Benefits of Analyzing & Extending WCAG 2.0 Beyond Three Digits

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Background

Experience

30+ yrs. of UI/UX Design & Development

12+ yrs. in medical devices

15+ yrs. in plans & providers

2X dot-com survivor

Started Web 1996

Started Accessibility 2002

Presentation

Product of 4+ yrs. of ongoing research & analysis at Optum Technology

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Agenda

What's up with WCAG 2.0 Success Criteria?

Analysis

- **Define Sub-Cases**
- **Map Relationships**
  - – **Discover "Meta-Rules?"**
- **Extend Indexing to Track Sub-Cases**

Rules & Benefits

Also WCAG 2.1 Implications

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What's Up with WCAG 2.0 Success Criteria?

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A Tale of Two Crits

SC3.1.1 Language of Page

SC1.1.1 Non-Text Content

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SC3.1.1 Language of Page

Single sentence of just 12 words:

"The default human language of each Web page can be programmatically determined."

1 Example

4 Sufficient Techniques

- **1 – HTML (H57)**
  - addressable by adding 10 characters to the `<html>` tag: `[space]lang="en"`
- **1 – Flash (FLASH13)**
- **2 – PDF (PDF16, PDF19)**

2 Advisory bullet points

"No Failures"

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SC1.1.1 Non-Text Content

6 Bullet points in the criterion text

11 examples

Sufficient Techniques has 6 Situations (A-F)
- **Some short and long description options**
- **Lists single item for all but D which has three**
- **Each with lots of techniques with over 70 total**

22 Additional advisory techniques
- **Grouped by "informative," "live," CAPTCHA, HTML, CSS**

10 Failure Cases

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~~One Size~~ Three Digits Do~~es~~ Not Fit All

Criteria are "Variable"

- **Inconsistent textual and semantic structures**
  - Bulleted list vs. comma or semicolon separated items
- **Inconsistent grouping of items**
- **Inconsistent structure within and between criteria**

Results

- **No easy explicit way to group advisory techniques, failure cases, checkpoints, etc.**
- **Hard to track some topics in or between criteria**
- **Makes WCAG difficult to understand & implement**

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Approach Taken

Analyze success criteria

Identify underlying structures across criteria
- **Define sub-cases or patterns found across the criteria**

Extend WCAG numbering structures
- **Simple additions to WCAG's 3 digit identifiers**

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WCAG 2.0 Analysis Results

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Five Success Criteria Sub-Cases

1. **Situations**

2. **Sub-Situations**

3. **Options**

4. **Exceptions**

5. **Requirements**

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Frequency & Distribution (WCAG 2.0)

34 instances of sub-cases (A/AA/AAA)

90 sub-case "line items" (A/AA/AAA)
- **62 (A/AA)**

By Criteria
- **39% of ALL criteria have sub-cases (24/61)**
- **39% of A/AA criteria have sub-cases (15/38)**
- **6 criteria with two or more sub-cases**

Frequency & Distribution (WCAG 2.1)

19 sub-cases (A/AA/AAA)

39 sub-case "line items" (A/AA/AAA)
- **30 (A/AA)**

By Criteria
- **83% of ALL 2.1 criteria have sub-cases (10/12)**
- **82% of A/AA 2.1 criteria have sub-cases (14/17)**
- **5 criteria with two or more sub-cases**

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Sub-Cases Definitions

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Situations & Sub-Situations

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What is a "Situation?"

- **A typical case of web content for a success criterion**
- **Defined in the sufficient techniques section by the WCAG authors**

Situations

Most common sub-case

- **Found in 17 criteria**

  1. **SC1.1.1** Non-Text Content (A)
  2. **SC1.2.1** Audio-only and Video-only (Prerecorded) (A)
  3. **SC1.2.8** Media Alternative Both (Prerecorded) (AAA)
  4. **SC1.3.1** Info and Relationships (A)
  5. **SC1.4.1** Use of Color (A)
  6. **SC1.4.3** Contrast (Minimum) (AA)
  7. **SC1.4.6** Contrast (Enhanced) (AAA)
  8. **SC2.2.1** Timing Adjustable (A)
  9. **SC2.2.2** Pause, Stop, Hide (A)
  10. **SC3.1.3** Unusual Words (AAA)
  11. **SC3.1.4** Abbreviations (AAA)
  12. **SC3.2.5** Change on Request (Context Change Only on Request) (AAA)
  13. **SC3.3.1** Error Identification (A)
  14. **SC3.3.3** Error Suggestion (Correction) (AA)
  15. **SC3.3.4** Error Prevention (Legal, Financial, Data) (AA)
  16. **SC3.3.5** Help (Context-Sensitive) (AAA)
  17. **SC4.1.2** Name, Role, Value (A)

How to Recognize Situations

They are in the "Sufficient Techniques" section ("box') in the Understanding Document

Has instructions that explicitly list them

"Instructions: Select the situation below that matches your content. Each situation includes techniques or combinations of techniques that are known and documented to be sufficient for that situation."

Explicitly called "Situation" with letters

- **But never explicitly called out anywhere**

Index method

- **Separator: Period (".") – since it's "standard"**
- **Index character: Letter – as defined for situation**

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Sub-Situations

What is a "Sub-Situation?"

- **One part of a "bulky" situation that probably should be split up**

Rare sub-case

- **Found in 2 Criteria**
  - **SC1.1.1** Non-Text Content, **Situation D**
  - **SC1.3.1** Info and Relationships, **Situation A**

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How to Recognize Sub-Situations

"Bulky" or "Awkward Situations

- Single situation made up of several "other" situations or many "different" techniques

Index method

- Separator: **Period** (".") – since it's a sub-part of "standard" situation

- Index character: **Number** – not a situation

Situation: SC1.1.1 Non-Text Content

Criterion Structural Analysis

Text has bullet points

- Controls, Input
- Time-Based Media
- Test
- Sensory
- CAPTCHA
- Decoration, Formatting, Invisible

Situations are lettered in Sufficient Techniques

A.	Short Description can serve…	1 + 13 techniques
B.	Short Description cannot serve…	1 + 13 + 9 techniques
C.	Controls, Input	2 + 16 techniques
D.	Time-Based Media; Test; Sensory (bullets 2-4)	13 techniques
E.	CAPTCHA	1 technique
F.	Ignored (Decoration, Formatting, Invisible)	4 techniques

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Sub-Situation: SC1.1.1 Non-Text Content, Situation D

Situation Structural Analysis

Sub-cases (and "former bullet points') listed within them separated by semi-colons

*"**Situation D**: If non-text content is time-based media (including live video-only and live audio-only); a test or exercise that would be invalid if presented in text; or primarily intended to create a specific sensory experience"*

Would be made clearer if formatted as a ordered list

SC1.1.1 Situation D: If non-text content is

1. time-based media (including live video-only and live audio-only);
2. a test or exercise that would be invalid if presented in text;
3. or primarily intended to create a specific sensory experience:

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SC1.1.1 Split into 8 Sub-Cases Items

1. **SC1.1.1.A Short Description Useful**
2. **SC1.1.1.B Short Description Not Useful**
3. **SC1.1.1.C Controls, Input**
4. **SC1.1.1.D.1 Time-Based Media**
5. **SC1.1.1.D.2 Test**
6. **SC1.1.1.D.3 Sensory Experience**
7. **SC1.1.1.E CAPTCHA**
8. **SC1.1.1.F Decoration, Formatting, Invisible**

Sub-Situation: SC1.3.1 Info and Relationships

Situation A: Semantic Structure Present

SC1.3.1.A: *"The technology provides semantic structure to make information and relationships conveyed through presentation **programmatically determinable**:"*

- **10 Numbered Entries**
  - 6 ARIA
    - Regions, headings, landmarks, controls
  - 3 General
    - Semantic markup, presentation, separating form and structure
  - And #10 "Programmatically Determinable (but not ARIA)"
- **#10 Has 30 Bullet Points**
  - "Everything else"
  - Listed in no particular order
  - General, HTML, Flash, PDF, Client-Side Scripting (SCR)
  - Covering tables, semantic markup, forms, links, and more
- **6 Advisory Techniques**
- **12 Failures**

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SC1.3.1.A Split into 6 Sub-Situations

Solution: Review and group

1. **SC1.3.1.A.1 Data Tables**
2. **SC1.3.1.A.2 Forms, Fields and Labels**
3. **SC1.3.1.A.3 Lists & Structure**
4. **SC1.3.1.A.4 Headings**
5. **SC1.3.1.A.5 Adobe Acrobat / PDF**
6. **SC1.3.1.A.6 Layout Tables (Misleading use of semantic elements)**

May still not be ideal but at least it's not a dumpster

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Options & Exceptions

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Options

What is an "Option?"

- **A way a criterion can be met**

Common Sub-case

- **Found in 6 Criteria**
  1. **SC1.1.1** Non-Text Content (A)
  2. **SC1.2.3** Audio Description or Media Alternative (Prerecorded) (A)
  3. **SC1.4.7** Low or No Background Audio (AAA)
  4. **SC2.2.1** Timing Adjustable (A)
  5. **SC3.3.4** Error Prevention (Legal, Financial, Data) (AA)
  6. **SC3.3.6** Error Prevention (All) (AAA)

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How to Recognize Options

May be

- **In a bulleted list**
- **Numbered in an ordered list**
- **Sentence separated by**
  - **Commas**
  - **Semi-colons**

Usually a minimum of one or more

- **"… at least one of the following is true:"**

Index method

- **Separator: Lower case "o" for "option"**
- **Index character: Letter**

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Exceptions

What is an "Exception?"

- **A condition where the criterion no longer applies**

Common Sub-case

- **Found in 6 Criteria**
  1. **SC1.2.1** Audio-only and Video-only (A)
  2. **SC1.2.2** Captions (Prerecorded) (A)
  3. **SC1.2.3** Audio Description or Media Alternative (Prerecorded) (A)
  4. **SC1.4.3** Contrast (Minimum) (AA)
  5. **SC1.4.6** Contrast (Enhanced) (AAA)
  6. **SC2.2.1** Timing Adjustable (A)

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How to Recognize Exceptions

May be

- In a bulleted list
- Mixed with options
- Explicitly labeled "Exception"
- Following "except" or "unless" in the text

Index method

- Separator: Lower case "x" for exception
- Index character: Letter

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Options & Exceptions: SC2.2.1 Timing Adjustable

Criterion Structural Analysis

- **Options & exceptions in single bullet list**

    "…at least one of the following is true:

    - **Turn off** *(Option)*
    - **Adjust** *(Option)*
    - **Extend** *(Option)*
    - **Real-time Exception**
    - **Essential Exception**
    - **20 Hour Exception"**

- **Situations unrelated to options & exceptions**

    *"**Situation A:** If there are session time limits*

    ***Situation B:** If a time limit is controlled by a script on a page:*

    ***Situation C:** If there are time limits on reading:"*

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SC 2.2.1 Split into 9 Sub-Case Items

3 Options

1. **SC2.2.1oA Turn Off**
2. **SC2.2.1oB Adjust**
3. **SC2.2.1oC Extend**

3 Exceptions

1. **SC2.2.1xA Real-Time Exception**
2. **SC2.2.1xB Essential Exception**
3. **SC2.2.1xC 20 Hour Exception**

3 Situations

1. **SC2.2.1.A Session Time Limits**
2. **SC2.2.1.B Script Control**
3. **SC2.2.1.C Time Limits on Reading**

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Requirements & ...

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Requirements

What is a "requirement?"

- **A "mandatory" SET of options**

Rare Sub-case in WCAG 2.0

- **Found in 1 Criterion**
  1. SC1.4.8 Visual Presentation (AAA)

More Common in WCAG 2.1

- **Found in 4 Criteria**
  1. SC1.3.4 Identify Common Purpose (AA)
  2. SC1.4.10 Reflow (AA)
  3. SC1.4.12 Text Spacing (AA)
  4. SC1.4.13 Content on Hover or Focus (AA)

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How to Recognize "Requirement" (WCAG 2.0)

Criterion text numbers 1-5 in an ordered list

Labeled "Requirements" in Sufficient Techniques
- **Listed by position "first" through "fifth"**
  - First Requirement
  - Second Requirement
  - Third Requirement
  - Fourth Requirement
  - Fifth Requirements

Index method
- **Separator: Lower case "r" for "requirement"**
- **Index character: Number – that's what the authors used**

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How to Recognize "Requirement" (WCAG 2.1)

Criterion text uses the following with bullet points

- **Explicitly uses "and" to describe them**
  - SC1.3.4 Identify Common Purpose (AA)
    - 2 Requirements
  - SC1.4.10 Reflow (AA)
    - 2 Requirements
- **"Supports the following…"**
  - SC1.4.12 Text Spacing (AA)
    - 4 Requirements
- **"the following are true…"**
  - SC1.4.14 Content on Hover or Focus (AA)
    - 3 Requirements

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SC1.4.8 Split into 5 Sub-Case Items

5 Requirements

1. **SC1.4.8r1 User-selectable foreground & background colors**
2. **SC1.4.8r2 80 character width**
3. **SC1.4.8r3 No justified text**
4. **SC1.4.8r4 Space-and-a-half leading, 1.5X paragraph spacing**
5. **SC1.4.8r5 Text resizing up to 200 percent**

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Sub-Cases *NOT* Created

Some crits might have sub-cases in their names

- **SC2.4.6 Headings and Labels**
  - Could be two situations
    1. Situation A: Headings
    2. Situation B: Labels
- **SC2.2.2 Pause, Stop, Hide**
  - Could be 2-3 options
    1. Situation A: Pause
    2. Situation B: Stop
    3. Situation C: Hide

Not created to avoid adding more than provided by authors

- **Adding "phantom" situation letters might be misleading**

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Applying Sub-Cases & Extended Indexing

Map Techniques to Options & Situations

H67: Using null alt text and no title attribute on img elements for images that AT should ignore

Applicability

- **SC1.1.1** Non-Text Content
  - **SC1.1.1.F** Decoration, Formatting, Invisible

G198: Providing a way for the user to turn the time limit off

Applicability

- **SC2.2.1** Timing Adjustable
  - **SC2.2.1oA** Turn Off
  - **SC2.2.1.A** Session Time Limits
  - **SC2.2.1.B** Script Control
  - **SC2.2.1.C** Time Limits on Reading

Map Techniques to Multiple Criteria & Situations

G83: Providing text descriptions to identify required fields that were not completed

- **Applicability**
  - **SC3.3.1** Error Identification
    - **SC3.3.1.A** Required Fields

  - **SC3.3.3** Error Suggestion
    - **SC3.3.1.A** Required Field, No Information

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Map Failures to Criteria & Situations

F39: Failure of Success Criterion 1.1.1 due to providing a text alternative that is not null (e.g., alt="spacer" or alt="image") for images that should be ignored by assistive technology

Applicability

– **SC1.1.1** Non-Text Content

- **SC1.1.1.F** Decoration, Formatting, Invisible

F46: Failure of Success Criterion 1.3.1 due to using th elements, caption elements, or non-empty summary attributes in layout tables

Applicability

– **SC1.3.1** Info and Relationships

- **SC1.3.1.A.6** Layout Tables (Misleading use of semantic elements)

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Pattern Mapping Across Criteria &"Meta-Rules?"

Common Exceptions & Meta Rules?

- **"Media Alternative for Text"**
- **"Essential"**
- **"Unmodified User Agent Component" (WCAG 2.1)**

Logical "Tiers" or "Pairs"

- **Error Handling Tiered Situations**
  - Mandatory fields
  - Specific data formats, specific values
- **Contrast Pair Exceptions**
- **Error Prevention Paired Options**
- **Meaning Paired Situations**
- **20 Hour Exception Pair & Meta Rule?**

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"Media Alternative for Text" Exception

1.2.1xA: Audio-only and Video-only (Prerecorded) (A)

"… *except* when the audio or video is a *media alternative for text and is clearly labeled as such*."

1.2.2xA: Captions (Prerecorded) (A)

"… *except* when the media is a *media alternative for text and is clearly labeled as such*."

1.2.3xA: Audio Description or Media Alternative (Prerecorded) (A)

"… *except* when the media is a *media alternative for text and is clearly labeled as such*."

Meta-Rule(?): "Media alternatives for text" are exceptions to success criteria if "clearly labeled as such"

"Essential" Exceptions WCAG 2.0

WCAG 2.0 has 2 Essential Exceptions

- **SC2.2.1xB: Timing Adjustable (A)**

  "of the following is true: […]
  *Essential Exception The time limit is **essential** and extending it would invalidate the activity"*

- **SC1.4.5xB: Images of Text (AA)**

  *"**except** for the following […] A particular presentation of text is **essential** to the information being conveyed*
  *Note: Logotypes (text that is part of a logo or brand name) are considered **essential**."*

"Essential" Exceptions WCAG 2.1

WCAG 2.1 CR has 7 Essential Exceptions

- **SC1.4.10xA: Reflow (AA)**

  "*Except* for parts of the content which *require* two-dimensional layout for usage or meaning."

- **SC1.4.11xC: Non-Text Contrast (AA)**

  "*except* when a particular presentation of graphics is *essential* to the information being conveyed."

- **SC2.2.7xA: Animations from Interactions (AAA)**

  "*unless* the animation is *essential* to the functionality or the information being conveyed.."

- **SC2.5.3xD: Target Size (AAA)**

  "*except* when: […] A particular presentation of the target is *essential* to the information being conveyed;"

- **SC2.5.4xA: Concurrent Input Mechanisms (AAA)**

  "*except* where the restriction is *essential*,"

- **SC2.6.1xA: Motion Actuation (AA)**

  "*Except* when […] The motion is *essential* for the function and doing so would invalidate the activity

- **SC2.6.2xA: Orientation (AA)**

  "*unless* a specific display orientation is *essential*."

"Essential" Exceptions Meta-Rule?

Meta-Rule(?): "Essential" characteristics of presentation or operation are exceptions to success criteria

"Unmodified User Agent Component" Exception

SC1.4.11xB: Non-Text Content (AA)

*"except […] where the appearance of the component is **determined by the user agent and not modified by the author;"**

SC1.4.13xA: Content on Hover or Focus (AA)

*"**Exception:** The visual presentation of the additional content is **controlled by the user agent and is not modified by the author**."*

SC2.5.3xC: Target Size (AAA)

*"… **except** when:
The size of the target is **determined by the user agent and is not modified by the author**."*

SC2.5.4xC: Concurrent Input Mechanisms (AAA)

*"…except … **or required to respect user settings**."*

"Unmodified User Agent Component" Meta-Rule?

Assume default user agent settings are accessible if not modified

Error Handling Tiered Situations

Mandatory Fields

- **SC3.3.1.A: Error Identification (A)**

  *"If a form contains fields for which **information from the user is mandatory**."*

- **SC3.3.3.A: Error Suggestion (AA)**

  *"If a **mandatory field** contains no information:"*

- **SC3.3.5.A: Help (Context-Sensitive) (AAA)**

  *"If a form **requires text input**:"*

Specific Data Formats & Specific Values

- **SC3.3.1.B: Error Identification (A)**

  *"If information provided by the user is required to be in a **specific data format** or of **certain values**."*

- **SC3.3.3.B: Error Suggestion (AA)**

  *"If information for a field is required to be in a **specific data format**:"*

- **SC3.3.3.C: Error Suggestion (AA)**

  *"Information provided by the user is **required to be one of a limited set of values**:"*

- **SC3.3.5.B Help (Context-Sensitive) (AAA)**

  *"If a form requires text input in an **expected data format**:"*

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Contrast Pair Exceptions

SC1.4.3 Contrast Minimum (AA)

- **SC1.4.3xA Large Text**
- **SC1.4.3xB Incidental Text**
- **SC1.4.3xC Logotypes**

SC1.4.6 Contrast Enhanced (AAA)

- **SC1.4.6xA Large Text**
- **SC1.4.6xB Incidental Text**
- **SC1.4.6xC Logotypes**

Error Prevention Paired Options

SC3.3.4 Error Prevention (Legal, Financial, Data) (AA)

- **SC3.3.4oA Reversible**
- **SC3.3.4oB Checked**
- **SC3.3.4oC Confirmed**

SC3.3.6 Error Prevention (All) (AAA)

- **SC3.3.6oA Reversible**
- **SC3.3.6oB Checked**
- **SC3.3.6oC Confirmed**

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Meaning Paired Situations

SC3.1.3 Unusual Words (AAA)

- **SC3.1.3.A Unique Meaning within Page**

  *"If the word or phrase **has a unique meaning within the Web page:**"*

- **SC3.1.3.B Multiple Meanings within Page**

  *"If the word or phrase **means different things within the same Web page:**"*

SC3.1.4 Abbreviations (AAA)

- **SC3.1.4.A One Meaning within Page**

  *"If the abbreviation **has only one meaning within the Web page:**"*

- **SC3.1.4.B Different Meanings within Page**

  *"If the abbreviation **means different things within the same Web page:**"*

General rule about number of meanings in a page?

20 Hour Exception Pair & Meta-Rule?

SC2.2.1 Timing Adjustable (A)

- **SC2.2.1xC 20 Hour Exception**

  *"20 Hour Exception: The time limit is **longer than 20 hours**."*

SC2.2.6 Timeouts (AAA) (WCAG 2.1)

- **SC2.2.6xA 20+ Hours of Data Preservation**

  *"**unless** the data is **preserved for more than 20 hours** when the user does not take any actions."*

Meta-Rule(?): Users do not have to be alerted to time limits of 20 or more hours

Summing Up...

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Analysis: Five Success Criteria Sub-Cases

1. **Situations**

2. **Sub-Situations**

3. **Options**

4. **Exceptions**

5. **Requirements**

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Uses & Benefits: Analysis of Sub-Cases

Clearly identifies common criteria elements

- Regardless of source in criterion text or sufficient techniques
- Whether in lists or sentences

Makes distinctions different sub-cases

- Breaks up bulleted lists with of multiple types
  - Such as options AND exceptions

Breaks up "bulky" situations

- "Tracks" original bullet points in criterion text regrouped in sufficient techniques

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Uses & Benefits: Mapping Sub-Cases

Techniques & failures to specific sub-case(s)
- Track back to specific or multiple separate situations

Checkpoints to sub-cases
- Clearly specifying situation and related techniques

Sub-cases within a single criterion
- Correct for differences in groupings
- Group otherwise unorganized sets of techniques or failures

Sub-cases between or across multiple criteria
- Tiers or pairings of criteria definitions within guidelines
- Common sub-cases between guidelines or principles
- Identification of "Meta-Rules" across WCAG(?)

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Uses & Benefits: Extended Indexing

Always declares success criterion
- Still first 3 digits

Shorter, simpler 4-5 character reference
- "1.1.1.B" not "1.1.1 Situation B"

More precise
- No "third bullet point of SC 2.2.1"

Identifies sub-type by letter
- "o" for "Option"

Unique identifiers
- Appropriate for tagging or database keys

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Thank you

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