

Commonwealth of Virginia

Enterprise Architecture Standard (EA-225)

Enterprise Solutions Architecture [ESA] Web Systems

Revision History

Web System Requirements: Version History

| Revision | Date | Description |
|----------|------------|---|
| 1.0 | 9/6/2022 | Initial document created |
| 1.1 | 9/12/2022 | Updated for comments from DBVI |
| 1.2 | 10/11/2022 | Updated for comments from VITA |
| 1.3 | 10/27/2022 | Updated for additional comments from VITA |
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| 1.6 | 3/30/2023 | Amended WEB-154 to clarify the use of CAPTCHA |
| 1.7 | 2/1/2024 | Updated languages and numbering |
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| 2.0 | 5/5/2025 | Administrative Changes: Amended to reflect new domain naming requirements |

Review Process

This requirements document was posted on the Virginia Information Technologies Agency’s (VITA) Online Review and Comment application (ORCA). All agencies, stakeholders, and the public were encouraged to provide their comments through ORCA. All comments were evaluated, and individual commenters were notified of action(s) taken.

Requirements and agency Exceptions

The requirements included within this document are mandatory. Agencies deviating from these requirements must request an exception for each desired deviation, and receive an approved *enterprise Architecture Exception* via Archer, prior to developing, procuring, or deploying such technology, or not complying with a requirement specified in this document. The instructions for completing and submitting an exception request are contained within the *Commonwealth Enterprise Architecture Policy*.

Glossary

As appropriate, terms and definitions used in this document are in the COV ITRM IT Glossary. The [COV ITRM IT Glossary](#) is available on the [VITA](#) website.

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Introduction

| Vision & Strategy | |
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| Vision | |
| Commonwealth of Virginia (COV) Workers shall create and maintain web-based content for the citizens of the Commonwealth in a manner that is accessible, consistent, creative, and secure. | |
| Strategy | |
| Objective 1 | To produce a consistent and homogenous appearance for COV web systems across all Commonwealth agency websites |
| Objective 2 | To produce web content that is accessible by all citizens of the Commonwealth |
| Objective 3 | To establish a sense of authenticity through consistency in domain naming, ensuring citizens that information being provided comes from a trusted source |
| Objective 4 | To ensure that COV web systems are secure from harm against cybersecurity attacks |

Purpose

The intent of this standard is to guide the management, development, purchase, and use of [web system](#) resources within COV. This standard encompasses and replaces the previous **Website Topic Report** released on September 21, 2017.

For further information on the perspectives identified in this document, please reference the VITA [Enterprise Architecture Standard \(EA-225\)](#).

Scope

This standard is applicable to all Commonwealth agencies (hereinafter collectively referred to as "agencies") that are responsible for the management, development, purchase and use of information technology resources in the Commonwealth of Virginia and applies to all [COV web systems](#).

This standard does not apply to research projects, research initiatives, or instructional programs at public institutions of higher education.

In addition to the requirements below all COV IT technology solutions comply with the standards found on VITA's [Policies, Standards & Guidelines](#).

Authority

| | |
|--|--|
| Code of Virginia, §2.2-2007 | Powers of the CIO |
| Code of Virginia, §2.2-2007.1 | Additional duties of the CIO relating to information technology planning and budgeting |
| Code of Virginia, §2.2-2009(A) | Additional duties of the CIO relating to security of government information |
| Code of Virginia, §2.2-2012(A) | Additional powers and duties related to the procurement of information technology |
| U.S. Access Board | ICT Accessibility 508 Standards |

Solution Business Requirements

VITA

- WEB-01 VITA shall define and maintain a Commonwealth of Virginia [Design System](#) (COV Design System)¹ as a guide for [COV web systems](#) that shall include:
- Branded template framework
 - Website components
 - Software Resources
 - Commonwealth Banner
 - Best Practice Guidelines
- WEB-02 VITA shall define design principles to be employed in the development of COV web systems. These shall include guidance for the device independent responsive display of COV content across a broad range of [form factors](#), to make these systems consistent and homogenous in appearance across the Commonwealth agency portfolio.
- WEB-03 VITA shall create and maintain the design system resource for COV web systems to utilize.
- WEB-04 VITA shall calculate peak load for new COV web systems prior to launch.
- WEB-05 VITA shall create and maintain an implementation schedule for the adoption of the requirements identified in this standard.
- WEB-06 VITA shall conduct accessibility and vulnerability scans for COV web systems.

COV Agencies

- WEB-07 All Commonwealth of Virginia agencies shall use the COV Design System for web systems.
- COV intranets and [Private Authenticated Web Applications](#) shall conform to the Accessibility and Security sections below but are not required to follow any other requirements in this standard.
- WEB-08 All agencies shall adhere to VITA-defined design principles and guidance for the development of COV web systems.
- WEB-09 All agencies shall identify to VITA a point of contact who serves as the responsible party for each COV web system.
- WEB-10 All agencies shall adhere to the published implementation schedule for the adoption of the requirements identified in this standard.
- WEB-11 COV web systems shall not display advertisements or commercial banners unless authorized by COV or the agency.
- WEB-12 Agencies shall annually provide output from compliance tools in Archer that attest to the following, to confirm adherence with the requirements contained in this standard:
- Application of COV Design System Styles, Components, and Templates
 - Accessibility testing
 - Performance testing
 - Security scans
 - Penetration testing

¹ developer.virginia.gov

- Technology requirements
- WEB-13 Agencies shall comply with the [Code of Virginia, § 2.2-3803 \(B\)](#) and at a minimum:
- Develop an Internet privacy policy and an Internet privacy policy statement that explains the policy to the public²
 - Tailor the policy and the statement to reflect the information practices of the individual agency
- The Internet Privacy Policy and Internet Privacy Policy Statement shall address:
- What information, including personally identifiable information, shall be collected if any
 - Whether any information shall be automatically collected simply by accessing the website and, if so, what information
 - Whether the website automatically places a computer file, commonly referred to as a cookie, on the Internet user's computer and, if so, for what purpose
 - How the collected information is being used or shall be used.
 - A prescribed procedure for an individual to learn the purpose for which information has been recorded and particulars about its use and dissemination
 - A clearly prescribed and uncomplicated procedure for an individual to correct, erase or amend inaccurate, obsolete, or irrelevant information
- WEB-14 Agencies that maintain exclusions to WEB-07, including those systems identified as exempt in the [Code of Virginia, § 2.2-3802](#), shall state those exclusions in their policy.
- WEB-15 Agency Internet Privacy Policy Statements shall identify that any personal information that is collected and retained is maintained in compliance with the [Code of Virginia, §§ 2.2-3800](#) and [2.2-3803](#).
- WEB-16 Agency Internet Privacy Policy Statements shall inform users that information collected on this site may be provided to anyone that requests it under the [Virginia Freedom of Information Act](#).
- WEB-17 COV web systems shall provide a conspicuous link for their agency's Internet Privacy Policy Statement that shall be displayed per the directives of the COV Design System.
- WEB-18 All agency COV web systems shall have a web policy that shall include the following:
- Disclaimer – a statement that indemnifies the commonwealth from responsibility for third party or externally linked content
 - Link policy – a policy stating the criteria that allows a link to be placed on the site
 - FOIA – a statement that explains the agency's Freedom of Information Act policies and contacts
- WEB-19 Agencies shall develop and post on their COV web systems a language translation policy that states the level of support for language translation on agency web systems.
- Agencies that rely on AI translation services such as Google Translate shall incorporate the Automated Translation Disclaimer into the Language Translation Policy
- WEB-20 COV web systems shall provide language translation where required by applicable law or where appropriate to achieve other business objectives.
- Agencies providing content for which a high degree of accurate translation is essential shall consider engaging professional language translation services.

² An example of an agency privacy policy may be found on the [VITA](#) website.

- Where feasible, web systems should provide for machine translation in the top languages of the Commonwealth: English, Spanish, Chinese (Traditional and Simplified), Korean, Arabic, Vietnamese, Tagalog, Urdu, French, and Hindi³.

Domain Naming

Government Internet domain naming identifies and implements standardized naming conventions to aid in developing statewide electronic directories and reducing overhead and administrative costs. Consistency in domain naming also conveys a sense of authenticity to a consumer, that the information being provided comes from a trusted source.

Domains and sub-domains of other domains are often referred to by level. The levels of a domain name are numbered from right to left. Using the sample domain name **department.oaa.virginia.gov** the levels are as follows:

- first-level gov
- second-level virginia
- third-level agency acronym
- fourth-level agency discretion

Fourth-level names may include the web system name, activity name, or department name.

Example

- department.oaa.virginia.gov

WEB-21 All agencies and boards in the Commonwealth except for institutions of higher education shall use the **virginia.gov** domain name. This requirement does not preclude agencies from possessing other domain names for which they separately register and accept full responsibility.

Any Commonwealth entity seeking to implement domain names that deviate from this standard shall require that an Enterprise Architecture exception be granted before the domain name can be created.

Any COV entity seeking to implement domain names that deviate from this standard must ensure consistency, security, and brand alignment for Virginia agency websites.

Alternate URLs may be used alongside (agency).virginia.gov URLs only under specific, justified business conditions and must satisfy the following conditions:

- Public Engagement – The alternate URL supports a statewide initiative or public-facing campaign that requires a distinct, memorable web address for accessibility and outreach.
- Operational Necessity – The agency operates a specialized service or web application that requires a non-standard domain due to technical or vendor-related constraints.
Example: agencymuseum.org
- Interagency Collaboration – The alternate URL facilitates a multi-agency partnership where branding must remain neutral to represent multiple stakeholders.

³ Source: [DataUSA: Virginia](https://datausa.io/virginia/)

All alternate URLs must be pre-approved by the Virginia IT Agency (VITA) via an EA exception.

Agencies must provide a business justification demonstrating alignment with the above conditions.

Alternate URLs must redirect users to the corresponding virginia.gov domain when feasible.

Branded domain names are acceptable but must have a redirect from a properly formed **virginia.gov** address.

All legacy domain names that do not comply with the standard will be grandfathered but must redirect to a properly formed DNS name. All new domain names must comply on creation.

Domain names produced COTs or SaaS solutions where the resulting URL is not under COV control are excluded from this requirement.

- WEB-22 Domain Names are to be composed of alphabetic characters and numbers. Upper/lower case is transparent. Hyphens (dashes) are allowed but may not be used at the beginning or end of a domain name. Within a domain name spaces, the underscore, and special characters are not permitted. Special characters include but are not limited to: ! @ # \$ % ^ & * () ? ”
- WEB-23 The name of an agency of the Commonwealth of Virginia will be at the third level and will consist of the official agency acronym/abbreviation.
- Examples**
- vita.virginia.gov
 - doa.virginia.gov
- WEB-24 Fourth Level Domain Names – The fourth level of the **virginia.gov** domain will be used to further subdivide the entities established at the third level. Since many organizations exist at several levels of government, their location within this hierarchy will allow citizens to distinguish between them. Fourth level names are generally at the discretion of the requesting agency. The examples below are offered as a guideline to encourage a generally accepted and recognizable naming convention.
- Examples of Departments or Activities of Executive Branch Agencies**
- license.dwr.virginia.gov
 - eva.dgs.virginia.gov
- WEB-25 Agencies shall provide annually to VITA a list of all first level domains registered on **domains.dotgov.gov** or other private registrars, including non-government top-level domains such as **.com**, **.us**, and **.org**.
- WEB-26 Agencies with public DNS entries must classify those entries in Archer as one of the following types:
- Web site
 - Web application
 - Administrative entry

Design/Architecture

- WEB-27 All agencies shall display the Commonwealth Banner unaltered and as defined by the COV Design System.

- WEB-28 COV web systems shall provide an agency site search box which shall appear on every page and shall be displayed per the directives of the COV Design System.
- WEB-29 COV web systems shall include a sitemap to enable search engines to crawl a website more efficiently. Examples will be provided in the COV Design System.
- WEB-30 COV web systems shall ensure that each page shall have a footer containing, at a minimum, the following information:
- Agency name
 - Copyright information
 - Text or an approved icon link stating [Web Accessibility Initiative](#) (WAI) compliance.
 - Link to the agency's Internet Privacy Policy Statement.
 - Link to FOIA Information
 - Translation Disclaimer
 - Other items as defined by the COV Design System
- WEB-31 COV web systems shall provide a Contact Us page that shall include, at a minimum, the agency's:
- Mailing address
 - FAX number, if available
 - Phone number, including a toll-free number and/or, TTY number if available
 - Email link or contact form to an agency contact
- The Contact Us page shall be accessible from the page footer.
- Note** Agencies should employ generic email addresses and avoid associating agency contact links to specific individuals.
- WEB-32 COV web systems shall ensure that all public content posted shall be searchable and discoverable through the public search engines appearing on the [COV Search Engine Technology Roadmap](#).
- WEB-33 Agencies shall audit COV web systems search results relevant to their agency name and content on a semi-annual basis.
- WEB-34 COV web systems that shall retain function in offline or low-bandwidth instances shall be implemented as [Progressive Web Applications](#).
- WEB-35 COV web systems shall support [Dark Mode](#) to conserve the battery life of [Organic Light-Emitting Diode \(OLED\)](#) screen devices and for users with visual sensitivity to bright screens.
- WEB-36 COV [platform web systems](#), including Commercial Off-the-Shelf (COTS) systems, shall support [white-labelling](#) for seamless use of Commonwealth Branding as defined by the COV Design System.
- WEB-37 COV web systems shall employ web analytics to track, analyze, and report on web system traffic. Analytics reporting shall be available to VITA for review.
- WEB-38 Agencies shall submit their COV web systems for architecture review in Archer for the requirements covered in this standard prior to their initial release, and on subsequent release of [architecturally significant changes](#). Agencies shall use VITA approved reporting tools for accessibility scoring, Performance scoring, and Vulnerability scans. Artifacts for architecture review shall include:
- Accessibility scoring, targeting a minimum 86% accessibility compliance
 - Policy review, to ensure compliance with website design requirements
 - Performance scoring, targeting 90% or better

- Vulnerability scans, ensuring compliance with Commonwealth Security Standards

Accessibility

These accessibility requirements were derived from and conform to [Web Content Accessibility Guidelines \(WCAG\) 2 Level AA](#).

WEB-39 COV web systems shall provide needed accessibility information that shall be displayed per the directives of the COV Design System, so that the user shall have immediate knowledge as to how to best navigate the website.

WEB-40 COV web systems shall support high-contrast colors for users with low vision and graphical rendering of audio cues for users with hearing disabilities.

WEB-41 COV web systems shall include information in text when the color of words, backgrounds, or other content is used to convey information.

WEB-42 COV web systems shall ensure that hyperlinks are easily identifiable through non-color means, including both default and hover states.

Note The easiest and most conventional way to signify links is underlining.

WEB-43 COV web systems shall ensure that required fields and fields with errors must include some non-color way to identify them.

WEB-44 COV web systems shall organize pages using properly nested HTML headings.

WEB-45 COV web systems shall use Accessible Rich Internet Applications ([ARIA](#)) to enhance accessibility only when HTML is not sufficient.

Note Use caution when providing ARIA roles, states, and properties.

WEB-46 COV web systems shall use ARIA landmarks and labels to identify regions of a page.

WEB-47 COV web systems shall programmatically indicate required fields using the **required** or **aria-required** attributes.

WEB-48 COV web systems shall follow corresponding ARIA authoring practices for tooltips:

- Tooltips are displayed and disappear via keyboard focus and removal of focus and by the mouse events - mousing over and mousing out
- Tooltip never receive focus, focus stays on the owning element
- Tooltips can be hidden with the Escape key
- Tooltips are only hidden via JavaScript and CSS selectors, when JavaScript is not available the tooltip is shown

WEB-49 When visible text alone is not sufficient to convey meaning, COV web systems shall use advanced techniques to provide additional meaning, such as ARIA attributes, screen reader only text, or the title attribute.

WEB-50 COV web systems shall identify errors using **aria-invalid**.

WEB-51 When providing inline help text, COV web systems shall use **aria-describedby** to associate the help text with the input.

WEB-52 When creating a custom interactive widget, COV web systems shall consult the ARIA Authoring Practices Document. COV web systems shall use ARIA labels, descriptions, roles, states, and properties to expose information about the component.

WEB-53 COV web systems shall use ARIA live regions or ARIA alerts to convey a status message to screen reader users.

- WEB-54 COV web systems shall ensure that status messages can be programmatically determined through role or properties, such that they can be presented to the user by assistive technologies without receiving focus, in content implemented using markup languages.
- WEB-55 COV web systems shall reserve tables for tabular data, use table headers appropriately, and use table captions.
- WEB-56 COV web systems shall ensure all content does not restrict its view and operation to a single display orientation, such as portrait or landscape, unless a specific display orientation is essential.
- Note** Examples where a particular display orientation may be essential are a bank check, a piano application, slides for a projector or television, or virtual reality content where content is not necessarily restricted to landscape or portrait display orientation.
- WEB-57 COV web systems shall not automatically play audio on pages.
- WEB-58 COV web systems shall provide an easy way to disable the audio and adjust the volume where audio is provided.
- WEB-59 COV web systems shall ensure that text, including images of text, have a contrast ratio of at least 4.5:1. For text and images of that is at least 24px and normal weight or 19px and bold, use a contrast ratio that is at least 3:1.
- WEB-60 COV web systems shall ensure a color contrast of at least 3:1 for custom states of elements where they appear, such as hover, active, or focus.
- WEB-61 COV web systems shall ensure that visual presentations of the following must have a contrast ratio of at least 3:1 against adjacent colors:
- User interface components (except for inactive components or when the appearance of the component is determined by the user agent)
 - Graphical objects that are required to understand the content, except when that particular presentation of objects is essential to the information being conveyed
- WEB-62 COV web systems shall avoid the use of images of text except in cases such as logos.
- WEB-63 COV web systems shall provide responsive stylesheets such that content can be presented without loss of information or functionality, and without requiring scrolling in two dimensions (horizontal and vertical) for:
- Vertical scrolling content at a width equivalent to 320 CSS pixels (equivalent to a starting viewpoint of 1280 CSS pixels wide at 400% zoom)
 - Horizontal scrolling content at a height equivalent to 256 CSS pixels (equivalent to a starting viewpoint height of 1024 CSS pixels at 400% zoom)
- Note** This does not apply to content that requires two-dimensional layout for usage or meaning such as maps and diagrams, video, games, presentations, and data tables.
- WEB-64 For content that appears on hover and focus COV web systems shall ensure that the content:
- Is dismissible with the escape key
 - Can be hovered over
 - Remains available unless it is dismissed, it is no longer relevant, or the user removes hover and focus

- WEB-65 COV web systems shall ensure that content that appears on hover or focus should not obscure other content unless it presents a form input error. or can be dismissed with the escape key.
- WEB-66 COV web systems shall ensure pointer hover or keyboard focus triggers additional content to become visible and then hidden when the following are true:
- A mechanism is available to dismiss the additional content without moving pointer hover or keyboard focus unless the additional content communicates an input error or does not obscure or replace other content
 - If pointer hover can trigger the additional content, then the pointer can be moved over the additional content without the additional content disappearing
 - The additional content remains visible until the hover or focus trigger is removed, the user dismisses it, or its information is no longer valid
- Note** This rule does not apply to the visual presentation of additional content that is controlled by the user agent.
- WEB-67 COV web systems shall ensure that entering/exiting a menu or combo box, or moving among open web pages on a website, does not cause the user to lose focus.
- WEB-68 COV web systems shall ensure that all functionalities shall be available to a keyboard without requiring specific timing of keystrokes unless the functionality cannot be provided by a keyboard alone.
- WEB-69 COV web systems shall ensure that items on the page do not automatically move, blink, scroll, or update, including carousels. Exceptions to this requirement shall provide a way to pause, stop, or hide the moving, blinking, scrolling, or updating.
- WEB-70 COV web systems shall not provide any content that flashes more than three times in any 1-second period.
- WEB-71 COV web systems shall create a logical tab order through links, form controls, and interactive objects.
- WEB-72 When inserting content into the DOM COV web systems shall insert the content immediately after the triggering element or use scripting to manage focus in an intuitive way. When triggering dialogs and menus, those elements shall follow their trigger in the focus order in an intuitive way. When content is dismissed or removed, COV web systems shall place focus back on the trigger.
- WEB-73 COV web systems shall ensure that the purpose of each link can be determined from the link text alone, or from the link text and the containing paragraph, list item, or table cell, or the link text and the title attribute.
- WEB-74 COV web systems shall include at least two of the following:
- List of related pages
 - Table of contents
 - Site map
 - Search
 - List of all pages
- WEB-75 COV web systems shall ensure that on each page, headings, landmark labels, and form labels are unique unless the structure provides adequate differentiation between them.
- WEB-76 COV web systems shall provide keyboard focus styles that are highly visible, and make sure that a visible element has focus at all times when using a keyboard. COV web systems shall not rely on browser default focus styles.

- WEB-77 COV web systems shall require that all functionality using multipoint or path-based gestures for operation, be operated with a pointer input that operates with one point of contact with the screen without a path-based gesture, unless a multipoint or path-based gesture is essential.
- Note** This rule does not apply to actions that are required to operate the user agent or assistive technology.
- WEB-78 COV web systems shall ensure that for functionality that can be operated using a pointer input that operates with one point of contact with the screen, at least **one** of the following must be true:
- The event that occurs when the trigger stimulus of the pointer is depressed is not used to execute any part of the function
 - Completion of the function on the event that occurs when the trigger stimulus of a pointer is released, and a mechanism is available to abort the function before completion or to undo the function after completion
 - The function on the event that occurs when the trigger stimulus of a pointer is released reverses any outcome of the preceding event that occurs when the trigger stimulus of the pointer is depressed
 - Completion of the function on the event that occurs when the trigger stimulus of the pointer is depressed is essential. Functions that emulate a keyboard or numeric keypad key press are considered essential
- Note** This rule does not apply to actions that are required to operate the user agent or assistive technology.
- WEB-79 COV web systems shall avoid triggering functionality on down-events, such as **onmousedown**, and prefer events such as **onclick** instead. Functions triggered by an up event such as **onmouseup** shall provide a way to abort or undo the function.
- WEB-80 COV web systems shall avoid activating functionality through motion, such as shaking a phone. If motion triggers functionality, COV web systems shall provide a way to disable the motion trigger and provide an alternative way to activate the functionality. Functionality that can be operated by device motion or user motion can also be operated by user interface components and responding to the motion can be disabled to prevent accidental actuation, except when:
- The motion is used to operate functionality through an accessibility-support interface
 - The motion is essential for the function and doing so would invalidate the activity
- WEB-81 When the focus changes or when a user inputs information or interacts with a control, COV web systems shall not:
- Cause a change in page content
 - Spawn a new browser window
 - Submit a form
 - Cause further change in focus
 - Cause any other change that disorients the user
- When an input causes such a change, the user shall be informed ahead of time.
- WEB-82 COV web systems shall ensure that when components are repeated across web page, they should appear in the same relative order regarding other repeated components on each web page where they appear.

- WEB-83 COV web systems shall ensure that when a navigation menu is presented on multiple pages, the links shall appear in the same order on each page.
- WEB-84 COV web systems shall ensure that when components have the same functionality across several web pages, the components are labeled consistently on each page.
- WEB-85 COV web systems shall visually indicate required fields in the form's instructions or form labels and shall not indicate required fields via CSS alone.
- WEB-86 COV web systems shall make errors easy to discover, identify, and correct.
- WEB-87 COV web systems shall use [semantic](#), descriptive labels for inputs.
- WEB-88 COV web systems shall visually position labels in a consistent way that makes associating labels with form controls easy and shall not rely on placeholder text in lieu of an HTML label.
- WEB-89 COV web systems shall provide text instructions at the beginning of a form or set of fields that describes the necessary input.
- WEB-90 COV web systems shall ensure the purpose of each input field collecting information about the user can be programmatically determined when:
- The input field serves a purpose identified in the following list defined by the WCAG.
 - The content is implemented using technologies with support for identifying the expected meaning for form input data.
- Note** An element is considered programmatically determined when software from author-supplied data provided in a way that different software used to retrieve and view web content, including assistive technologies, can extract and present this information to users in different modalities such as markup languages.
- WEB-91 When an input error is detected and suggestions for correction are known, COV web systems shall provide suggestions for fixing the submission. Refer to the COV Design System for examples of error handling.
- WEB-92 COV web systems shall provide easy ways to confirm, correct, or reverse a user action where a mistake would cause a serious real-world consequence, such as submitting financial data, entering into a legal agreement, submitting test data, or making a transaction.
- WEB-93 COV web systems shall ensure that all **img** tags have **alt** attributes.
- WEB-94 When short **alt** text is sufficient to describe an image, COV web systems shall provide the short text via the image's **alt** attribute.
- WEB-95 When short text alternative is not sufficient to describe an image, such as in a chart, graph, or diagram, COV web systems shall provide short text via the image's alt attribute and include a long description in nearby text.
- WEB-96 If an image or icon is used as a button or link, COV web systems shall ensure the image has a text alternative sufficient to describe the purpose of the button or link.
- WEB-97 For images that are decorative, used for formatting, or contain content already conveyed in text, COV web systems shall have a null **alt** attribute or shall be implemented as CSS background images.
- WEB-98 When **iframes** are employed in COV web systems they shall have descriptive titles and include the **sandbox** attribute.

- WEB-99 COV web systems shall minimize the number of adjacent links to the same destination by combining adjacent images and text into a single link, rather than creating a separate link for each element.
- WEB-100 COV web systems shall use [semantic markup](#) to designate headings, lists, figures, and emphasized text.
- WEB-101 When the appearance of text conveys meaning, COV web systems shall use appropriate semantic markup.
- WEB-102 COV web systems shall avoid emulating links and buttons.
- Use the **a** and **button** tags appropriately
 - Avoid using **a** tags for buttons
 - Avoid using **div**, or **span** tags for links or buttons
- WEB-103 COV web systems shall avoid using whitespace characters for layout purposes.
- WEB-104 COV web systems shall ensure that the source order presents content meaningfully. When the page is viewed without styles, all content on the page shall still appear in a meaningful and logical order.
- WEB-105 COV web systems shall not identify content based on its color, size, shape, position, sound, or other sensory characteristics.
- WEB-106 COV web systems shall not convey information solely through icons or symbols.
- WEB-107 When a form field asks for information about the user and if there is an appropriate HTML autocomplete attribute COV web systems shall include that autocomplete attribute.
- WEB-108 COV web systems shall ensure that there is no loss of content or functionality when text resizes.
- WEB-109 COV web systems shall ensure that content implemented using markup languages that support the following text style properties below, should ensure no loss of content or functionality occurs by setting all of the following and by changing no other style property:
- Line height to at least 1.5x the font size
 - Spacing following paragraphs to at least 2x the font size
 - Letter spacing to at least 0.12x the font size
 - Word spacing to at least 0.16x the font size
- Note** This does not apply to human languages and scripts that do not make use of one or more of these text style properties in written text.
- WEB-110 COV web systems shall define texts and text containers in relative units (percents, ems, rems) rather than in pixels.
- WEB-111 COV web systems shall avoid using pixels for defining the height and spacing, such as height or line height, of text boxes.
- WEB-112 COV web systems shall avoid implementing access keys. When access keys and other keyboard shortcuts are implemented, they shall not interfere with existing browser and screen reader provided shortcuts.
- WEB-113 COV web systems shall avoid relying exclusively on pointer-driven events, such as **onmouseover**, to provide functionality when scripting. Generally, such functionality will also require scripting for keyboard operability.

- WEB-114 COV web systems shall avoid using scripts to remove focus from an element until the user moves focus manually.
- WEB-115 COV web systems shall ensure keyboard focus is never trapped on an element without an obvious way to move focus out of the element. COV web systems shall ensure the user can move focus to and from all focusable elements using a keyboard only.
- WEB-116 COV web systems shall ensure if a keyboard shortcut is implemented in content using only letters (including upper- and lower-case), punctuation, numbers, or symbol characters, then at least **one** of the following must be true:
- A mechanism is available to turn the shortcut off
 - A mechanism is available to remap the shortcut to include one or more non-printable keyboard keys
 - The keyboard shortcut for a user interface component is only active when that component has focus
- WEB-117 COV web systems shall not require time limits to complete tasks unless necessary. If a time limit is necessary, the time limit should be at least 20 hours, or it can be extended, adjusted, or disabled.
- WEB-118 COV web systems shall provide a link to skip to the main content as the first focusable link on the page.
- WEB-119 COV web systems shall ensure each web page has a title tag that is descriptive, informative, and unique.
- WEB-120 COV web systems shall avoid using tab index values greater than 0.
- WEB-121 COV web systems shall ensure that for user interface components with labels that include text or images of text, the name contains the text that is presented visually. A best practice is to have the text of the label at the start of the name.
- WEB-122 COV web systems shall ensure that when a visual label is present for an interactive element, such as a link or form control, the accessible name of the element should contain the visual label.
- WEB-123 COV web systems shall provide a **lang** attribute on the page's html element. If a portion of the page is in a different language, use the **lang** attribute on that part.
- WEB-124 COV web systems shall validate all page HTML and avoid significant validation / parsing errors.
- WEB-125 COV web systems shall avoid creating custom widgets when HTML elements already exist.
- WEB-126 For pre-recorded audio without video, COV web systems shall provide a descriptive transcript that includes dialogue and all other meaningful sound.
- WEB-127 For pre-recorded video without audio, COV web systems shall provide a text alternative or audio descriptions that provide the same information presented.
- WEB-128 COV web systems shall provide captions for prerecorded audio content in non-live synchronized media.
- WEB-129 For non-live video, COV web systems shall provide a descriptive transcript or an audio description.
- WEB-130 COV web systems shall provide captions for live audio and video.

- WEB-131 COV web systems shall ensure that videos should include radio style narration so that content makes sense if someone is consuming just the audio track and include any text elements in the narration.
- WEB-132 COV web systems shall ensure that instruction in the operation of an accessible video player is available before the video is encountered.
- WEB-133 COV web systems shall ensure that video can be started and stopped, paused, and repeated through keyboard access.

Availability/Performance

- WEB-134 Agencies, in consultation with VITA, shall conduct user population analysis to identify the potential volume of traffic.

WEB-135 COV web systems shall meet the following minimum performance budget:

| Metric | Budget |
|--|----------------------|
| First Contentful Paint (FCP) | 0–1800 milliseconds |
| Speed index | 3.4–5.8 seconds |
| Largest Contentful Paint (LCP) | 0–2500 milliseconds |
| Time to Interactive (TTI) | 3.8–4.8 seconds |
| Cumulative Layout Shift (CLS) | 0–0.1 seconds |
| Total Blocking Time (TBT) | 200-600 milliseconds |

- WEB-136 COV web systems which have higher performance requirements than those identified in WEB-135 shall define those requirements in a [performance budget](#).
- WEB-137 VITA shall provide a performance testing service for COV web systems.
- WEB-138 COV web systems shall engage in performance testing prior to production deployment to confirm the system’s expected behavior.
- WEB-139 COV web systems shall be monitored for performance in production according to the minimum performance budget or agency-defined performance budget as appropriate.
- WEB-140 Providers of COV web system monitoring services shall triage, escalate, and report disruptions in performance.
- WEB-141 VITA shall provide a service to conduct traffic analysis of COV web systems to identify changes in user population and traffic patterns.
- WEB-142 Agencies shall conduct semi-annual traffic analysis of COV web systems.
- WEB-143 Agencies shall bi-annually load test web systems using synthetic requests which simulate estimated peak load.

Capacity

- WEB-144 Agencies shall create and maintain capacity plans for data storage required by COV web systems.
- WEB-145 COV web systems shall have sufficient infrastructure resources to support their predicted volume of traffic and storage, based on the performance profile identified in WEB-135, including additional headroom to address spikes in traffic.

Continuity

- WEB-146 COV web systems shall be categorized as one of the following:
- [Mission critical](#)
 - [Business critical](#)
 - [Non-critical](#)
- WEB-147 Mission critical COV web systems shall:
- Be deployed in a highly available configuration
 - Have an RTO and RPO of less than 15 minutes
 - Subscribe to Disaster Recovery services⁴
- WEB-148 Business critical COV web systems shall have an RTO of 4 hours and an RPO of 4 – 24 hours.
- WEB-149 Non-critical COV web systems shall have an RTO of 24 hours and an RPO of 25 – 48 hours.

Integration/Interoperability

- WEB-150 COV web systems shall be fully functional on approved web browsers identified in the [EUC Browser Technology Roadmap](#) and shall display and operate in a consistent manner.

Technology

- WEB-151 COV web systems shall be tested for functionality on approved web browsers prior to each production deployment.
- WEB-152 COV web systems shall use [permalinks](#) to ensure the long-term viability of links.
- WEB-153 Approved COV web browsers shall be configured to allow automated web page translation.

Security

- WEB-154 COV web systems shall be subject to periodic automated security scans to confirm robustness against cybersecurity attack.⁵ Systems must engage in the following tests prior to each production deployment and shall not be released with critical security defects identified as **High**.
- [Static Security Analysis Testing](#)
 - [Software Composition Analysis](#)
 - [Dynamic Analysis Security Testing](#)
- WEB-155 Providers of COV web vulnerability services shall stay attuned to changes in the threat landscape and shall escalate and report on all new threats requiring immediate attention to VITA.
- WEB-156 COV web systems shall have ad-hoc security scans performed when new exploits or vulnerabilities are identified by VITA and shall place priority on the remediation of all defects identified as **High** within 30 days of detection.

⁴ See VITA Service Catalog offering [Disaster Recovery \(Server\)](#).

- WEB-157 COV web systems shall be subject to annual penetration testing and shall place priority on the remediation of all critical defects identified by such tests within 30 days of detection.
- WEB-158 Public facing COV web systems shall employ Web Application Firewalls.
- WEB-159 Web systems that require authentication must employ accessible captcha to confirm that a user is a human.
- WEB-160 Web systems that present online forms must employ accessible captcha for submission.

Definitions

As appropriate, terms and definitions used in this document are included in the [COV ITRM IT Glossary](#).

| | |
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| Architectural significance | A concern, problem, or system element that has a wide impact on the structure of a system, or on its important quality properties such as performance, scalability, security, reliability, or evolvability. |
| Accessible Rich Internet Applications (ARIA) | A technical specification published by the World Wide Web Consortium (W3C) that specifies how to increase the accessibility of web pages dynamic content, and user interface components developed with Ajax, HTML, JavaScript, and related technologies. See Accessible Rich Internet Applications (WAI-ARIA) 1.2 . |
| Business critical | Business processes or systems that are essential for an agency to keep running, for which an outage produces significant disruption to the agency's mission. They are core to the agency's function, but which are not necessary to ensure immediate survival during outages and other disasters. |
| Captcha | A type of challenge–response test used in computing to determine whether the user is human in order to deter bot attacks and spam. |
| Citizen Facing Website | Any public, indexable website deployed on behalf of the Commonwealth. |
| COV web system | Any web system created by, or on behalf of, a Commonwealth agency that is deployed on COV-based infrastructure, hosted on a media platform, or is downloadable for installation on smart devices, including: <ul style="list-style-type: none"> • Web applications created by agency development teams or 3rd party vendors • Web sites created on platform systems⁶ • Low-code/No-Code applications⁷ • Web apps for smart devices • Web-based desktop systems⁸ |

⁶ Examples include systems such as T4, Oracle Financials, or Salesforce.

⁷ Examples include systems such as Microsoft Power Apps or AWS Honeycode.

⁸ Examples include systems constructed in the manner of Microsoft Teams or Slack.

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| Cumulative Layout Shift (CLS) | A measure of the largest burst of layout shift scores for every unexpected layout shift that occurs during the entire lifespan of a page. |
| Dark mode | A color scheme that uses light-colored text, icons, and graphical user interface elements on a dark background. It is often discussed in terms of computer user interface design and web design. |
| Design System | A set of interconnected patterns and shared practices coherently organized. Design systems aid in digital product design and development of products such as applications or websites. They may contain, but are not limited to, pattern libraries, design languages, style guides, coded components, brand languages, and documentation. |
| Document Object Model | The data representation of the objects that comprise the structure and content of a document on the web. |
| Dynamic Analysis Security Testing | A runtime analysis of an application that is live in an environment to scan link, images, line of text and code to identify vulnerabilities. |
| First Contentful Paint (FCP) | Measures the time from when the page starts loading to when any part of the page's content is rendered on the screen. |
| Form factor | <p>A hardware design aspect that defines and prescribes the size, shape, and other physical specifications of components, particularly in electronics.</p> <p>Examples of different smart device form factors include:</p> <ul style="list-style-type: none">• Laptops• Smartphones• Tablets |
| General Authenticated Web Application | An application that is used by Commonwealth Employees and the public. |
| Hypertext Markup Language (HTML) | The standard markup language for documents designed to be displayed in a web browser. |
| Hypertext Transfer Protocol (HTTP) | An application layer protocol in the Internet protocol suite model for distributed, collaborative, hypermedia information systems. It is the foundation of data communication for the World Wide Web. |
| Hypertext Transfer Protocol Secure (HTTPS) | An extension of HTTP which uses encryption for secure communication over a computer network. |
| Largest Contentful Paint (LCP) | Reports the render time of the largest image or text block visible within the viewport, relative to when the page first started loading. |
| Layout shift | Any time a visible element changes its position from one rendered frame to the next. |

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| Mission critical | A business process or system that must function continuously for an agency to be successful, for which the impact of an outage is immediate and catastrophic to the agency's mission. |
| Non-critical | A business processes or system for which an outage will not significantly affect an agency's mission. |
| Organic Light-Emitting Diode (OLED) | A light-emitting diode (LED) in which the emissive electroluminescent layer is a film of organic compound that emits light in response to an electric current. OLEDs are used to create digital displays in devices such as television screens, computer monitors, and portable systems such as smartphones and handheld game consoles. |
| Performance Budget | A collection of limits imposed on a defined set website metrics that describe expected performance. |
| Permalink | A URL that is intended to remain unchanged for many years into the future, yielding a hyperlink that is resistant to link rot |
| Platform web system | Any web system that provides enterprise-level capabilities for large-scale or multitenant implementations, including human resource management systems (HRMS), Financial Management Solutions (FMS), supply chain management (SCM), customer relationship management (CRM), enterprise performance management (EPM), and Content Management Systems (CMS). |
| Private Authenticated Web Application | An application that is used exclusively by Commonwealth Employees. |
| Progressive Web Application (PWA) | A type of application software delivered through the web, built using common web technologies including HTML, CSS, JavaScript, and WebAssembly. They employ an architectural approach called the App Shell Model where service workers store the Basic User Interface or shell of the responsive web design web application in the browser's offline cache, allowing the PWA to maintain native-like use with or without web connectivity. |
| RPO | The measurement of the point in time to which data must be restored to resume processing transactions. Directly related to the amount of data that can be lost between the point of recovery and the time of the last data backup. |
| RTO | The period in which systems, applications or functions must be recovered after an outage. |
| Semantic markup | The use of a markup language such as HTML to convey information about the meaning of each element in a document through proper selection of markup elements, and to maintain complete separation between the markup and the visual presentation of the elements contained in the document. |
| Smart device | An electronic device capable of connecting to a network, or to other devices, via wireless communication protocols, and which can operate interactively and autonomously to some extent. It |

includes devices that exhibit some properties of ubiquitous computing, such as artificial intelligence.

Smart devices support a variety of form factors, a range of properties pertaining to ubiquitous computing and to be used in three main system environments: physical world, human-centered environments, and distributed computing environments.

Several notable types of smart devices are:

- Laptops
- Smartphones
- Tablets & Phablets
- Smartwatches
- Smart vehicles

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|------------------------------------|--|
| Software Composition Analysis | Analysis of open-source libraries included in applications for security flaws and vulnerabilities. |
| Speed index | A measure of how quickly content is visually displayed during page load on a web system. |
| Static Security Analysis Testing | Analysis of application code for security flaws and vulnerabilities without execution of that code. |
| Time to Interactive (TTI) | <p>A measure of how much time passes before the page is fully interactive, which means:</p> <ul style="list-style-type: none"> • First Contentful Paint (FCP) is complete. • No long JavaScript tasks happened within the last 5 seconds. • No more than two in-flight GET requests are occurring at the same moment. |
| Total Blocking Time (TBT) | Measures the total amount of time that a page is blocked from responding to user input, such as mouse clicks, screen taps, or keyboard presses. The sum is calculated by adding the blocking portion of all long tasks between First Contentful Paint and Time to Interactive. |
| Web Accessibility Initiative (WAI) | An initiative of the World Wide Web Consortium (W3C) that develops standards and support materials for the understanding and implementation of accessibility in web systems. |
| Web Application Firewall | Protects web applications by filtering and monitoring HTTP traffic between a web application and the Internet. It typically protects web applications from attacks such as cross-site forgery, cross-site-scripting (XSS), file inclusion, and SQL injection, among others. |
| Web system | Any system that delivers content between a web-client and webserver using HTTP as the underlying communication standard, including HTTP and HTTPS . |

Note

All COV infrastructure is bound by security standards SEC-501/SEC-520/SEC-530 which contain the control **SC-8**

Transmission Confidentiality and Integrity for the encryption of data in transit requiring [HTTPS](https://).

White-labelling

A white-label product is a product or service produced by one company that other companies rebrand to make it appear as if they had made it. The name derives from the image of a white label on the packaging that can be filled in with the marketer's trade address