

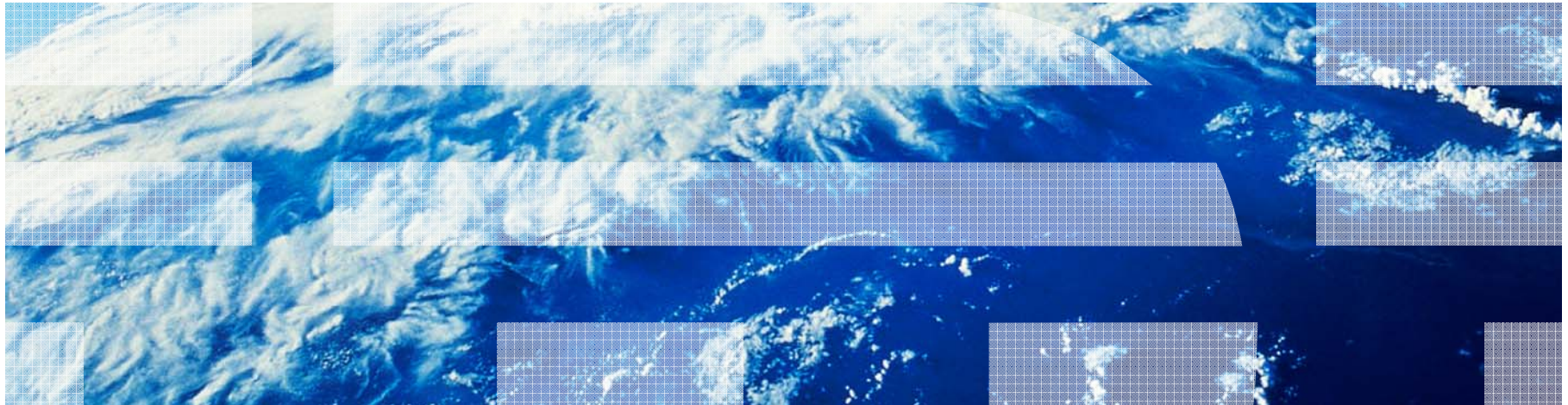
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CSUN 2011



# Collaborative Web Accessibility Improvement System: A Real-World Deployment



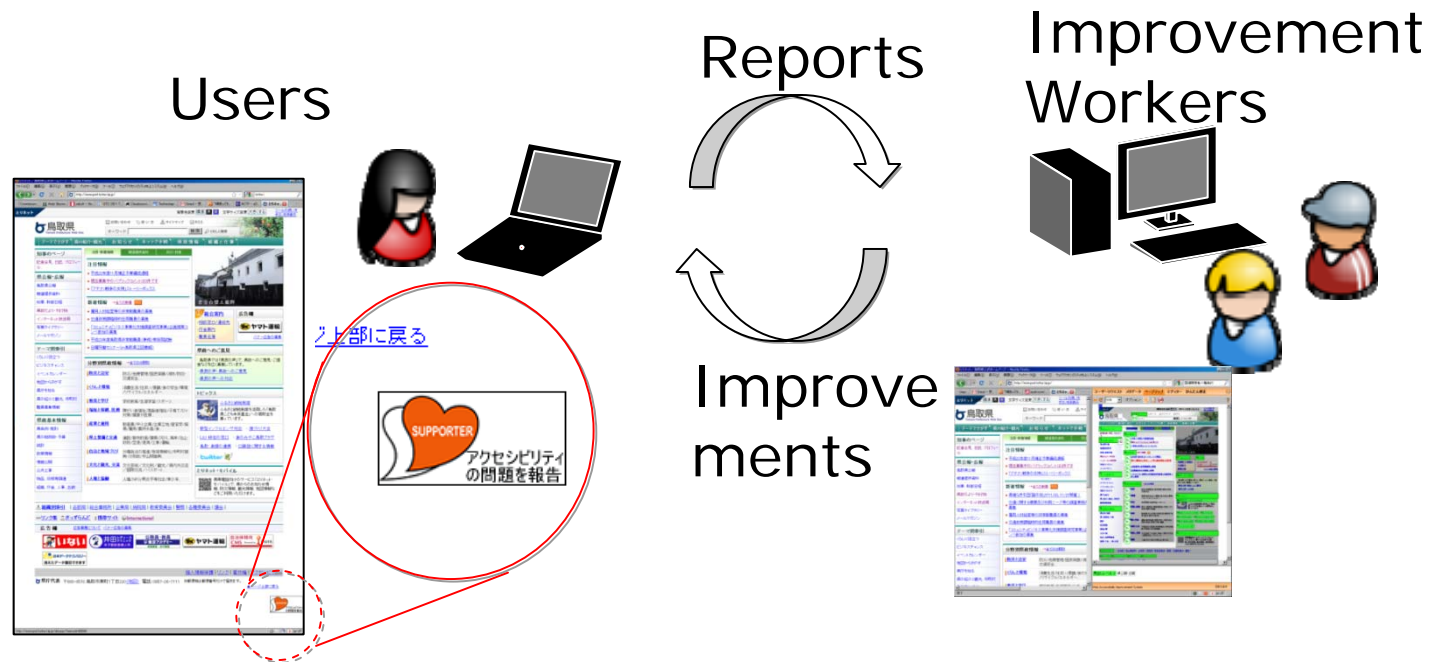
# Social Accessibility

- Social computing + accessibility
- Any user can improve accessibility of any web page without changing original content.
- Any visually impaired user can join the improvement process through various collaboration mechanisms.

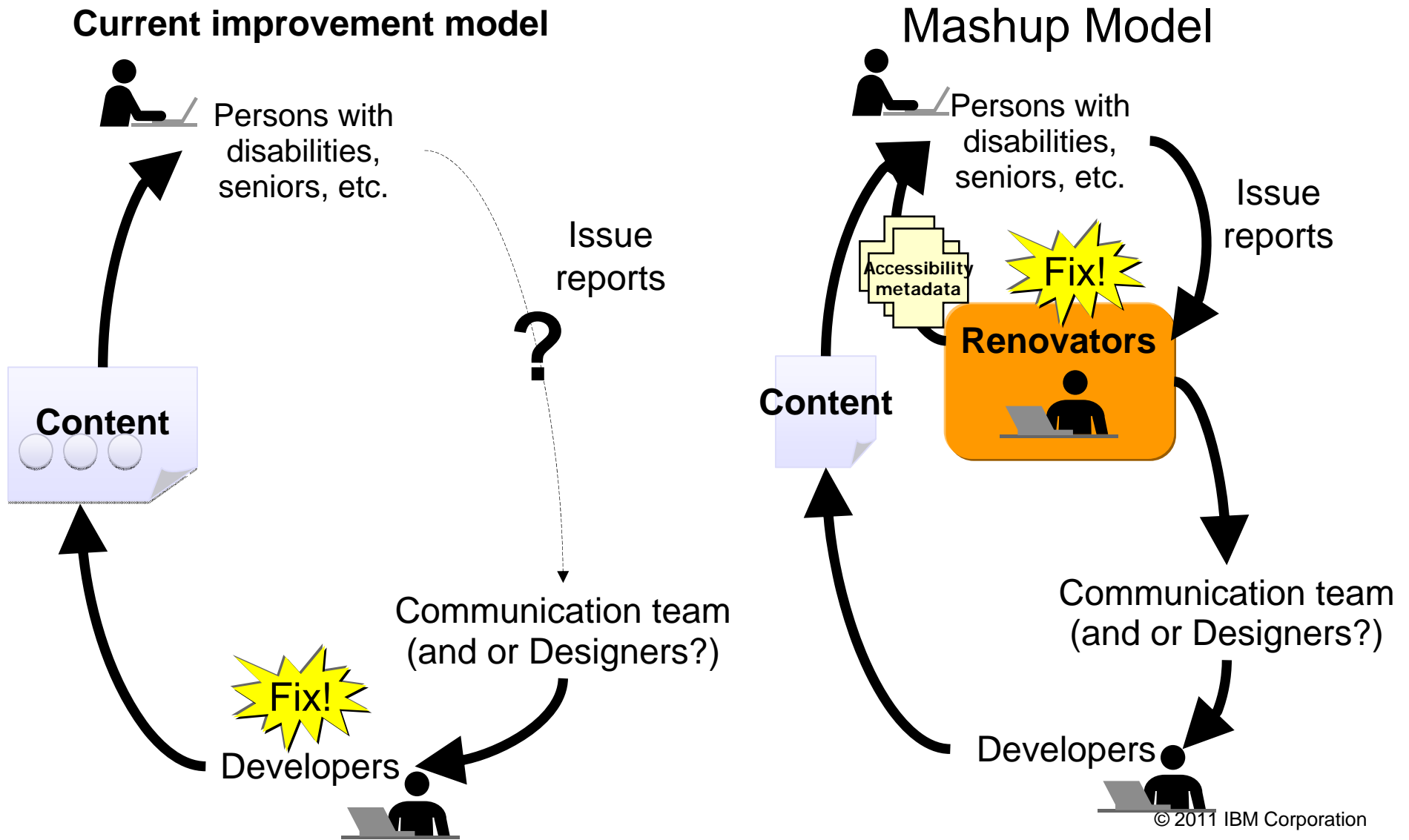


# Collaborative Web Accessibility Improvements: Tottori Prefecture Site

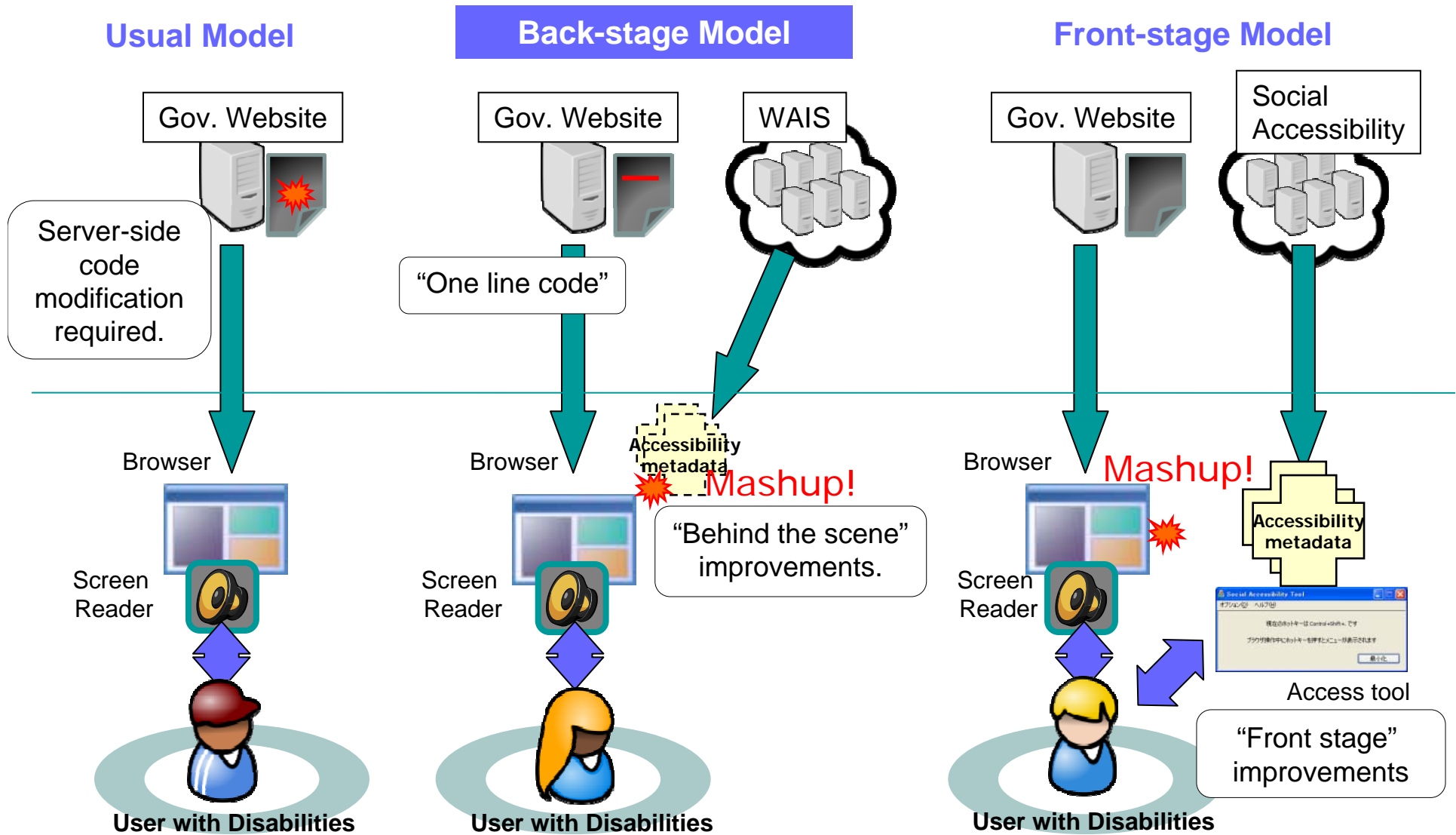
- Crowd-sourcing to create jobs for people with disabilities.
- A local government in Japan (Tottori Prefecture) integrated a collaborative Web accessibility improvement system developed by IBM Research into their website.



# User Involvement and Prompt Support



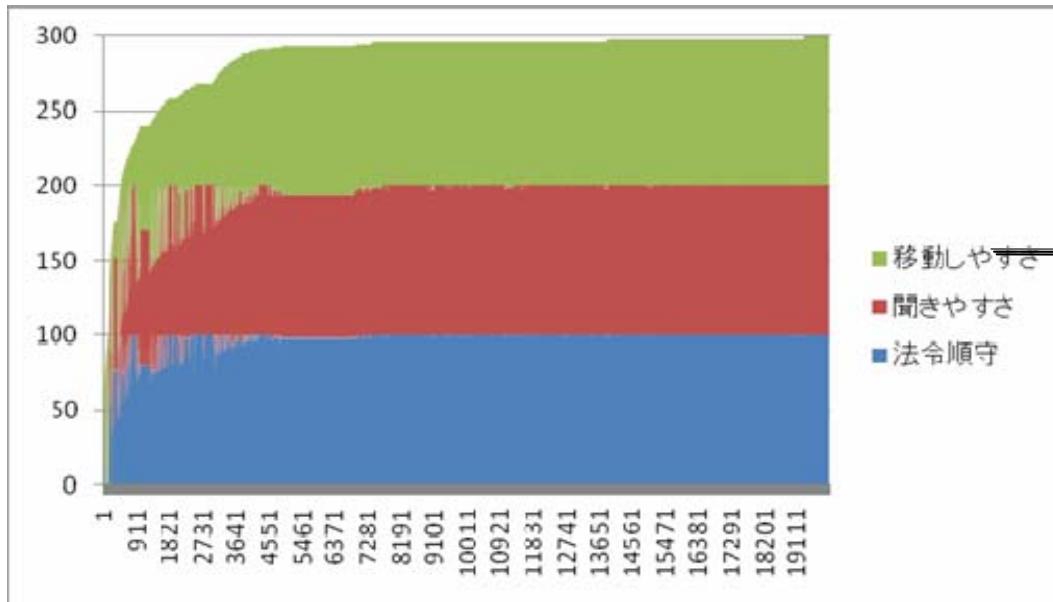
# New Method to Improve Accessibility - Mashup



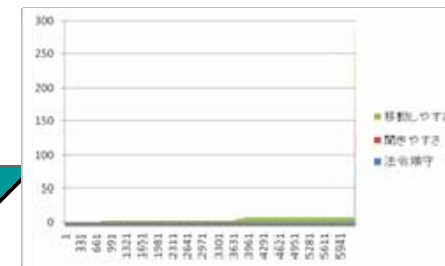
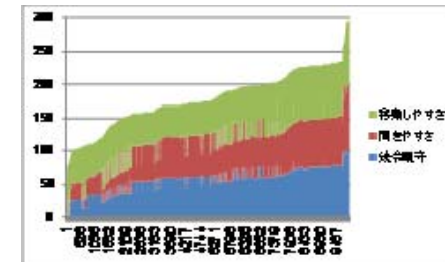
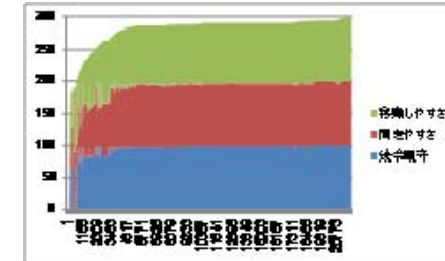
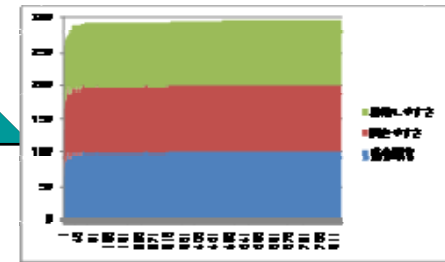
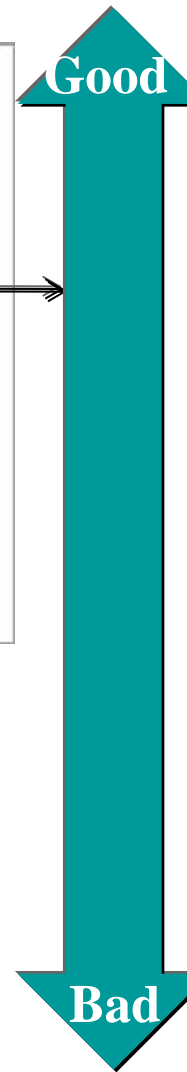
# WCAG 2.0 Support

Guideline		WAIS	
		Automated Check	Repair Function
Perceivable	Text Alternatives	✓ (mostly)	Alternative text
	Time-based Media	Information	(Working for standardization of text-based audio descriptions for Internet video.)
	Adaptable	✓ (partially)	Headings, Reading order, Label, Space separated characters
	Distinguishable	✓ (partially)	(under consideration: text/background color customization)
Operable	Keyboard Accessible.	✓ (partially)	-
	Enough Time	✓ (partially)	Blink tag
	Seizures	Information	-
	Navigable	✓ (partially)	Headings, Reading order, Intra-page links, Page title, Alternative text, Label
Understandable	Readable	✓ (partially)	-
	Predictable	✓ (partially)	-
	Input Assistance	✓ (partially)	Label
Robust	Compatible	✓ (partially)	Deprecated tags, Page title, Headings, Label

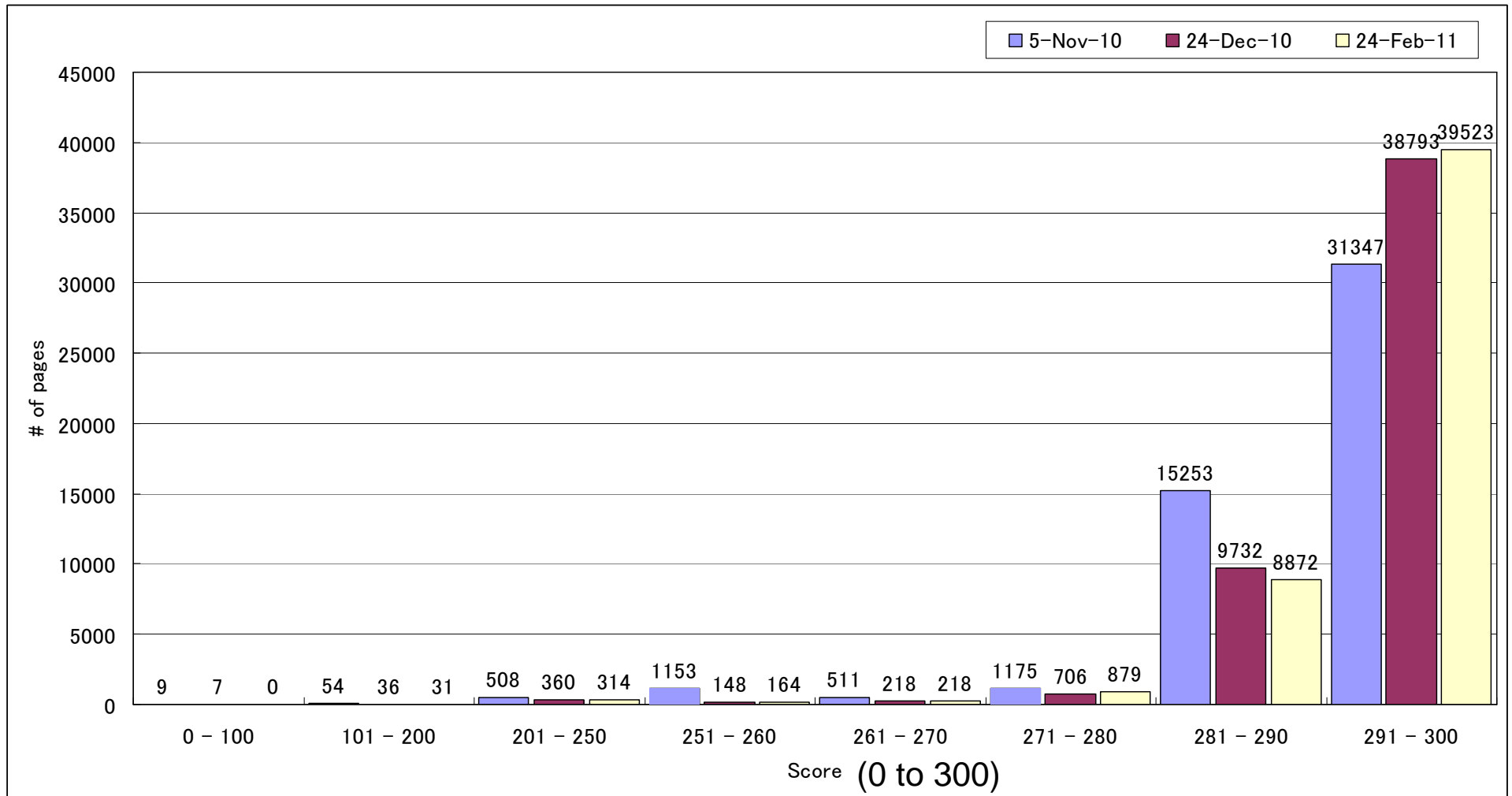
## Site-wide Evaluation System Example



- An example of existing Japanese local government site consisting of 20,000 pages.
- Vertical axis: green = navigability, red = listenability, and blue = compliance.
- Horizontal axis is pages sorted from bad to good.



# Improvements of Accessibility Score





## Number of Automatically Detected Problems

	5-Nov-10	24-Dec-10	24-Feb-11
Space separated characters	22,499	13,943	11,134
Broken intra-page links	12,588	1,068	1,538
Redundant alternative texts	8,500	5,345	3,831
Images without alt attribute	2,642	1,546	1,034
Inappropriate alternative texts	1,728	521	38
Others	4,229	2,985	2,986
<b>Total</b>	<b>52,186</b>	<b>25,408</b>	<b>20,561</b>

(per 50,000 pages)

# Participants

Organization	# of renovators				# of supporters (support, education, etc.)
		Non- impaired	Motor disability	Other	
TIC	2	2	0	0	0
A	19	0	9	10	3
B	4	0	1	3	4
Total	23	0	10	13	7

## Focus of Each Organization

- In order to accumulate expertise, we assigned a few specific issues to each organization.

	Alternative text	Label	Space separated characters	Headings	Intra-page link	Reading order	Page title	Blink tag	Total
TIC	6,131		4,904	1	11,616		153	41	22,846
A	5,723		19,789	7					25,519
B					2,353				2,353

## Renovation results

Organization	Work period	# of renovators	Total hours (*)	# of metadata	Productivity (Metadata per hour)
Tottori Prefecture Information Center (TIC)	Oct. 2010 - Mar. 2011	2	672h	22,846	34.0
A (Nonprofit Social Welfare Organization)	Oct. 2010 - Nov. 2010	19	3,080h	25,519	8.3
B (NPO)	Nov. 2010	4	672h	2,353	3.5
total		25	4,424h	50,718	11.4

\* Total hours includes educations, etc.

# Site-wide Metadata Inference

Create metadata for the "Rational Team Concert" Project page.

Automatic inference for The "Jazz Foundation" project page

Now, the metadata covers (maybe) all of the project pages.



Open another project page...

One click!

## Efficiency of Accessibility Metadata

- In this phase, we used a conservative method (create a piece of metadata for each problem) in most cases to train novice renovators.
- After renovators became experienced, we started to test page-wide/site-wide metadata to improve the efficiency.

	12-Nov-10	24-Dec-10	24-Feb-11
# of metadata (applied)	884	37,526	41,960
# of fixed problems per metadata	1	1.05	1.05
max # of fixed problems by one metadata (per webpage)	1	30	86
max # of fixed problems by one metadata (per website)	1	12,171	11,787

(per 50,000 pages)

## Lessons learned

- **Consensus with site owners**

- Need to have consensus on the methods and rules of fixes
  - Rules for heading levels, rules for alternative texts, etc.
- Need to share the rules among workers before starting the work.

- **Step by step**

- Need to take into account learning curve of workers.
- Start from simple fixes, and then step up to more advanced fixes.
  - More complicated issues, use inference engine to apply one metadata to other pages, etc.

- **Page design should not be effected**

- To get acceptance from page owners, metadata should not change the appearance of a page.
  - Spacing between characters, font sizes, etc.

- **Personalization of the tools**

- Renovators are persons with disabilities with different requirements.
- Interface should be customizable to maximize the productivity.
  - Button size, commands, etc.

## Comments from Morimoto-san (Tottori)

- More than 40000 pages on the site
  
- 300 people are updating Web pages
  - They are required to check and fix themselves.
  - CMS is working, but not enough to achieve best accessibility
  
- Massive number of “old contents” before accessibility guidelines

**WAIS decreased the cost + created jobs for PwD**



## Future Work

- Dynamic content
  
- Major renovations
  - Functions to allow collaboration between end-users, accessibility experts, and developers.
  
- Original page modification
  
- Multimedia
  
- More job creation!!

# Thank you!

## **Acknowledgement**

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