises installations of the platform. Decision Lens may be hosted in a single server environment, or in a multi-tiered, clustered environment, on virtual machines or dedicated hardware. Ordering Activity-hosted installations may be deployed with a custom architecture suitable for Ordering Activity needs. Please see the Technical Services section for more information regarding Ordering Activity-hosted installations.

*See Appendix A for technical documentation regarding Amazon Web Services.

Single Server Deployments

Decision Lens may be deployed in a single server environment. Under such a deployment, the single server contains and executes Apache HTTP Server, Tomcat Application Server, and MySQL. This is the simplest deployment infrastructure, but also provides the least amount of scalability and reliability, due to static resource levels and single points of failure (non-clustered server components). A single server deployment also makes inefficient use of resources compared to multi-tiered, clustered deployments, which can be tailored for resource efficiency at each tier.

Hardware Requirements for Single Server Deployments

- Processor: Intel 5000 Series CPU, 800 MHz FSB, 2 MB cache (or equivalent)
- Memory: 8 GB RAM minimum
- Disk Space: 20 GB minimum

Multi-tiered, Clustered Deployments

Decision Lens may be deployed in multi-tiered, clustered environments. This means that web, application, and database tiers can be separated and deployed across clustered servers. This type of deployment generally provides better scalability, reliability, and efficient use of resources than a single server deployment. The infrastructure details of this type of deployment are outside the scope of this document, but can be summarized as follows:

- A load balancer provides a single point of entry for all inbound application traffic. The load balancer distributes all web service requests to the web tier according to various load-balancing algorithms.
 - The web tier serves up static application assets (HTML pages, Flash content, CSS, etc.) and proxies web service requests to the application tier. The web tier consists of one or more clustered web nodes (servers) running Apache HTTP Server. The web tier is deployed across multiple
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subnets attached to Internet gateways for public accessibility through restricted server ports (80 and 443).

- The application tier contains and executes the web service code, which interacts with the database tier for data access. The application tier consists of one or more clustered app nodes running Tomcat Application Server. The application tier is deployed across multiple private subnets (no Internet gateway), restricting access to web servers only.
- The database tier stores and replicates all application data. The database tier consists of a master database node and one or more slave database nodes for redundancy. The database tier is deployed across multiple private subnets (no Internet gateway), restricting access to application servers only.

Hardware Requirements for Multi-tier Deployments

- Web Tier: 1 GB RAM, 10 GB disk space per node
- Application Tier: 4 GB RAM, 10 GB disk space per node
- Database Tier: 4 GB RAM, 10 GB disk space per node

Identity Management

In a standard deployment, Decision Lens stores all application identities (users) in the Decision Lens internal database. Role-protected functionality is provided via the user interface and web service API for creating, editing, and deleting user accounts.

Decision Lens also has the capability to integrate with Ordering Activity-provided external identity management systems. Such integrations can allow a Ordering Activity organization to use existing and familiar user accounts to access the application, and also provide single-sign-on (SSO) capabilities. Custom identity management integration is a separate service outside of the scope of a typical Decision Lens license.

Application Security

Decision Lens employs numerous security best practices to protect Ordering Activity data and ensure application availability.

Authentication

Whether accessing the application through a user interface, or by making requests directly to the web service API, Decision Lens requires authentication credentials to perform all application functionality. Authentication credentials consist of a user name and password. Password creation rules require minimum password lengths and complexity (alphanumeric, symbols, capitalization). All passwords are hashed with the SHA-2 algorithm before being stored in the application database. Multi-factor authentication is also optionally available.

Decision Lens' internal identity management system and authentication mechanism can be replaced through custom integration with a Ordering Activity-provided external identity management system. Please see the Professional Services section for more information.

Authorization

Access to all Decision Lens application data is controlled through authorization logic based on user roles. All Ordering Activity data is logically separated from other customers, ensuring the security of sensitive data. User roles can be assigned at the application (system) level, and also at the individual decision level.

Application (System) Level Roles

- Group Admin: create/edit/delete user accounts, assign application level roles to users, create and
- participate in decision portfolios
- Portfolio Creator: create decision portfolios, participate in decision portfolios
- Participant: participate in decision portfolios only

Decision Level Roles

- Owner: create/edit/delete all decision data, export/copy/delete decision portfolio, input participant data (votes, comments) on behalf of all decision participants, does not participate in decision process as a voter.
- Voting Owner: same permissions as Owner, but also participates in the decision process as a voter
- Voter: submits votes and comments during the decision process, cannot modify other decision data
- Reviewer: may independently review all decision data in read-only mode.
- Voting Reviewer: same permissions as Reviewer, but also participates in the decision process as a voter

Data Transmission

All data transmitted between the Decision Lens user interface (or other web service client) and the web service API is secured using Secure Sockets Layer (SSL). If self-hosting, the Ordering Activity is required to provide their own signed SSL certificates.

Hosting Infrastructure Security

All Decision Lens hosted Decision Lens server resources are protected from unauthorized access via a number of security measures.

- Web, application, and database resources are all protected by firewall rules, restricting remote access to appropriate infrastructure clients only. The database tier is accessible via the application tier only, and the application tier is accessible via the web tier only.
- The web tier is deployed across multiple VPC subnets attached to Internet gateways for public □ accessibility through restricted server ports (80 and 443).
- Privileged access to the hosting infrastructure requires multi-factor authentication with a private VPN accessible only from Decision Lens' private network, a private cryptographic key, and is secured via SSH. Only Decision Lens administrators have accounts on the VPN and access to the private keys.
- The application tier is deployed across multiple private VPC subnets (no Internet gateway), restricting access to web servers only. Application server access requires a private key.
- The database tier is deployed across multiple private VPC subnets (no Internet gateway), restricting access to application servers only. Database access requires authentication credentials.
- Any IP addresses that are used in Denial of Service (DDoS) or brute force penetration attacks are permanently blacklisted at the external firewall level.

Backup and Disaster Recovery

All Decision Lens web, application, and database servers are deployed in server clusters distributed across multiple physical data centers for scalability and redundancy. All Ordering Activity data is backed up multiple times per day to separate, secure storage locations.

All database backups (“data at rest”) are encrypted with asymmetric key pairs utilizing the RSA 4096 bit cryptosystem.

Application and Infrastructure Patching

Decision Lens has dedicated administrators who monitor Decision Lens server resources and are automatically alerted of any resource problems or operating system, firewall or application updates. All security updates are applied to Decision Lens servers within 24 hours, and critical patches are applied immediately after release from the vendor. Non-critical patches are not applied before they are thoroughly tested by Decision Lens. Critical application bugs are fixed and deployed within 48 hours through Decision Lens’ emergency change request process. All other bugs are addressed during regular product release cycles.

Technical Services

Technical Services are available at additional cost to support custom needs regarding the deployment and utilization of Decision Lens within an organization’s environment. Typical Technical Services efforts include:

- Ordering Activity hosted deployments. If a Ordering Activity wishes to host Decision Lens themselves, Technical Services are available to assist the Ordering Activity with establishing an appropriate deployment architecture within their network environment, configuring and deploying all server components, testing the deployment, establishing appropriate data backups and disaster recovery procedures, etc.
- Single Sign-On (SSO). Decision Lens may be integrated with external identity providers, such as CAC/PKI or SAML enabled systems, to provide SSO. Such integrations allow Ordering Activity to utilize their existing identity management systems to control user authentication and authorization within the application. SSO solutions also provide ease of access to the application for end users. □ Data Integration. Decision Lens’ web service API allows for powerful custom data integrations. Such integrations can allow a Ordering Activity to automatically push data from an existing data source into Decision Lens decision portfolios, or import decision results from Decision Lens to an external system for additional analysis or reporting.

