

# **Universal Knowledge Framework - Enhanced Design System**

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### **Core Layout Components**

#### **Header Architecture**

- Navigation Bar
  - Position: Fixed top, height: 64px
  - Logo: Left-aligned, SVG format
  - Primary menu: Centered, Roboto 16px
  - User profile: Right-aligned with dropdown
  - Language selector: Right corner
  - Accessibility controls: Font size, contrast mode

#### **Hero Banner**

- Full-width container (.container-fluid)
- Height: 600px with parallax background
- Gradient overlay: rgba(0,51,102,0.8) to rgba(0,128,128,0.6)
- Main heading: Roboto Bold 48px, white
- Animated knowledge graph visualization using Three.js
- Call-to-action buttons with hover animations

# **Navigation System**

## **Sidebar Navigation**

- Structure
  - Width: 280px, collapsible
  - Dark theme: #1a1a1a
  - Menu items: Roboto Regular 14px
  - Breadcrumb navigation integration
  - Search bar with advanced filtering

## **Main Content Area**

- Grid System
  - 12-column Bootstrap 5 grid
  - Responsive breakpoints: xs, sm, md, lg, xl, xxl
  - Gutters: 24px
  - Content sections with lazy loading

# **Component Library**

## **Data Cards**

- Knowledge Cards
  - Dimensions: 360px × variable height
  - Background: white
  - Shadow: 0 4px 6px rgba(0,0,0,0.1)
  - Border-radius: 8px
  - Loading skeleton states
  - Error handling states

## **Interactive Elements**

- Buttons
  - Primary: #003366 background, white text
  - Secondary: #008080 border, teal text
  - Hover effects: Scale(1.05) with 0.3s transition
  - Loading states with spinners
  - Disabled states with visual feedback

## Advanced Features

### AI Integration

- Chat Widget
  - Position: Fixed bottom-right
  - Initial state: Collapsed
  - Animation: Slide-up on open
  - AI avatar with typing animation
  - Real-time response indicators
  - Message history preservation

### Data Visualization

- Interactive Charts
  - D3.js integration with custom themes
  - Real-time updates via WebSocket
  - Interactive tooltips with rich data
  - Export functionality (PNG, SVG, PDF)
  - Responsive sizing across devices

### Multimedia Support

## **Rich Media Integration**

- Video Player
  - HTML5 player with custom controls
  - Autoplay on scroll into view
  - Picture-in-picture support
  - Bandwidth-aware quality switching
  - Closed captions support

## **Document Handling**

- File Management
  - Drag-and-drop upload interface
  - Progress indicators with cancel option
  - Preview functionality for common formats
  - Version control integration

## **Performance Optimization**

- Loading Strategy
  - Progressive image loading
  - Component code splitting
  - Service worker for offline support
  - Browser caching optimization

## **Security Measures**

- Authentication System
  - Multi-factor authentication support
  - Session management with timeout
  - Role-based access control

- Security event logging

## Accessibility Compliance

- WCAG 2.1 AA Standards
  - ARIA labels for interactive elements
  - Keyboard navigation support
  - Screen reader optimization
  - High contrast mode toggle
  - Focus indication system
  - Skip navigation links



```
graph TD
    A["Universal Knowledge Framework"] --> B["Core Components"]
    A --> C["Knowledge Organization"]
    A --> D["User Interface"]
    A --> E["Security & Compliance"]

    B --> B1["Data Management"]
    B --> B2["Analytics Engine"]
    B --> B3["Integration Layer"]
    B --> B4["System Core"]

    C --> C1["Content Structure"]
    C --> C2["Classification"]
    C --> C3["Taxonomy"]

    D --> D1["Dashboard"]
    D --> D2["Search Interface"]
    D --> D3["User Controls"]
    D --> D4["Reports"]

    E --> E1["Access Control"]
    E --> E2["Data Protection"]
    E --> E3["Standards"]
    E --> E4["Monitoring"]

    style A fill:#003366,color:#fff
    style B,C,D,E fill:#008080,color:#fff
```

## Design System Guidelines

### Typography

Primary Font: Roboto

Secondary Font: Open Sans

- Headers: Roboto Bold
- Body Text: Roboto Regular 16px
- Menu Items: Roboto Regular 14px

## Color Palette

- Primary: #003366 (Deep Blue)
- Secondary: #008080 (Teal)
- Background Gradient: rgba(0,51,102,0.8) to rgba(0,128,128,0.6)
- Text: White on dark backgrounds, Dark gray on light backgrounds

## Layout Specifications

- Container Width: 100% (.container-fluid)
- Grid System: 12-column Bootstrap 5 grid
- Gutters: 24px
- Card Border Radius: 8px
- Box Shadows: 0 4px 6px rgba(0,0,0,0.1)

## Interactive Elements

- Buttons: 40px height with 16px padding
- Hover Effects: Scale(1.05) with 0.3s transition
- Input Fields: 48px height
- Card Dimensions: 300px × variable height

## Responsive Breakpoints

- Desktop: 1200px and above
- Tablet: 768px to 1199px
- Mobile: Below 768px

## Component Spacing

- Section Margins: 48px top/bottom
- Card Grid Gap: 16px between items
- Widget Spacing: 32px from viewport edges
- Padding: 16px for containers, 8px for elements

```
.chat-container {  
    width: 100%;  
    max-width: 800px;  
    height: 600px;  
    border-radius: 12px;  
    box-shadow: 0 4px 12px rgba(0,0,0,0.15);  
    display: flex;  
    flex-direction: column;  
    background: #fff;  
}  
  
.chat-header {  
    padding: 16px;  
    background: linear-gradient(90deg, #003366, #008080);  
    color: white;  
    border-radius: 12px 12px 0 0;  
}  
  
.message-container {  
    flex: 1;  
    padding: 16px;  
    overflow-y: auto;  
}  
  
.input-area {  
    padding: 16px;  
    border-top: 2px solid #eee;  
    display: flex;
```

```

    gap: 16px;
    align-items: center;
}

.message-input {
  flex: 1;
  padding: 12px 16px;
  border: 2px solid #ddd;
  border-radius: 24px;
  font-size: 14px;
}

.send-button {
  padding: 12px 24px;
  background: #003366;
  color: white;
  border: none;
  border-radius: 24px;
  cursor: pointer;
  transition: all 0.3s ease;
}

.send-button:hover {
  background: #008080;
  transform: translateY(-1px);
}

```

## Application Directory Structure

```

src/
  ui/          # Frontend Layer
    |__ components/ # UI Components
    |   |__ atoms/  # Basic elements (buttons, inputs)
    |   |__ molecules/ # Composite components (cards, forms)
    |   |__ organisms/ # Complex components (knowledge cards)

```

```

|   └── layouts/    # Layout Templates
|       ├── default/ # Standard layout
|       ├── dashboard/# Data visualization layouts
|       └── auth/    # Login/authentication pages
|   └── styles/     # Styling
|       ├── theme/   # Brand colors (#003366, #008080)
|       ├── tokens/   # Design variables
|       └── global/   # Shared styles
|   └── animations/ # Motion Effects
|       ├── micro/   # Subtle interactions (hover: scale(1.05))
|       └── page/    # Transitions between views
└── features/      # Core Functionality
    ├── dashboard/  # Data visualization (D3.js)
    ├── chat/        # AI chat widget
    └── knowledge/   # Knowledge graph tools
    └── hooks/       # React Hooks
        ├── ui/        # Interface hooks
        ├── auth/       # Security hooks (multi-factor)
        └── data/       # API connectivity
    └── services/    # Backend Integration
        ├── api/       # Data endpoints
        ├── auth/       # Authentication (WCAG 2.1 AA)
        └── storage/    # Local/cloud data
    └── utils/        # Helper Functions
        ├── accessibility/ # Screen reader support
        ├── validation/   # Data verification
        └── formatting/   # Content processing

```

The Universal Knowledge Framework Enhanced Design System is a comprehensive system that defines the visual and interactive elements for the Universal Knowledge Framework. It includes:

## Core Components

- **Layout Elements:** A fixed-top navigation bar (64px height), hero banner (600px height with parallax background), and sidebar navigation (280px width, collapsible)

- **Design Guidelines:** Typography (Roboto as primary font, Open Sans as secondary), color palette (primary: #003366, secondary: #008080), and layout specifications (12-column Bootstrap 5 grid)
- **Component Library:** Knowledge cards (360px × variable height), interactive buttons with hover effects, and AI chat widget

## Advanced Features

- **AI Integration:** Chat widget with typing animation and message history preservation
- **Data Visualization:** D3.js integration with interactive tooltips and real-time updates
- **Multimedia Support:** HTML5 video player and document handling with drag-and-drop interface
- **Accessibility Compliance:** WCAG 2.1 AA standards with keyboard navigation support and screen reader optimization

The system includes a well-structured application directory and CSS implementations for various components like chat interfaces, providing a solid foundation for developing consistent and user-friendly interfaces for the knowledge framework.

This comprehensive design system defines visual and interactive elements for the knowledge framework.

## Core Components

The system includes:

- **Layout Components:** Navigation bar (64px height), hero banner (600px parallax), and sidebar navigation (280px width)
- **Design Guidelines:** Typography with Roboto/Open Sans fonts, color palette with primary #003366 and secondary #008080
- **Component Library:** Knowledge cards, interactive buttons, and specialized widgets
- **Advanced Features:** AI chat integration, D3.js data visualization, multimedia support

## Technical Implementation

- **Project Structure:** Organized in atomic design pattern with atoms, molecules, and organisms
- **Styling:** Detailed CSS for components including chat interfaces and cards
- **Security:** Multi-factor authentication and role-based access controls
- **Accessibility:** WCAG 2.1 AA standards implementation with screen reader optimization

## Additional Features

- **Performance Optimization:** Progressive loading, component code splitting, service worker support
- **Interactive Visualization:** Animated knowledge graph visualizations using Three.js
- **Responsive Design:** Breakpoints for desktop (1200px+), tablet (768-1199px), and mobile (below 768px)

The system provides a cohesive and user-friendly interface for the Universal Knowledge Framework, emphasizing accessibility, performance, and visual consistency.