

# Open Source Software Paradigms

## Lecture - 07

## Content Management and ERP Systems

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# Learning Objectives

By the end of this lecture, you will be able to:

- ☞ Define and differentiate between Enterprise Resource Planning (ERP) and Content Management Systems (CMS).
- ☞ Understand the core functions and evolution of both systems.
- ☞ Identify the critical business needs each system addresses.
- ☞ Explore the concept of integration between CMS and ERP.
- ☞ Analyze the benefits and challenges of integration.
- ☞ Examine real-world use cases and future trends.

# Contents

- ☞ Understanding Content Management Systems (CMS)
  - What is a CMS?
  - Key Functions and Benefits
  - How a CMS Works
  - Types of CMS: Monolithic vs. Headless
  
- ☞ Understanding Enterprise Resource Planning (ERP)
  - The Challenge of Business Silos
  - What is an ERP System?
  - The High Cost of Traditional ERP
  - The Rise of Open Source ERP

# What is a Content Management System (CMS)?

- CMS is a software application that helps users with little to no coding experience to create, edit, manage, and publish content on a website.
- It separates content (text, images) from presentation (design, code).
- It simplifies website management by providing a user-friendly interface for tasks like text editing, image uploads, design customization, and content organization, enabling collaborative work among users with different permissions.

# What is a Content Management System (CMS)?

## Key Functions and Benefits



### **Content Creation & Management**

Users can create and edit content through a user-friendly interface, often with features similar to word processors.



### **User-Friendly Interface**

Non-technical users can manage websites without needing to code in HTML or other technical languages.



### **Collaboration**

Multiple users can work together on content, with different roles and permissions for authors, editors, and administrators.



### **Scalability**

CMS platforms can be scaled to accommodate websites of all sizes, from personal blogs to large corporate sites.

# What is a Content Management System (CMS)?

## Key Functions and Benefits



### **Design Customization**

Pre-designed templates and themes allow for easy website design and customization without coding.



### **Extensibility**

Plugins and extensions can be added to provide additional functionality, such as SEO tools, e-commerce capabilities, and social media integration.



### **Organization**

Content is stored in a central location (a database), making it easy to organize, find, and manage.

# What is a Content Management System (CMS)?

## Examples



*Image source: "9 Best Free and Open-Source CMS," TechJockey, [Online]. Available: <https://cdn.techjockey.com/blog/wp-content/uploads/2023/06/04153645/9-Best-Free-and-Open-Source-CMS-Platforms-in-2024-.jpg?d=840>. [Accessed: 07-Oct-2025].*

# What is a Content Management System (CMS)?

## How a CMS Works?

### Creating and Organizing Digital Content

- ✓ WYSIWYG (What You See Is What You Get) Editor.
- ✓ Media Library for images, videos, and documents.
- ✓ Content Organization via categories, tags, and folders.
- ✓ Non-technical users can easily publish and manage content.

# What is a Content Management System (CMS)?

## How a CMS Works?

### Managing the Content Lifecycle

- ✓ User Roles and Permissions (Admin, Editor, Author).
- ✓ Content Scheduling (Publish/Unpublish at specific times).
- ✓ Version Control and Content History.
- ✓ Editorial Workflows (Draft -> Review -> Approve -> Publish).
- ✓ Ensures content quality, control, and team collaboration.

# What is a Content Management System (CMS)?

## How a CMS Works?

### Controlling the Look and Feel

- ✓ Themes and Templates for consistent design.
- ✓ Responsive Design for mobile-friendly content.
- ✓ **Monolithic CMS** - Manages design and content together.
- ✓ **Headless CMS** - Manages only content; design is handled by the front-end application.

# Types of CMS

## Traditional/ Monolithic CMS

- The most common type.
- Used for corporate websites, blogs, e-commerce sites.
- Manages the entire website experience.
- **Examples**



*Image source: "Drupal, Joomla, WordPress Logos," Joomla!Art, [Online]. Available: [https://static.joomlaart.com/images/blog/2016/october/Drupal\\_Joomla\\_WordPress.png](https://static.joomlaart.com/images/blog/2016/october/Drupal_Joomla_WordPress.png). [Accessed: 07-Oct-2025].*

# Types of CMS

## Traditional/ Monolithic CMS



- WordPress is the simplest, most popular way to create your own website or blog.
- The core WordPress software is licensed under the GNU General Public License (GPL) version 2 or later.
- WordPress powers over **43.6%** of all the websites on the Internet [\[1\]](#).

*Image source: "Drupal, Joomla, WordPress Logos," Joomla!Art, [Online]. Available: [https://static.joomlaart.com/images/blog/2016/october/Drupal\\_Joomla\\_WordPress.png](https://static.joomlaart.com/images/blog/2016/october/Drupal_Joomla_WordPress.png). [Accessed: 07-Oct-2025].*

# Types of CMS

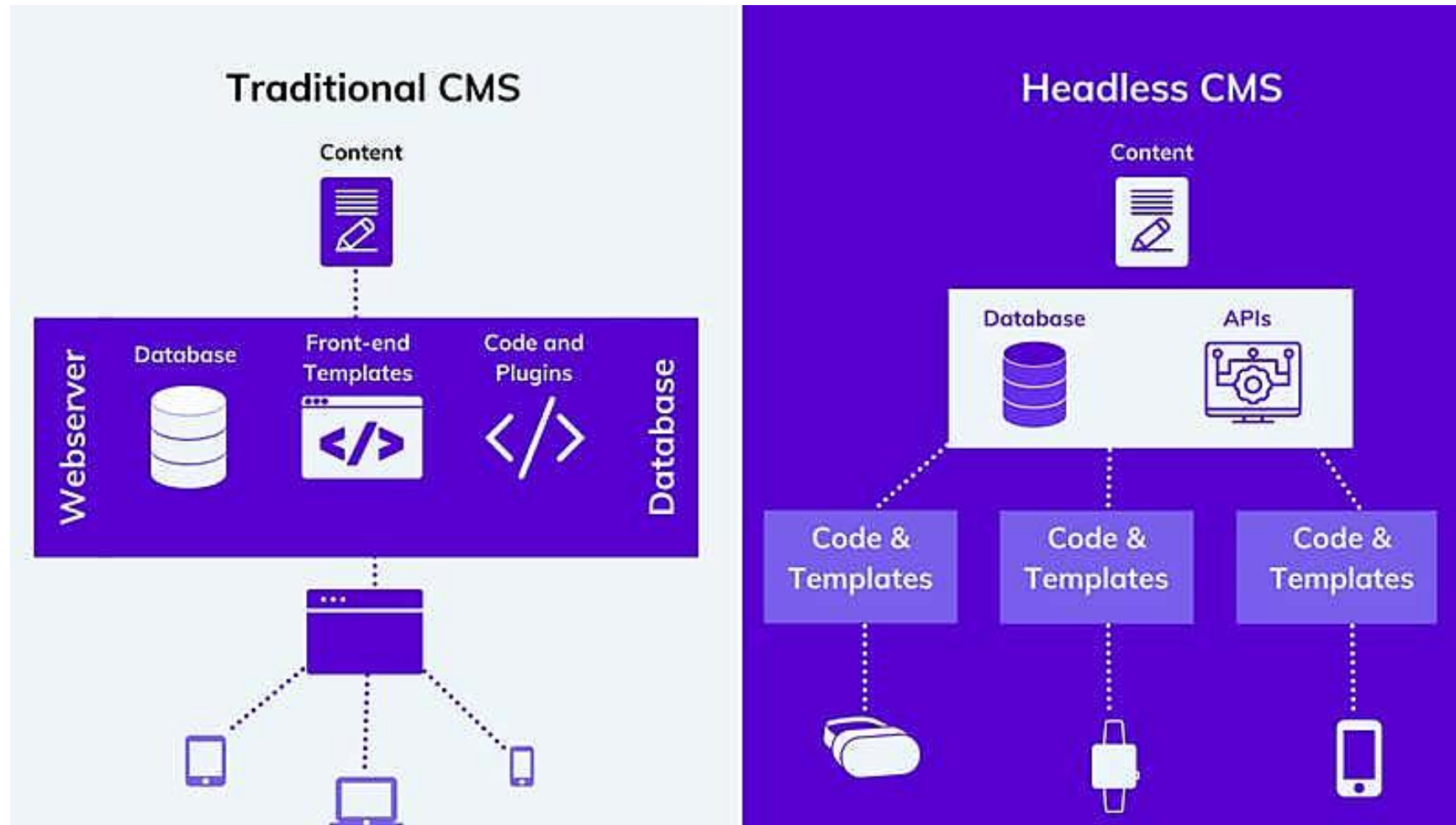
## Headless CMS

- Provide Backend-only.
- Content is delivered via APIs to any front-end (Web, Mobile App, Smartwatch, Digital Signage).
- Greater flexibility, future-proof, omnichannel ready.
- **Examples**



**Image source:** "Strapi vs Sanity Comparison," Revelation, [Online]. Available: [https://www.reveation.io/\\_next/image?url=https%3A%2F%2Freveation-website-2023-strapi.s3.us-east-1.amazonaws.com%2Fstrapi\\_vs\\_sanity\\_reveation\\_labs\\_598a3d1387\\_a25e152142\\_057a3600e8.png&w=1920&q=75](https://www.reveation.io/_next/image?url=https%3A%2F%2Freveation-website-2023-strapi.s3.us-east-1.amazonaws.com%2Fstrapi_vs_sanity_reveation_labs_598a3d1387_a25e152142_057a3600e8.png&w=1920&q=75). [Accessed: 07-Oct-2025].

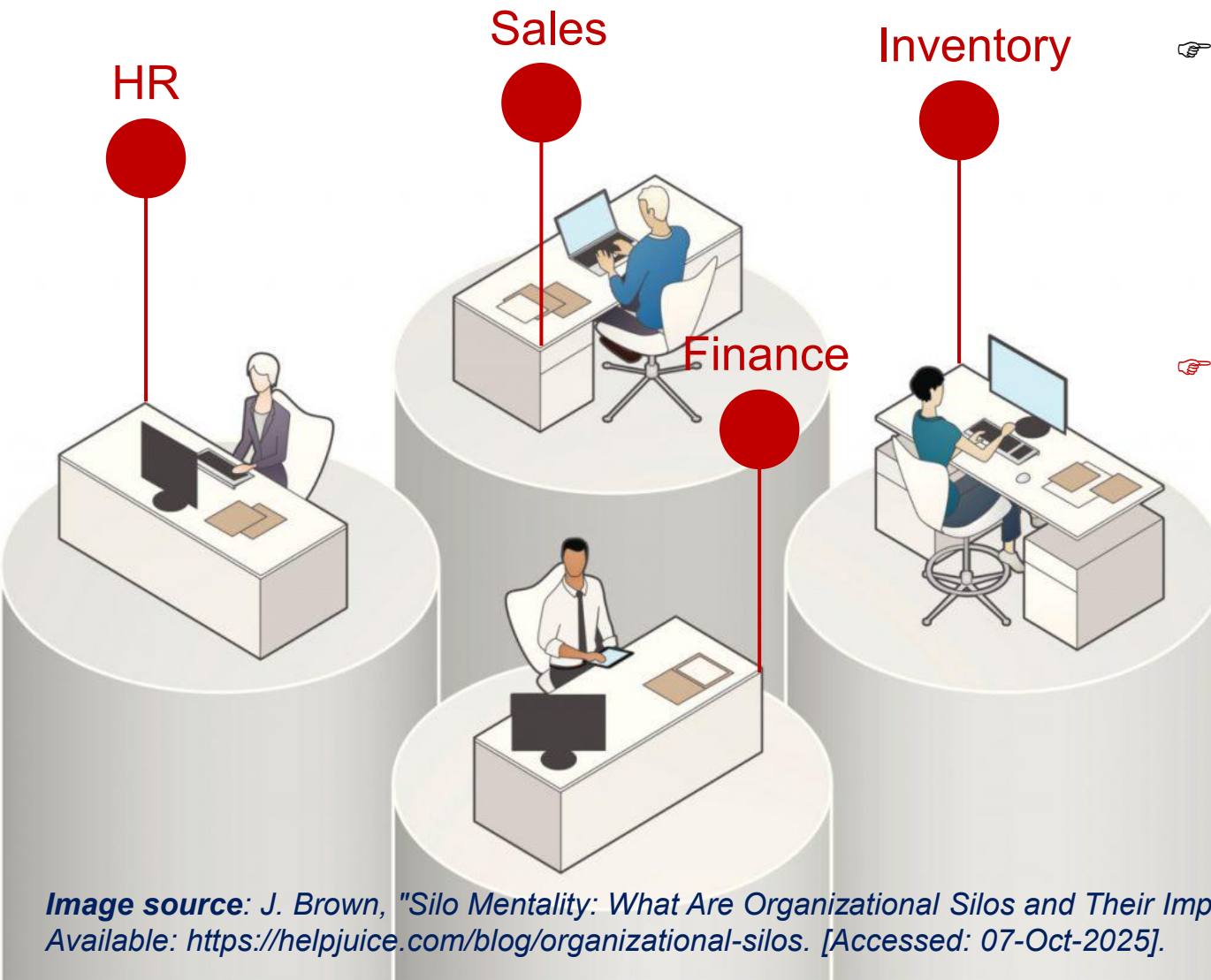
# Types of CMS (Summary)



**Image source:** "Drupal, Joomla, WordPress Logos," Joomla! Art, [Online]. Available: [https://static.joomlaart.com/images/blog/2016/october/Drupal\\_Joomla\\_WordPress.png](https://static.joomlaart.com/images/blog/2016/october/Drupal_Joomla_WordPress.png). [Accessed: 07-Oct-2025].

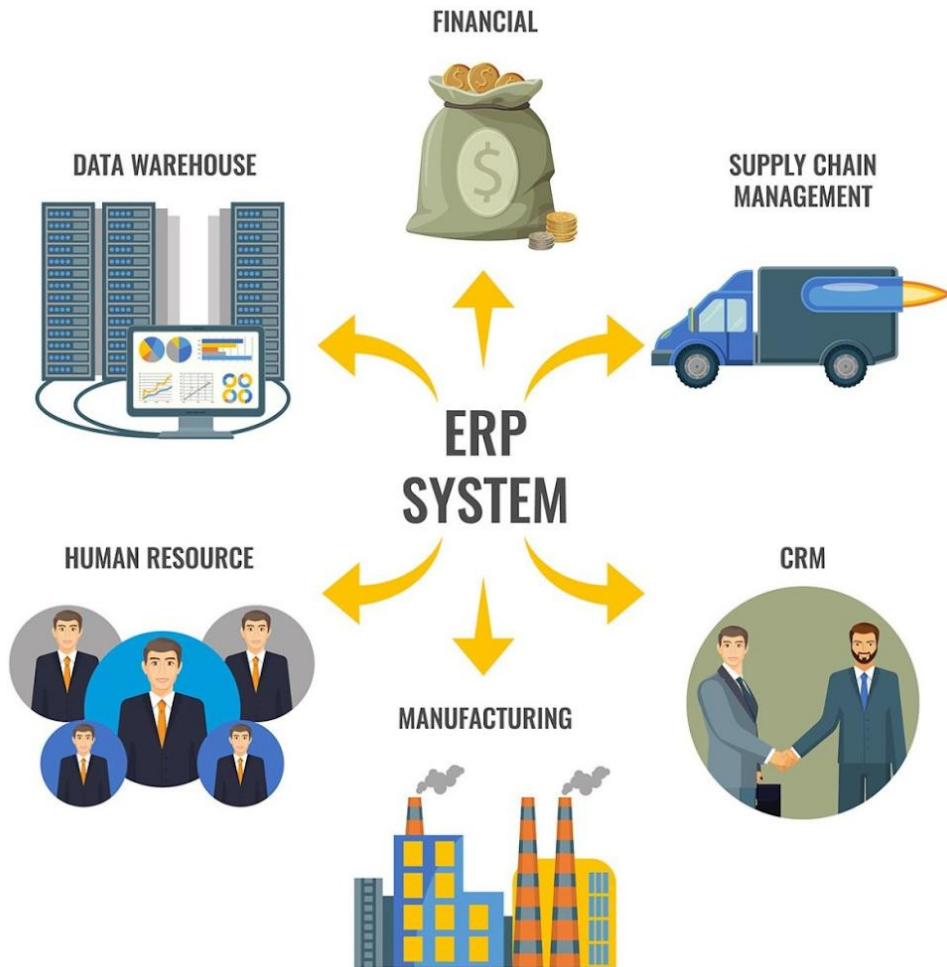
# Enterprise Resource Planning (ERP)

# The Challenge of Business Silos



- ➔ Departments often use disconnected software.
- 👎 HR doesn't talk to Sales
- 👎 Sales doesn't talk to Finance.
- 👎 Finance doesn't talk to Inventory.
- ➔ Leads to data duplication, inefficiencies, and poor decision-making.

# What is an Enterprise Resource Planning (ERP) System?



- ERP is a suite of integrated applications that help an organization manage its core business processes in real-time.
- An integrated suite of applications that helps an organization manage its core business processes in a unified system.
- It uses a common central database for all data.
- The central nervous system of a business.

# The problem with Traditional (Proprietary) ERP

- **High Licensing Fees** → Per-user, per-module licensing.
- **Implementation Costs** → Often 3-5x the software license cost.
- **Vendor Lock-in** → Difficult and expensive to switch.
- **Closed Ecosystem** → Customizations are difficult and expensive.

## Examples:

SAP

Oracle Netsuit

Microsoft Dynamics

# The Rise of Open Source ERP

- Addresses the cost and flexibility limitations of proprietary ERP.
- Offers the same core benefits of OSS
  - ✓ No license fees
  - ✓ Transparency
  - ✓ Community
- Democratizes advanced business tools for Small and Medium-sized Enterprises (SMEs).

# The Rise of Open Source ERP

## Odoo

- "All-in-one" business software with a seamless, integrated user experience.
- Odoo uses Freemium model.
- A strong core is open source, with advanced features and support available via paid enterprise licenses.
- The latest Odoo Community Edition is licensed under LGPL version 3.



**Image source:** "Odoo CRM Software," [Online Image]. Available:

<https://5.imimg.com/data5/SELLER/Default/2023/7/330284633/YR/JR/ED/131208625/odoo-crm-software-500x500.png>. [Accessed: 07-Oct-2025].

# The Rise of Open Source ERP

## Odoo

It's key strengths are:

- Beautiful, user-friendly interface.
- Very modular; you can start with one app (e.g., CRM) and add more.
- Huge number of apps (both official and community).



**Image source:** "Odoo CRM Software," [Online Image]. Available:

<https://5.imimg.com/data5/SELLER/Default/2023/7/330284633/YR/JR/ED/131208625/odoo-crm-software-500x500.png>. [Accessed: 07-Oct-2025].

# The Rise of Open Source ERP

## ERPNext

- A fully-featured, truly open source ERP under the GNU GPL v3 license.
- The core software is 100% free.
- Revenue comes from paid hosting, support, and implementation partners.



*Image source: "ERPNext," [Online Image]. Available: <https://globalteckz.com/wp-content/uploads/2025/07/ERPnext-1.png>. [Accessed: 07-Oct-2025].*

# The Rise of Open Source ERP

## ERPNext

It's key strengths are:

- Very comprehensive feature set out-of-the-box.
- Strong focus on manufacturing and distribution.
- Completely free to download and self-host.



*Image source: "ERPNext," [Online Image]. Available: <https://globalteckz.com/wp-content/uploads/2025/07/ERPnext-1.png>. [Accessed: 07-Oct-2025].*

## Odoo vs ERPNext

Business Model

Pricing

Target Size

Modularity

User Interface

Feature Richness

Community & Support

Customization

## Odoo

- 👉 Open-Core (Community is free, Enterprise is paid)
- 👉 Per-User, Per-App (Enterprise). Costly as you scale.
- 👉 SME to Large Enterprises (Highly Scalable)
- 👉 Highly Modular (Start small, add apps)
- 👉 Modern, Polished, Intuitive (Easier for non-technical users)
- 👉 Very high, especially in Manufacturing, Accounting, etc. (Enterprise)
- 👉 Large global community and partner network; Official support (Enterprise)
- 👉 Excellent, including no-code tool (Odoo Studio-Enterprise)

## Odoo vs ERPNext

Business Model

Pricing

Target Size

Modularity

User Interface

Feature Richness

Community & Support

Customization

## ERPNext

- ☞ Pure Open-Source (All features are free)
- ☞ No per-user license fees. Cost is mainly for hosting/support.
- ☞ Small to Medium Enterprises (SMEs)
- ☞ All-in-One (All core modules included out-of-the-box)
- ☞ Functional, Simpler (Can feel more technical)
- ☞ Good coverage of core functions, but less advanced in specialized areas.
- ☞ Active open-source community; Paid support from Frappe/partners.
- ☞ Excellent, highly customizable via Frappe Framework (developer-focused)

# Other Notable Open Source ERP Systems



## Dolibarr

Very lightweight, perfect for small service companies or freelancers.



## Apache OFBiz

A powerful, developer-oriented toolkit for building custom ERPs. Less of a ready-to-use product.



## Tryton

A fork of TinyERP (Odoo's predecessor), known for its stability and modularity.






**Image-1 source:** "Dolibarr Logo," Dolibarr ERP CRM Wiki, [Online]. Available: [https://wiki.dolibarr.org/index.php?title=File:Dolibarr\\_logo.png](https://wiki.dolibarr.org/index.php?title=File:Dolibarr_logo.png). [Accessed: 06-Oct-2025].

**Image-2 source:** "Apache OFBiz Logo," Wikimedia Commons, [Online]. Available: [https://commons.wikimedia.org/wiki/File:Apache\\_OFBiz\\_logo.svg](https://commons.wikimedia.org/wiki/File:Apache_OFBiz_logo.svg). [Accessed: 06-Oct-2025].

**Image-3 source:** "Apache OFBiz Logo," Wikimedia Commons, [Online]. Available: [https://commons.wikimedia.org/wiki/File:Apache\\_OFBiz\\_logo.svg](https://commons.wikimedia.org/wiki/File:Apache_OFBiz_logo.svg). [Accessed: 06-Oct-2025].






# Open Source ERP: Key Implementation Challenges

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
Challenge	Description	Key Question to Ask
 <b>Total Cost of Ownership</b>	"Free" software has real costs: implementation, customization, support, and maintenance.	Do we have a realistic budget for long-term ownership, not just initial setup?
 <b>Expertise Gap</b>	Smaller talent pool than proprietary systems. Finding skilled developers & partners is critical.	Do we have a reliable implementation partner or the internal skills to manage this?
 <b>You Own the Responsibility</b>	No single vendor to blame. Your team is responsible for security, updates, and system health.	Is our IT team prepared to own the full lifecycle of this critical system?
 <b>Integration &amp; Customization</b>	Customizing core code can create complexity. Integrating with other systems requires careful planning.	Have we mapped all required integrations and prioritized customizations?
 <b>Change Management</b>	Technical success depends on user adoption. Resistance to new processes is a major risk.	Do we have a strong plan for training and managing organizational change?

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# Navigating the Security Landscape of Open Source ERP

Challenge	The Core Issue	Mitigation Strategy
 <b>The Transparency Paradox</b>	Public code exposes vulnerabilities to both defenders and attackers.	Proactive monitoring of security advisories and rapid patch application.
 <b>Customization Risks</b>	Custom code bypasses community scrutiny, creating unique, unvetted vulnerabilities.	Rigorous internal code review & security testing for all custom modules.
 <b>Supply Chain Attacks</b>	A vulnerability in a single third-party module/plugin can compromise the entire system.	Meticulous vetting of all external modules and dependencies.
 <b>The Human Factor</b>	Shared responsibility model can lead to assumptions and security gaps ("Who owns this?").	A clear, documented Internal Responsibility Matrix for all security tasks.
 <b>Compliance &amp; Auditing</b>	Proving compliance (e.g., SOX, GDPR) without a single vendor's seal of approval.	Meticulous logging, documentation, and potentially a third-party audit.

# Summary

-  **Open Source Philosophy:** Freedom, flexibility, and collaboration trump vendor lock-in and high costs.
-  **CMS (WordPress, Drupal, Joomla):** Manages external digital content and communication. Powers your website.
-  **ERP (Odoo, ERPNext):** Manages internal business operations and data. Runs your business.

# Brain Teaser

1. The "freemium" model, where a strong core system is open source but advanced features and support require a paid license, is a characteristic of which leading open-source ERP?

A. Odoo

B. ERPNext

C. Drupal

D. Wordpress

# Brain Teaser

1. The "freemium" model, where a strong core system is open source but advanced features and support require a paid license, is a characteristic of which leading open-source ERP?

A. Odoo

B. ERPNext

C. Drupal

D. Wordpress

# Brain Teaser

2. The "freemium" model, where a strong core system is open source but advanced features and support require a paid license, is a characteristic of which leading open-source ERP?

A. ERPNext

B. Dolibarr

C. Odoo

D. Apache OFBiz

# Brain Teaser

2. The "freemium" model, where a strong core system is open source but advanced features and support require a paid license, is a characteristic of which leading open-source ERP?

A. ERPNext

B. Dolibarr

C. Odoo

D. Apache OFBiz

# Thank you!

"Open source software is a testament to the power of collaboration; it transforms ideas into innovations, empowering individuals and communities to build a better future together."

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# Reference

[1] Kinsta, "WordPress Market Share Statistics (2011-2025)," [Online]. Available: <https://kinsta.com/wordpress-market-share/>. [Accessed: 07-Oct-2025].