

Technical White Paper

COLLABORATION

www.novell.com

Novell Vibe™ OnPrem 3

Preserving Knowledge and Increasing Team Productivity
in Secure Online Workspaces

Novell.

Table of Contents:	2 Introduction
	2 Create High-performance Teams
	2 Streamline Business Processes
	3 Leverage Organizational Knowledge
	4 Important Features
	5 Novell Vibe OnPrem 3 Security
	6 Novell Vibe OnPrem 3 Definition System
	7 Standard Three-tier Architecture
	9 Deployment Considerations
	12 Extending Novell Vibe OnPrem 3
	14 Conclusion



Introduction

Novell Vibe OnPrem 3 brings the right people together in secure, online workspaces where they can interact easily.

Face-to-face collaboration between colleagues provides a great medium to spark creativity, innovation and productivity. However, productive interaction shouldn't be limited by locality. In today's scattered environments, the people with the skills and expertise to solve problems and drive business success might be on the other side of the campus, city, state or world. To leverage these valuable resources, organizations need the ability to easily create environments that foster dynamic collaboration and breakthrough productivity between team members, no matter where they work.

Novell Vibe™ OnPrem 3 brings the right people with the right skills together in secure, online workspaces where they can interact easily. The Vibe OnPrem workspace serves as a digital "office" where team members, working locally or dispersed geographically, can gather to coordinate their efforts, information, resources and skill sets toward the completion or maintenance of a project, purpose or topic of interest. Vibe OnPrem ensures that the collective knowledge of any skilled group is never lost, and leverages the synergies of skills, ideas and inspiration to accomplish goals quickly and effectively.

Unlike some collaboration solutions, Novell Vibe OnPrem 3 doesn't require an army of web designers or programmers to be effective. Once it's deployed, users can immediately create and control their Vibe environments to:

- *Create high-performance teams*
- *Streamline business processes*
- *Leverage organizational knowledge*

Create High-performance Teams

The most powerful ideas come from a broad set of diverse minds. Novell Vibe OnPrem 3

provides digital workspaces that give organizations a simple and powerful way to unite the people, information and resources required to address an undertaking of any size. These can be small projects that last only a few days and involve a handful of members, or they can be multiyear ventures that span continents and require thousands of team members. Vibe OnPrem facilitates the creation of virtual teams based on the match among expertise, skills, availability and business need, rather than proximity or organizational charts. Members from multiple organizations can be brought into teams.

Project leaders and team members can leverage Vibe OnPrem workspaces to store and organize all information related to a specific project, such as ideas, plans, research, milestones, tasks, expected outcomes, work in progress and more. In addition to workspaces, through the use of metadata, Vibe OnPrem enables teams to digitally connect data from different collaboration sources—including wikis, blogs, forums, e-mail, calendars, documents and webpages—and aggregate relevant information based on the contextual needs of a specific project. Vibe OnPrem consolidates and integrates collaboration tools into one secure, powerfully indexed solution that empowers team members to work together more intelligently, creatively and productively.

Streamline Business Processes

Novell Vibe OnPrem 3 is all about empowering people to collaborate and work together more effectively. Part of that empowerment comes from built-in workflow capabilities. Workflows enable process automation, saving time, eliminating errors and improving overall efficiency. The workflow capabilities in Novell Vibe OnPrem 3 streamline business

processes by enabling organizations to create a more formal structure for collaboration processes, giving organizations precise control over how information flows through their organization. Vibe OnPrem provides the ability to enhance and streamline processes that are important to the success of business operations.

Unlike other collaboration solutions that offer workflow capabilities, Novell Vibe OnPrem 3 doesn't require programmers or developers to deploy workflows. Not only is it simple to implement and use, but it employs an easy-to-understand structure that comprises six main elements: states, transitions, entries (also known as forms), folders, notifications, on-entry and on-exit settings, and access controls.

The workflow engine in Novell Vibe OnPrem 3 can handle and facilitate everything from simple workflows to extremely complex business process workflows. Additionally, organizations don't have to start from scratch to take advantage of workflows in Novell Vibe OnPrem. Novell provides the Vibe OnPrem Resource Library, an online library of existing entry forms and workflows that have been designed to solve specific business problems. Vibe OnPrem users can easily download the custom forms and workflows, then import them into their Vibe OnPrem environment. Any of the default data types such as blogs, discussions, wikis, photos or folders can also be used as templates to create custom entries or forms for a workflow. Vibe OnPrem also makes it easy to modify and adjust workflows for an organization's specific needs.

To help teams monitor and manage their workflows, Novell Vibe OnPrem 3 offers the ability to create custom workflow dashboards that allow authorized workflow participants or managers to get a summary view of the current state of all pertinent workflows. For example, business managers can get an at-a-glance view of all the workflows for which they are responsible. Dashboards can also show help desk managers a summary view

of how many trouble tickets are in the queue, how long tickets have been waiting to be assigned or how many have been resolved.

Leverage Organizational Knowledge

Just as time is money, knowledge is power. It's what employers pay for. Novell Vibe OnPrem 3 makes it easy to find the relevant knowledge and resources that team members need to do their jobs. They can easily navigate through the system to see contextually how projects and other collections of information relate to each other. To enable this, Novell Vibe OnPrem 3 adds a layer of metadata to published data that establishes contextual links among relevant pieces of information. It also fosters contextual interactions among people and their ideas, research, work and knowledge. Together, Vibe OnPrem workspaces and metadata relationships make it easy for organizations to connect with the people and information that can bring the most value to any project, task or relationship.

In Novell Vibe OnPrem 3 workspaces, it's easy to identify the specific talents, expertise and knowledge of the different contributors to a team. When corporate managers know who does what exceptionally well, it becomes easy to build powerful teams for further projects. It's like tailoring a dream team to tackle whatever problem, goal or task the organization gives them, knowing that this particular team possesses the collection of skills required to get the job done quickly, productively and successfully.

The knowledge retention and sharing capabilities inherent in Novell Vibe OnPrem 3 workspaces can help ensure that the collective knowledge of any skilled group is never lost, and is always available to the organization. When someone leaves the group—or even the organization—that user's knowledge doesn't sit on a hard drive that could be deleted at any moment. Rather, information is right where it should be—in the team

The knowledge retention and sharing capabilities inherent in Novell Vibe OnPrem 3 workspaces can help ensure that the collective knowledge of any skilled group is never lost, and is always available to the organization.

Team member lists allow teams to be formed from anywhere in the organization, or even between organizations.

workspace—where existing and new team members can access it at any time.

Important Features

Some of the important features in Novell Vibe OnPrem 3 include the following:

- **Team workspaces** provide a digital “office” where the members of physically distributed teams can gather online to coordinate their efforts and bring together the right information, resources and skills for a project. A team workspace can include team members, goals, time lines, tasks, documents, images, blogs, wikis and much more.
- **Personal workspaces** provide individual members of the team a place to use personally. Just as the team workspace is the digital “office,” a personal workspace can be considered a digital “cubicle,” where an individual can create a personal online work environment. Personal workspaces can leverage all of the functionality available to other workspaces in Vibe OnPrem (i.e., blogs, wikis, folders, documents, images, tasks, work in progress), but the individual has personal control over whether workspace elements are private or available for public viewing. Organizations also have the flexibility to configure personal workspaces to restrict their usage or make them completely open.
- **Global workspaces** provide enterprises a digital “gathering place” for all employees or members of an organization as a whole. They contain information that might be of interest to everyone within an organization. Global workspaces might primarily contain static documents, such as organizational policies, procedures, mission statements, reporting structures, news, HR bulletins, corporate or divisional goals, or anything else that upper management might want employees to know about. A global workspace might also have a more dynamic side that serves as a forum for company surveys, the corporate comment

box or an executive blog. Global workspaces also provide an excellent venue for communities of practice to foster and share knowledge across an organization through discussion forums and posted information.

- **Folders** hold the information a team needs to be productive. File sharing can provide a simple means of document collection and version control. Work in progress collects in these folders. Types of folders include files, wikis, discussions, calendars, tasks, milestones, blogs, surveys, photo albums and custom folders. Each folder is an optimal place to describe and refine expected outcomes and constraints. Through the creation of custom accessories, folders also have the ability to reference and display data from varied sources, including e-mail, office productivity applications and databases.
- **Team member lists** allow teams to be formed from anywhere in the organization, or even between organizations. Team members can see everyone involved, and the workspace manager can set access control rights for each member to ensure that sensitive information is always secured.
- **Global searches** let users quickly find information in almost any format in any workspace that they’re authorized to access. They make discussions, documents, attachments and any other information that is posted in a workspace easy to find and use. Team leaders and members can also use the search tool to find people with specific talents and skills, as well as their contributions to team projects.
- **Workflow automation** enables team members to create customized workflows that automate specific processes, saving time, eliminating errors and improving overall efficiency.
- **Web access and compatibility** gives team members access to team workspaces through standard web browsers. Unlike competing teaming solutions, Novell Vibe OnPrem 3 works with multiple server and desktop operating systems, directories, office productivity software and databases.

- **Guest user access** gives organizations the ability to make areas on the Vibe OnPrem workspace accessible to “guest users” (people who have not logged in). This can be helpful in organizations such as government and educational institutions that have Vibe OnPrem sites for their employees, but also want to make certain information available to a broader audience—such as private citizens or the general student body.
- **The What’s New page** gives users a quick and easy way to keep current on all the resources and updates they have interest in. The What’s New page can be filtered to display only places of interest, team workspaces, information from followed users and so forth.

New Features

The following represent new features in the latest release of Novell Vibe OnPrem 3:

- **New, improved and more intuitive user interface** that presents users with a consistent look and feel, improving the implementation process and reducing the need for training.
 - **Faster navigation** with additional optimization of the indexing engine, providing faster, more responsive page displays and downloads.
 - **Workflow improvements** such as histories, folder-relative entry designs and workflows, workflow callouts, chaining and group lists.
 - **Easy workspace and site branding** allows users to provide a custom graphic or text on the header of a workspace, enabling it and its sub-workspaces to be quickly and visually associated with an organization, team or user. This can now be done for the entire site.
 - **Major and minor versions** give greater flexibility and control in managing documents. All data types now have a detailed history that allows users to undo mistakes made in updating content.
- File versions now have a simple note that can be used to easily communicate the nature of changes to files.*
- **Entry access controls** give greater security control not just at the folder and workspace level but to entries as well.
 - **Additional single sign-on** support for NT LAN Manager (NTLM) and Kerberos authentication.
 - **Improved integrations** with Novell® Conferencing and Novell Messenger. Novell Messenger is now available for free to Novell Vibe OnPrem customers.
 - **New home page** option allows for sites to have a defined home page for named users and guests, which can be used as an intranet home page.
 - **What’s New page** shows users the latest activities across the entire site or just areas or people of interest. Of course this is always secure and only shows what a user has access to.
 - **User profiles** have been greatly enhanced to give greater insight to individuals’ experience, skills, contact information and more.
 - **Wiki updates** improve the ease of use of wikis in workspaces and team knowledgebases.

In addition to features inherent to Novell Vibe OnPrem 3, Novell now offers an online library of frequently used custom forms and workflows for processes such as procurement, conference room scheduling, document review and more. This resource is called the Vibe Resource Library. This library also provides the latest success stories, useful use cases, workspace templates, and helpful articles and videos. See: www.novell.com/products/vibe-onprem/resource-library/

Novell Vibe OnPrem 3 Security

Novell Vibe OnPrem 3 implements a standard role-based access control mechanism for access to both objects and functions. At the design level there are six basic rights: Read, Add Comments, Create Entries, Change Structure, Modify/Delete Content and Change

Novell now offers an online library of frequently used custom forms and workflows for processes such as procurement, conference room scheduling, document review and more.

Users can log in to Novell Vibe OnPrem 3 by direct username and password or via a single sign-on facility such as Novell Access Manager.

Access. The basic rights can be manifested in a variety of ways to provide different levels of granularity and can be grouped together to create named roles. Vibe OnPrem ships with several predefined roles, including Visitor, Participant, Workspace Designer, Team Member and Site Administrator.

Access to a particular object is determined by the following conditions:

- Roles are applied to a folder or workspace and then a set of users or groups is assigned to populate the role.
- Role membership can be inherited from a parent object (e.g., entries inherit roles from folders, and folders can inherit access from their parent workspace).
- A group contains a set of one or more users and/or other groups (i.e., group memberships can be nested).
- Access is defined by mapping the current user to the object's roles. (The highest level of access wins.)
- Workflow access controls can specify a different set of user access rights for each state in the workflow.
- Entry level access controls provide access to entries that are independent of the access controls on the parent folder or workspace. The entry access settings can augment the folder access settings or replace them on any entry.

The Spring Security framework provides the authentication layer for all user interface transactions, providing a variety of authentication mechanisms. Users can log in to Novell Vibe OnPrem 3 by direct username and password or via a single sign-on facility such as Novell Access Manager™. In terms of network firewall protection, Vibe OnPrem can take advantage of the following three different configurations:

- Basic firewall: The entire server is placed behind a firewall, allowing only port 80/443.
- Tomcat server isolation: An Apache web server is placed in the demilitarized zone

(DMZ) and the Apache JServ Protocol (AJP) is used to communicate with the application server through a single dedicated connection.

- Reverse proxy

Novell Vibe OnPrem 3 Definition System

Novell Vibe OnPrem 3 uses a concept called “definitions” to shape the basic objects that govern the organizational structure of information within the system. The set of definitions that ship with Novell Vibe OnPrem 3 create much of what users see when using Vibe OnPrem. However, to better address an organization's needs, these definitions can be modified or new ones can be created. The main goals behind the definition system are to accomplish the following:

- Show how to render and form the view of an object
- Determine what data should be captured when filling out a form

Essentially, a definition is an Extensible Markup Language (XML) file that maps out what elements will make up an entry or binder, how the elements will be displayed and how to build the form that will be used to enter data into an entry or binder. Entries and binders are the two most basic objects in Novell Vibe OnPrem 3. Entries are the basic unit of information storage within Vibe OnPrem and are used to bind together content (text, attached files, etc.) with metadata. Examples of entries include discussion entries, blog entries, comments, user profiles and group profiles. Binders are basically collection objects that contain zero or more entry objects or other binder objects. Workspaces, folders and profile lists are all considered binders.

Every object in Novell Vibe OnPrem 3 has a definition. The definition governs what data is stored with the object and basic information about how it is rendered within the user interface. The definitions enrich the basic binder and entry objects with the following:

- **Attributes.** Basic data items such as text strings and numbers
- **Attachments.** Arbitrary files (documents, photographs, any binary data)
- **Events.** Temporal information for the object (calendars, repeat frequencies, etc.)
- **Workflows.** State information linked with a workflow definition that governs how state transitions can occur

In addition to its primary goals, the definition system in Novell Vibe OnPrem 3 serves additional purposes. The definition system makes Novell Vibe OnPrem 3 inherently field extensible, enabling organizations to customize the Vibe OnPrem environment—even at the most basic level—to fit their specific needs. The definition system also facilitates the translation of objects and

forms into different languages. Additionally, because all definitions are simply XML files, they are portable from one system to another.

Standard Three-tier Architecture

Novell Vibe OnPrem 3 is a 100 percent Java* 2 Enterprise Edition (J2EE) Tomcat application that employs a standard three-tier design model that comprises a presentation tier, business tier and data access tier. This design pattern isolates the logic used to interact with the browser from the business logic and data management. It utilizes an “interface-based design” approach to separate out the implementation of components from their interface. This creates an implementation that allows modules to be substituted with minimum impact on the overall design of the product.

The definition system makes Novell Vibe OnPrem 3 inherently field extensible, enabling organizations to customize the Vibe OnPrem environment—even at the most basic level—to fit their specific needs.

The Vibe OnPrem Domain Model

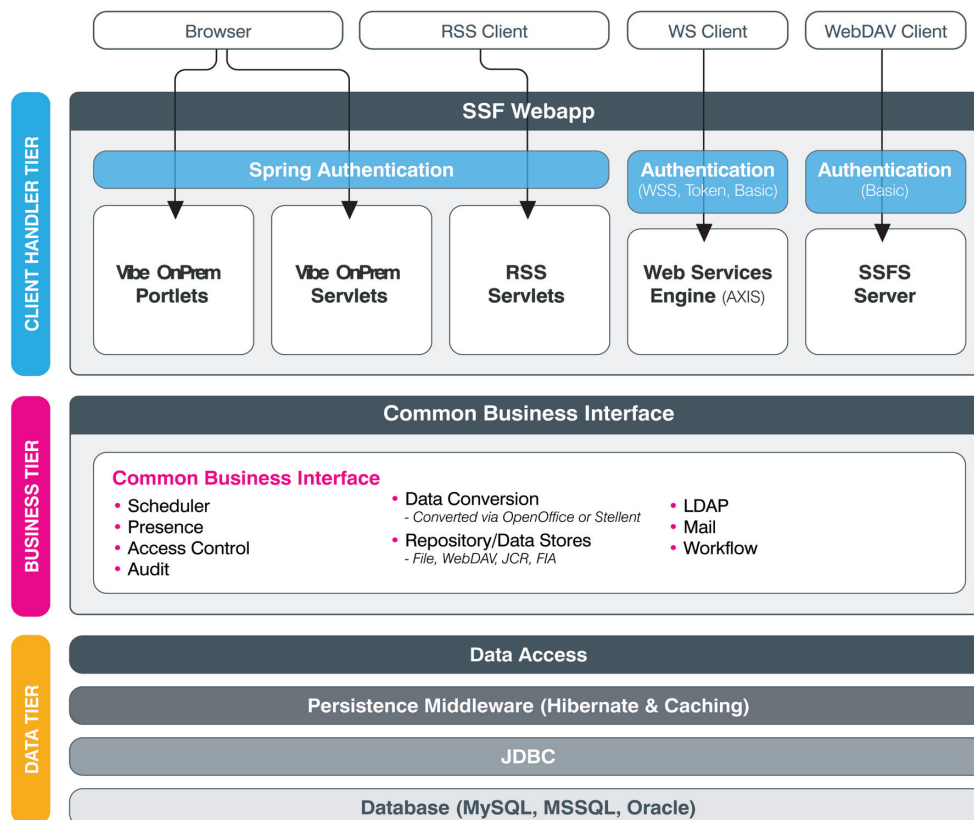


Figure 1. Vibe OnPrem Domain Model

Access to the Business Tier modules is provided entirely through its common business interface, which includes access to the business implementation classes referred to more commonly as modules.

Presentation Tier

Novell Vibe OnPrem 3 supports multiple client devices and interfaces, including browsers, RSS, web services clients and Web-based Distributed Authoring and Versioning (WebDAV). Since Vibe OnPrem employs interactions that go beyond typical browser transactions, Novell often refers to the Presentation tier more generically as the client-handler tier.

For browser and RSS clients, Vibe OnPrem uses the Spring Security framework to give it a wide variety of authentication mechanisms and integration options, which include Lightweight Directory Access Protocol (LDAP), X.509 certificates, digest authentication and single-sign-on authorities such as SiteMinder.

Novell Vibe OnPrem 3 includes two web services interfaces. The primary web service interface uses the Apache Axis3 toolkit to interpret Simple Object Access Protocol (SOAP) requests and then make calls to the Vibe OnPrem web Services Facade, a very thin layer that provides access to the Business Tier. These services use WS-Security (WSS) for authentication. The second web service interface enables the integration of remote applications and uses a token-based authentication.

Novell Vibe OnPrem 3 also exposes a standard WebDAV interface for clients such as Windows* Explorer, Microsoft* Office and OpenOffice. WebDAV allows desktop applications to directly manipulate files stored in attachments. Vibe OnPrem uses the Jakarta Slide WebDAV Construction Kit (WCK) to create a WebDAV file server called "SSFS." It utilizes cross-context invocation to translate WebDAV requests into Vibe OnPrem business interface requests.

As Vibe OnPrem receives requests from the various client devices or interfaces, the services in this tier interact with the Business Tier, which in turn calls upon the Data Tier to

retrieve any required data. The Business Tier then passes the information back to the Client Handler Tier, which then properly formats it and passes it back to the client interface.

Business Tier

The Business Tier holds the application logic for Novell Vibe OnPrem 3, meaning the individual behaviors and rules that determine how Vibe OnPrem operates. The components that make up the Business Tier include business implementation modules, data converters, repository managers, business implementation modules, and a variety of other managers and services. Many of the components in the Business Tier are modular in nature such that they can be replaced very easily with other software. For example, Novell Vibe OnPrem 3 utilizes Stellent for document conversion, while the Kablink open source version of Vibe OnPrem utilizes OpenOffice for document conversion.

Access to the Business Tier modules is provided entirely through its common business interface, which includes access to the business implementation classes referred to more commonly as modules. These modules implement major functionality such as administration, workspace and folder operations, calendar support, workflows and reporting. The modules, in turn, make use of services and managers within the Business Tier. These are capabilities that are shared between the modules such as access control, scheduling, workflow and content indexing via Lucene.

File Management

The Business Tier also provides functionality related to data management outside of the basic object store handled by the Data Access Tier. In particular, the Business Tier is responsible for creating repositories for files that are arbitrarily uploaded into the Vibe OnPrem system. The repository manager in the Business Tier provides an abstract interface to a variety of on-disk storage locations and mechanisms using the following repository types:

- **Simple File System.** *A cluster-safe interface to a local file system.*
- **WebDAV.** *A cluster-safe access to a WebDAV server via Apache Slide.*
- **Java Content Repository (JCR).** *Used to store files in a JSR-170 compliant server via Apache Jackrabbit.*
- **File Integration.** *Used to retrieve and/or store files managed outside of Vibe OnPrem (either in a folder in a local file system or a WebDAV folder). This mechanism can provide mirrored folder functionality.*

Except for file integration repositories, Vibe OnPrem assumes it has full ownership and control over the repository resources and can use it to implement features such as versioning.

Lucene Index Server

In many ways, the Lucene search engine is the heart of Novell Vibe OnPrem 3. Nearly all transactions, not just search requests, run through the search engine. For example, folder listings, blog pages and workspaces all involve one or more search engine queries. In every entry, Vibe OnPrem indexes all content and metadata. Vibe OnPrem has added specialized field update logic to Lucene to avoid whole-entry re-indexing for certain types of metadata changes, such as access control updates.

Due to the large amount of data flowing through the search engine, Novell Vibe OnPrem 3 has been designed to explicitly separate the search engine as a separate computational entity. By default, the search engine shares the same address space as the rest of the application, but it is possible to install and configure Vibe OnPrem so that a separate, dedicated Lucene server is used. Communication with the server is done via Remote Method Invocation (RMI).

Data Access Tier

The Data Access Tier uses a data access interface to isolate how objects are stored and retrieved. This level of abstraction allows

future implementations to substitute new, presumably faster object storage systems. Currently, the data access implementation stores the objects as Plain Old Java Objects (POJOs) and uses Hibernate as the mapping facility between the POJOs' internal representations and the relational database. Vibe OnPrem employs Hibernate's Ehcache plug-in with different settings depending on whether the deployment is on a single server or distributed in a cluster.

Besides ease of programming and performance, Hibernate allows Vibe OnPrem to be reasonably database-independent. It provides the Java Database Connectivity (JDBC) interface that enables Vibe OnPrem's support of Microsoft Structured Query Language (SQL) server, MySQL* and Oracle* SQL databases. Vibe OnPrem allows these databases to be either on the same server as Vibe OnPrem or to be placed (remoted) onto other servers to increase performance.

The Data Access Tier is responsible only for the persistence of the objects (i.e., binders, entries) that reside in the SQL databases. The Business Tier manages other data, such as attached files and searchable content, which is arbitrarily entered into the system.

Deployment Considerations

Some of the primary questions that organizations have when deploying Novell Vibe OnPrem 3 deal with high availability, sizing and scalability, and LDAP integration. The following sections provide a brief discussion of these issues.

High Availability

To provide high availability and load balancing, organizations can run multiple instances of Novell Vibe OnPrem 3 on multiple systems in a cluster and then front-end it with a high-availability web application such as Apache web server, Linux Virtual Services, Novell Access Manager or Microsoft Internet Information Services. The web application can be configured with the Vibe OnPrem site

Due to the large amount of data flowing through the search engine, Novell Vibe OnPrem 3 has been designed to explicitly separate the search engine as a separate computational entity.

Novell Vibe OnPrem 3 has incorporated a new feature that allows multiple instances of the Lucene index server to run to provide high availability and load balancing.

URL such that the URL will remain constant for Vibe OnPrem users regardless of which Vibe OnPrem server they access at any given time, while spreading the workload between the multiple instances of Vibe OnPrem.

Because Novell Vibe OnPrem 3 expects to connect with a single database, it allows only one instance of the database to be running. However, the database can be running in a clustered environment. Since all the nodes in the cluster will share the same database server, the database-initialization SQL scripts should not be executed more than once. Running the database initialization script on multiple cluster nodes can cause the database to be overwritten. To configure the script to initialize only once, the installer's Full Install option should be used on the first cluster node and then the Update option should be used on all other cluster nodes. The database connection settings on each node also need to be configured to use the same database.

Novell Vibe OnPrem 3 has incorporated a new feature that allows multiple instances of the Lucene index server to run to provide high availability and load balancing. To accomplish this, Novell Vibe OnPrem 3 wraps the Lucene index with a server wrapper that allows it to run on a different Java Virtual Machine (JVM) and service requests from multiple Vibe OnPrem instances through Java RMI communications.

Sizing and Scalability

Due to the wide variety of uses for Novell Vibe OnPrem 3, it is difficult to provide hard guidelines for determining system sizing. Factors such as number of users, concurrency patterns and the amount and type of data being handled should all be considered when planning a deployment.

The number of users and their expected concurrent system use is an important factor in the amount of central processing unit (CPU) "horsepower" and random access memory

(RAM) that is needed. For example, even though an organization might have upwards of 50,000 users, its Novell Vibe OnPrem 3 resource requirements could be very small if their system only gets 500 or so hits per day. By contrast, a smaller organization that has 1,000 users who each access the system 500 times a day would require significantly more resources.

Content usage and type also affect sizing. For example, an organization that plans to leverage Novell Vibe OnPrem 3 extensively for sharing and storing large documents (i.e., CAD and multimedia) will require significantly more disk storage than an organization that primarily utilizes Vibe OnPrem for making blog or discussion forum entries.

Additionally, the amount of processing required for any single transaction varies widely. For example, blogs, wikis and calendars tend to have a high read-to-write ratio. In other words, every time someone writes a blog entry it can result in hundreds of viewings of that single entry. Still, viewing entries requires fewer resources than issuing a search for a large number of documents, which in turn is far less resource-intensive than adding a large document.

Attachments can be major resource consumers in Vibe OnPrem. Unlike other data that is stored in Vibe OnPrem, attachments have a number of characteristics that factor into server performance:

- *Attachments tend to have more data (sometimes thousands of times more) than normal entries (like a blog posting). Moving this data around consumes network bandwidth and disk space.*
- *Like other entry data, Novell Vibe OnPrem 3 fully indexes the content of attachments. Since attachments are larger and there is more to index, they will require longer indexing times and larger indexes. This translates to higher CPU and disk consumption than normal entries.*

- *Unlike normal entries that primarily contain plain text, the contents of attachments are not usually in a format that is easy to index. This can require document conversion, which can consume significant system resources, depending on the document type, size and number of documents.*
- *To provide a richer user experience, attachments are also converted to an image format for thumbnails and also to HTML for viewing via a browser. These operations are done on demand when the attachment is viewed for the first time. While this doesn't factor into upload performance, it can generate bursts of heavy CPU usage during the conversion process.*

Sizing Scenarios

The following represent potential deployment scenarios based on normal usage, which constitutes 10 percent or less of the user base concurrently accessing the system at any given time. Actual deployment requirements vary depending on an organization's specific usage practices.

Minimal (1–5 users):

Suitable for evaluation or testing

(Single server, one to two 2Ghz CPUs, 1 to 2GB RAM)

This is an out-of-the-box deployment that is configured to use minimal RAM (2GB) and is suitable for single-person evaluation or light usage by a small group. All of the components are on a single server. This environment can handle a concurrent load of no more than five users. If the number of registered users exceeds 10, the RAM should be increased to 4MB.

Small (1–500 users):

Basic workgroup configuration

(Single server, two to four 2Ghz CPUs, 4 to 8GB RAM)

This is an out-of-the-box deployment suitable for a workgroup, department or small company. All of the components are on a single

server, but are running at more typical RAM allocations. Typical user load on a deployment of this size would be one to 500 users at normal usage.

Medium (500–1,500 users):

Separate database server

(Multiple servers, four 3Ghz CPUs, 4 to 8GB RAM)

In this configuration, the database server is split out to a separate server to increase the amount of parallel processing in the system. While Novell Vibe OnPrem 3 does not store a large amount of data in the SQL database, the database server can still consume significant resources by caching data, handling transactions, etc. Different database servers have different requirements, but generally speaking, the application server will require more CPU and RAM resources than the database server.

The application server should be configured to use at least 4GB of RAM. Additional processing power can be obtained by using 64-bit systems and larger RAM. This scenario would support between 500 and 1,500 users.

Large (1,500–8,000 users):

Separate database and index servers

(Multiple servers, four to eight 3Ghz CPUs, 4 to 8GB RAM)

This deployment should use 64-bit servers to allow the use of large RAM caches. This deployment employs load balancing across four Novell Vibe OnPrem 3 servers with at least 4GB of RAM with a minimum 3GHz processor. The database and index servers should be split out onto separate servers to allow for parallel processing and finer system tuning for each of the functions.

Separating the index (Lucene) server from the application server allows it to better utilize physical RAM. The RAM utilization of the index server is proportional to the index size, which is directly related to the number and

To provide a richer user experience, attachments are also converted to an image format for thumbnails and also to HTML for viewing via a browser.

Novell Vibe OnPrem 3 features an open development model that invites innovation from a broad community of developers and users.

size of documents and entries stored. As the number and size of documents and entries stored increase, RAM should be increased accordingly. Additionally, for this size of deployment, Novell recommends using a separate database server with a two or more node cluster.

Storage Area Networks (SANs) or other non-local file management systems are typically used in such a large deployment. File and archive repositories can be configured to use different, dedicated data services.

Organizations might also choose to run the web server on a separate server. The web server does not necessarily need the same amount of RAM as the application server, but it might require hardware accelerators to better handle Secure Socket Layer (SSL) encryption.

**Large II (8,000+ users):
Separate database, index and web servers**
(Multiple servers, CPU and RAM requirements vary)

This deployment is similar to a deployment with 1,500 to 8,000 users, with a few important differences. Deployments of this size must use 64-bit servers. The database, index and web servers should all run on separate servers. This deployment employs load balancing across four to six or more Novell Vibe OnPrem 3 servers with 4 to 8GB of RAM with high-speed multicore processors. For this size deployment, Novell recommends running the separate database server on a large cluster.

LDAP Integration

While Novell Vibe OnPrem 3 allows administrators to create groups and users locally within the solution, it might make more sense to use an LDAP directory that is already in use. Vibe OnPrem provides the ability to synchronize user information from both Novell eDirectory™ and Microsoft Active Directory*.

In the case of eDirectory, before configuring LDAP authentication with the LDAP synchronization tool provided by Vibe OnPrem, an administrator will need to know the following:

- *The hostname of an LDAP server where an eDirectory replica is available*
- *The port number used for LDAP connections to the server, which is usually 389 for non-SSL or 636 for SSL communication*
- *The eDirectory context location of the users that will have Vibe OnPrem accounts created for them (LDAP format)*
- *An eDirectory username and password with sufficient rights to read the user objects in the specified eDirectory context*

Extending Novell Vibe OnPrem 3

Novell Vibe OnPrem 3 features an open development model that invites innovation from a broad community of developers and users. The Kablink open source project is vital to this innovation and open development model. Customers or partners can make changes to Vibe OnPrem code and submit those changes to the Kablink community. The changes can then be included in later releases of the product, allowing all customers to benefit from the innovations driven by the community.

Novell Vibe OnPrem 3 also provides organizations with a number of ways to extend or customize the solution to their unique needs, including the following:

- *Web services*
- *Custom JavaServer Pages (JSPs)*
- *Remote applications*
- *Workflow extensions*

Web Services

Novell Vibe OnPrem 3 includes Java web services that provide a set of operations that client programs can use to exchange information with Vibe OnPrem. The web services are exposed through the Apache Axis toolkit,

which provides access to Vibe OnPrem functions through SOAP remote procedure calls. Vibe OnPrem supports authentication to the web services through either Web Services Security (WSS) authentication or HTTP basic authentication.

The current set of web services allows the creation and manipulation of entries, attachments, navigation of the workspace and folder tree, creation of folders, and retrieval of principal and team memberships. Novell Vibe OnPrem 3 provides explicit object definitions through Web Services Description Language (WSDL) and through a generated Java library. Additionally, the open source Kablink community provides sample clients in its product code base that can further assist developers in mastering the use of Vibe OnPrem's web services.

Custom JSPs

While the Form and View Designers tool in Novell Vibe OnPrem 3 provides the ability to add standard HTML or Vibe OnPrem elements to an entry, organizations can gain greater levels of formatting control and customization by taking advantage of the JSP customizations provided in Vibe OnPrem. Custom JSPs can be defined as part of an XML definition and provide the user interface component with what's necessary to render some part of an XML definition for a binder or entry.

JSP customizations can be applied to the following three types of Novell Vibe OnPrem 3 pages:

- **Form.** *Used to create a workspace, folder, entry or comment*
- **View.** *Displays the content of the created workspace, folder, entry or comment*
- **Mail.** *E-mail message that Vibe OnPrem sends as a result of the Send mail footer toolbar function*

There are two common approaches typically taken when using JSPs to customize an entry. The first approach uses a JSP file to

customize selected elements within the page segment, followed up by using the Vibe OnPrem designers to customize the remaining, non-JSP elements. In the second approach, the JSP files are used to define almost the entire page segment, while using the designers to include desirable Vibe OnPrem tools, such as the ability to subscribe to the entry, the send-mail feature, workflow, attachments or comments. Vibe OnPrem provides sample JSP files that can be utilized to learn different ways to take advantage of JSP customizations.

Remote Applications

To gain even more control over format and content than is provided by the designers or JSP customization files, Novell Vibe OnPrem 3 allows remote applications. Remote applications interact with the Vibe OnPrem web services interface to deliver significant power and flexibility in extending and enhancing an organization's collaboration environment.

Remote applications provide organizations with a way to add third-party content to Novell Vibe OnPrem 3 in a highly customizable and secure manner. Remote applications run on an external server, pulling data from Vibe OnPrem workspaces and other sources, and then merging and presenting that data to address specific needs. Remote applications can even be called directly from a workflow during a state transition. This allows developers or administrators to integrate with other systems via workflow.

In its simplest form, a remote application is an HTML fragment that has been provided via a remote web application but which can also do some very sophisticated integrations. Remote applications are comparable to Facebook apps in that the applications run on another system, but can call back into Vibe OnPrem for data.

Remote applications can be written in any language that supports handling HTTP. Once created, the Novell Vibe OnPrem 3

Novell Vibe OnPrem 3 provides explicit object definitions through Web Services Description Language (WSDL) and through a generated Java library.

administrator makes a remote application available and runs it using the permissions of the user loading the application. This means a remote application only has access to the data in the system that the user has access to.

Workflow Extensions

One of the most powerful features in Novell Vibe OnPrem 3 is its workflow capability, including the ability to add workflow processing to entries. This means that an approval process can be created for a blog or a custom entry. Any entry can have one or more workflows assigned to it. A powerful new addition to Novell Vibe OnPrem 3 comes from its ability to extend workflows to integrate with other third-party systems, such as SAP, Salesforce.com or an Asterisk server.

Each state in Novell Vibe OnPrem 3 can have custom actions defined for the On Entry or On Exit events. The new workflow extensions allow Vibe OnPrem to call into a custom Java class to perform unique developer-definable actions as a workflow transitions into or out of any specific state. This includes the ability to talk to, launch, pass data or receive data from external workflows.

Conclusion

Of all the choices available, only Novell Vibe OnPrem 3 empowers users directly with the

tools to easily build and use the workspaces and interactions they need to be productive. Vibe OnPrem gives organizations the flexibility and interoperability they need to deploy the solution in their heterogeneous environments, as well as the custom extensibility to allow it to connect and interact with other systems as needed.

Once IT deploys Novell Vibe OnPrem 3 and configures its powerful access controls, users are free to immediately begin creating workspaces, sharing information, coordinating activities and moving business forward. No one has to wait for someone else to create a webpage. Users can create their own teams, discussion groups, wikis, blogs, surveys, web landing pages and much more.

Novell Vibe OnPrem 3 allows team members to coordinate their efforts, information, resources and skill sets toward the completion or maintenance of a project, purpose or topic of interest. Whether it's leveraged for project collaboration, document management, business automation or as a knowledge repository, Novell Vibe OnPrem 3 brings the right people with the right skills together in a secure, online workspace where they can interact effectively, immediately and successfully.



Contact your local Novell Solutions Provider, or call Novell at:

1 800 714 3400 U.S./Canada
1 801 861 1349 Worldwide
1 801 861 8473 Facsimile

Novell, Inc.

404 Wyman Street
Waltham, MA 02451 USA