TRANSPORTATION RESEARCH SYNTHESIS

TRS 1805   July 2018

Content Management Systems and Website Practices

Prepared by CTC & Associates LLC

The MnDOT Office of Communications is interested in gathering information about content management systems (CMS) used by other state departments of transportation. With more than 150 subsites within its main website, MnDOT is considering the adoption of a CMS to help increase the efficiency of its website management.

This Transportation Research Synthesis presents the results of a survey distributed to the members of the American Association of State Highway and Transportation Officials (AASHTO) Committee on Transportation Communications and to selected Minnesota state agencies about their use of CMS. It also includes survey findings on the state of the practice regarding their website operations, processes and maintenance.
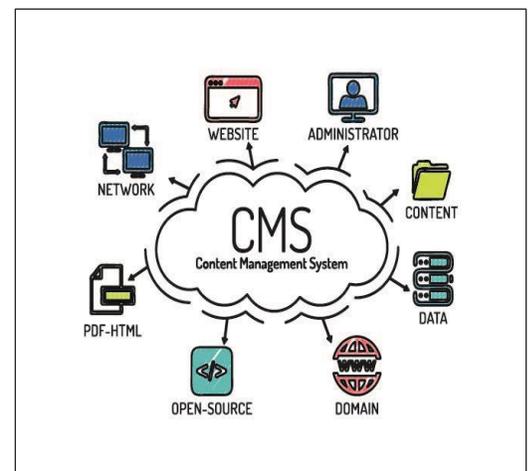
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Content Management Systems and Website Practices

Introduction

MnDOT's Office of Communications is considering the adoption of a content management system (CMS) to manage the agency's main website and more than 150 subsites. To inform its selection of a CMS, MnDOT is seeking information from other state departments of transportation (DOTs) and Minnesota state agencies about their use of CMS. MnDOT is also interested in information about web operation practices to help streamline internal web content management and website practices. This Transportation Research Synthesis presents the findings of a survey sent to all 50 state DOTs and selected Minnesota state agencies.

Summary of Findings

Survey of Practice

An online survey was distributed to members of the AASHTO Committee on Transportation Communications and selected Minnesota state agencies about the use of CMS and website operation practices. Twenty-one state DOTs and seven Minnesota state agencies responded to the survey. Below are highlights of the survey results in the following topic areas:

- Types of CMS and other technology.
- CMS costs and funding.
- Processes and workflows of website operations.
- Governance of CMS.

Types of Content Management Systems and Other Technology

Most agencies use either SharePoint or Drupal as a CMS. Five respondents do not use a CMS and the remaining respondents cited 14 other systems. Almost half the agencies noted that their current system is also their first with more than half using their system for more than five years.

One-half of the agencies used both an in-house IT team and an outside consultant to install their CMS. Training and customization issues were cited as the top reasons for installation issues.

CMS Costs and Funding

Most respondents did not provide information on costs and fees associated with their CMS. Three agencies reported upfront costs in the range of $28,000 to $30,000. Washington State DOT spent approximately $50,000 and Iowa DOT spent $200,000 in consulting fees for migration and training. Of the states providing fee information, licensing, server, hosting and user fees range from $24,000 to $50,000 per year. Arizona DOT spends approximately $5,000 per year for the Sitefinity CMS, not including support and maintenance costs, which were not provided.

Processes and Workflows of Website Operations

There was little consensus among respondents about the process used for updating content or creating new web pages, although some common practices were identified:

- Content updates are usually executed by a web content person from each department or division.

- Website changes need approval before they are published.

- Requests for website changes are made by completing a web request form or by sending an email to the appropriate web person.

When respondents were asked to rate the ease of use on tasks such as updating web page content, making changes to web page design and making web administrative changes to the CMS system, most respondents did not report difficulties when updating web content regardless of the CMS used. Drupal was consistently rated as easier to use than SharePoint with regard to the other two tasks.

Governance of CMS

In most cases, the agency's information technology (IT) department oversees the web infrastructure. Five agencies reported that their communications department is responsible. Most IT teams have two to four people who support a larger group of web users and can make content updates. The number of staff with full web administrative rights is restricted to a small group of people. Even though a large number of staff at most agencies can update website content, 18 respondents reported that their website content is centralized.

Management of the general website is usually the responsibility of the IT department, however, some agencies assign responsibility to the communications department or the public information office.

Next Steps

Moving forward, MnDOT may wish to consider:

- Re-examining MnDOT's website requirements to determine if Drupal or SharePoint would be viable options as a CMS.

- Following up with states for further information on CMS installation issues to avoid duplicating the same mistakes. This will aid in saving time and installation costs.

- Contacting the Minnesota Department of Employment and Economic Development about its experience with SDL Tridion and to obtain additional cost information.

Detailed Findings

Survey of Practice

An online survey was distributed to two groups: members of the AASHTO Committee on Transportation Communications, which includes representatives from all state departments of transportation (DOTs), and members of selected Minnesota state agencies. Representatives from both groups were surveyed on their use of content management systems (CMS) and website operation practices.

Twenty-one states responded to the survey:

• Alaska.	• Louisiana.	• North Dakota.
• Arizona.	• Michigan.	• Pennsylvania.
• Arkansas.	• Mississippi.	• Utah.
• Indiana.	• Montana.	• Vermont.
• Iowa.	• Nevada.	• Virginia.
• Kansas.	• New Hampshire.	• Washington.
• Kentucky.	• North Carolina.	• Wyoming.

Seven Minnesota state agencies responded to the survey:

- Department of Agriculture (MDA).
- Department of Employment and Economic Development (DEED).
- Department of Labor and Industry (DLI).
- Department of Natural Resources (DNR).
- Department of Public Safety (DPS).
- Metropolitan Council.
- Minnesota Pollution Control Agency (MPCA).

Appendix A provides the full text of the survey questions. The full text of survey responses is presented in a supplement to this report. Appendix B provides the contact information for all survey respondents.

Below is a discussion of survey results in six topic areas:

- Information technology (IT) staff and website permissions.
- Types of CMS and third-party systems.
- CMS costs and funding.
- Processes and workflow of website operations and maintenance.
- Governance of website operations and management.
- Other website technology tools.

Supplementing these survey results are findings from a limited literature search, which are provided in **Related Resources** sections throughout the report.

Information Technology Staff and Website Permissions

Respondents were asked to report the total number of staff on their IT website team and indicate the number of staff with the following level of web permissions: make content changes to web pages, make web page design changes and have full administrative web access rights. The number of staff members on an agency's IT team ranged from one to 17, with a majority staffing two to four people. The Washington State DOT respondent reported that the agency currently has one content editor, one mobile developer, two technical support staff members managing help calls and one Drupal administrator. He added that the agency needed three content editors at a minimum and two Drupal administrators.

The number of staff who can make web content changes is much larger than the number of staff with full administrative website rights. For most agencies, the number of staff with permission to make web page design changes is similar to the number of staff with administrative rights.

The only exception is in Vermont, where all staff who work on the website, including the four IT staff members, have full administrative rights. In a follow-up communication with the Vermont Agency of Transportation (which uses Drupal as its CMS), the respondent stated that the basic editing permissions did not meet the needs of the web users. Because Drupal did not have the permission settings needed, the agency gave all web users full administrative rights with the understanding that users only work within their own department web pages.

The table below summarizes survey responses.

IT Staff and Website Permissions				
State /Agency	**Total IT Staff**	**Make Content Changes**	**Make Web Page Design Changes**	**Have Administrative Rights**
Alaska	17	17	4	4
Arizona	3	38	4	4
Arkansas	4	2	2	1
DEED	3	6	2	2
DLI	6	3	3	3
DNR	5	11	5	3
DPS	2	45	2	1
Indiana	4	3	2	1
Iowa	4	3	4	4
Kansas	5	25	10	7
Kentucky	2	50	50	2
Louisiana	5	35	85	6

IT Staff and Website Permissions

State /Agency	Total IT Staff	Make Content Changes	Make Web Page Design Changes	Have Administrative Rights
MDA	2	40	2	2
Metropolitan Council	4	8	10	3
Michigan	2	50-60	2	2
Mississippi	2	12	2	2
Montana	3	3	3	3
MPCA	8	5	8	2
Nevada	1	120	3	3
New Hampshire	3-4	65	3-4	3-4
North Carolina	13	3	10	3-4
North Dakota	3 (part time)	40-50	8-10	4
Pennsylvania	2	90	40	10
Utah	1	8	14	2
Vermont	4	2	32	32
Virginia	3	60	5	3
Washington	6	300	5	5
Wyoming	7	50	5	5

*Two staff plus a student.

Types of Content Management Systems and Third-Party Systems

Current Content Management System

The types of CMS used by respondents varied widely. SharePoint and Drupal are the two most commonly used systems (see bar graph and table below). Seven survey respondents reported using SharePoint (DEED, DPS, Kentucky, Louisiana, Mississippi, North Carolina and Pennsylvania); five respondents reported using Drupal (DNR, MPCA, Vermont and Washington; DLI will launch in June 2018).
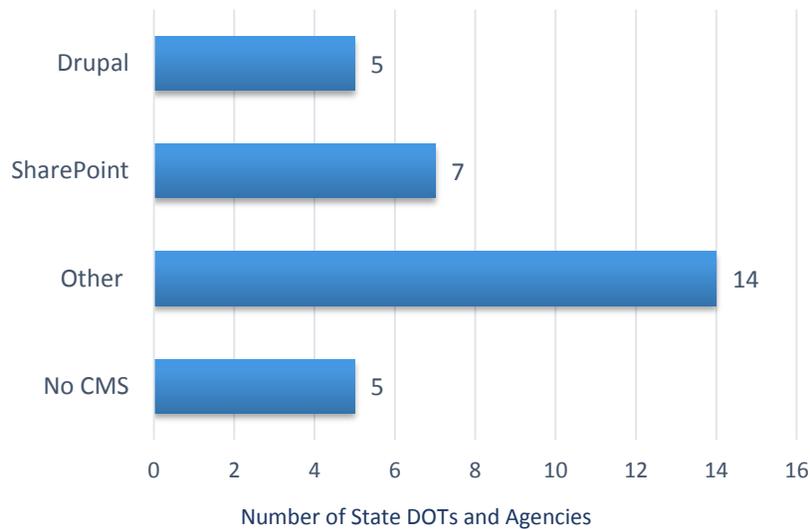

Figure 1. Types of CMS

Other CMS used by survey respondents are listed below:

- Crownpeak.
- DNN Evoq.
- Jahia Digital Experience Platform.
- Kentico .NET Web Content Management.
- Microsoft Content Management Server (MCMS) 2002.
- Oracle Application Express (APEX) (proprietary system).
- Percussion CM1.
- RedDot (now OpenText Web Site Management).
- SDL Tridion.
- Sitecore.
- Sitefinity.
- Vignette (now OpenText Web Experience Management).
- visionLive.
- WordPress.

Some agencies use more than one CMS. DEED uses SharePoint for the agency's intranet and SDL Tridion for its public website. In addition to using Drupal, Washington State DOT uses MCMS 2002 and DNR uses WordPress.

Five agencies—Alaska, Arkansas, Montana, New Hampshire and North Dakota—do not use a CMS. Both the Arkansas and New Hampshire DOT respondents reported using Dreamweaver (part of the Adobe Creative Suite).

North Dakota DOT uses custom .NET applications to mimic CMS elements. Montana DOT is currently conducting a web assessment of its internet site and is expected to receive recommendations about a CMS as a result of the assessment.

Brief summaries and links to more information about CMS used by survey participants are provided in **Related Resources** at the end of this report.

Summary of Content Management Systems Used by Survey Participants	
System	**State/Agency**
Crownpeak	Virginia
DNN Evoq	Iowa
Drupal	DLI, MPCA and Vermont
Drupal, MCMS 2002	Washington
Drupal, WordPress	DNR
Jahia Digital Experience Platform	Wyoming
Kentico .NET Web Content Management	Metropolitan Council
Oracle Application Express (APEX) (proprietary system)	Utah
Percussion CM1	Kansas
RedDot (now OpenText Web Site Management)	Indiana
SharePoint	DPS, Kentucky, Louisiana, Mississippi, North Carolina and Pennsylvania
SharePoint, SDL Tridion	DEED
Sitecore	MDA
Sitefinity	Arizona
Vignette (now OpenText Web Experience Management)	Michigan
visionLive	Nevada

Content Management System Usage Time

Of the 23 agencies using a CMS, more than half have used their system for more than five years. One-third of the agencies have used their CMS for two to four years. Wyoming DOT has used Jahia CMS for over 10 years. The DLI respondent noted that the agency plans to launch its new Drupal site in June 2018.
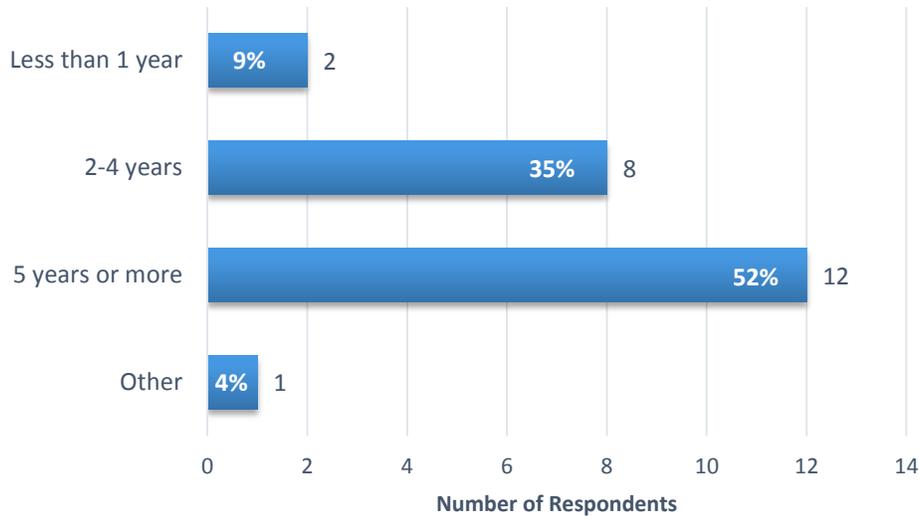

Figure 2. Length of CMS Use

Previous Content Management System

Ten agencies—Arizona, DLI, DPS, Iowa, Kansas, Kentucky, MDA, Metropolitan Council, Michigan and Utah—said their current CMS is their agency's first system. SharePoint was the previous CMS in three states (Indiana, Mississippi and Washington). Three other respondents (DNR, Virginia and Wyoming) developed their CMS in-house. Other systems used by agencies are listed below:

- ASP.NET (*Louisiana*).
- Crownpeak (*DEED*).
- Domino (*Pennsylvania*).

- Drupal 6 (*Vermont*).
- Ektron CMS (*Nevada*).
- Joomla (*MPCA*).

Third-Party Systems

Respondents were asked about database systems used before and after installation of the CMS. Nine respondents reported using one of the following systems:

- ColdFusion (*MPCA*).
- Domino (*Pennsylvania*).
- FrontPage (*Vermont*).
- Oracle (*Michigan and Wyoming*).
- Proprietary system (*Washington*).
- SQL/MySQL (*DNR, Louisiana and Mississippi*).

Apart from Washington State DOT (which created a proprietary system) and Arizona DOT (SQL), the remaining agencies continued using the same database with the new CMS system.

Five respondents reported using the following new database:

- Crownpeak (*Virginia*).

- Oracle (*Utah*).

- SharePoint (*Pennsylvania, which still uses Domino, but converts to SharePoint when possible*).

- SQL (*Arizona and DPS*)

Only four respondents cited a third-party system that is integrated with their current CMS:

- GovDelivery, Web 2.0 email and SMS messaging platform (*MPCA*).

- Nintex Workflow process automation tool (*Mississippi*).

- Trumba calendar tool (*DEED*).

- Webtrends and Siteimprove website analytics tools (*Virginia*).

Content Management System Installation and Issues

While half of the respondents used both an in-house IT team and outside consultants to assist with installation of a new CMS system, about one-third of respondents with a CMS used their own staff for the installation.

- **Outside consultant**: Arizona and DLI.

- **In-house IT team**: DNR, Indiana, Kentucky, Louisiana, Nevada, Vermont, Virginia (Communications web team) and Wyoming.

- **Both**: DPS, Iowa, Kansas, MDA, Metropolitan Council, Michigan, Mississippi, MPCA, North Carolina, Pennsylvania, Utah and Washington.

- **Other**: DEED (DEED web team and Minnesota IT Services (MNIT)).
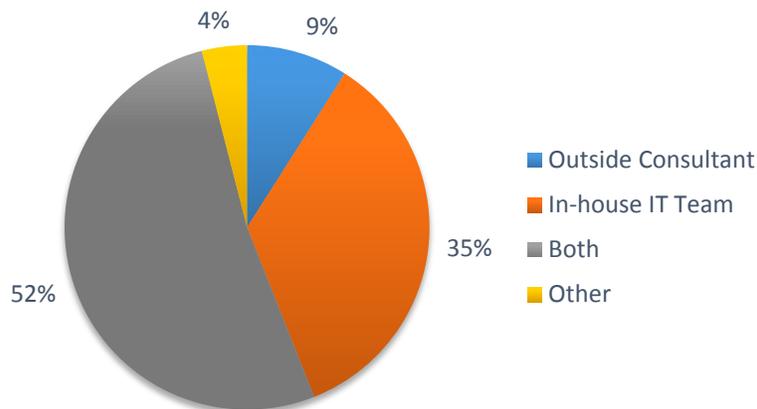

Figure 3. CMS Installation Assistance

Some of the respondents indicated issues with the installation, primarily related to customization, system migration and user training. In Arizona, the respondent encouraged agencies considering new systems to evaluate their needs realistically and to be selective and open to new practices. The agency gave responsibility for setup and customization of its Sitefinity platform to a consultant team (with final content review and publication handled internally) primarily because of the level of knowledge required to set up and customize a .NET platform. While the agency has learned more about this system over the years, the web team is still heavily reliant on developers to make substantive and functional changes when needed. At the time of the conversion, Arizona tried in several ways to make the tool meet current needs and practices, but over time many of those practices became outdated and now, some of the changes that were considered necessary are ignored.

The table below summarizes survey responses.

CMS Installation Issues		
Issue	**State/Agency**	**Description**
Customization	Arizona	Customizations for practices that later became outdated.
	MPCA	Customizations that are not sustainable with large CMS changes.
Domain change	Nevada	
Familiarity with new system	DLI	Learning the pros and cons of Drupal 8.
Hosting	DNR	• Initial load balancing. • URL migration from http to https.
Staff involvement	Washington	Staff unwilling to clean content before migration to new system.
System migration	Virginia	Double update everything in first transition (code freeze not possible). First redesign much easier.
System requirements	Arizona	
Training	Louisiana	Training users and educating the public, businesses and contractors.
	Nevada	Poor user training.
Other	Nevada	• Analytics tracking. • Updating URLs in printed and electronic materials.

Ease of Use

Using a rating scale ranging from very easy to very difficult, respondents rated the ease of use when performing three tasks on the agency's current CMS:

- Updating web page content.

- Making changes to web page design and layout.

- Making web administrative changes to the CMS.

Regardless of the CMS used, most respondents did not report difficulties when updating web page content. One respondent (MDA) rated Sitecore as somewhat difficult to use when performing this task.

Respondents reported a wider range of ratings for making web page design changes. Drupal received more very to somewhat easy ratings than SharePoint, where ratings ranged from very easy to very difficult.

Results were similar regarding the task of making web administrative changes to the CMS. Again, Drupal received more favorable ratings than SharePoint.

The Arizona DOT respondent noted that content updates to Sitefinity are easy, as are building pages, deleting pages and generally maintaining content. Some changes to page templates and local CSS (Cascading Style Sheets) are easy while other changes that require code access and changes are much more difficult and require technical support.

Ratings from survey respondents are summarized in the following tables.

Respondents' Assessment of Updating Web Page Content		
Performance Assessment	**CMS**	**State/Agency**
Very easy	Crownpeak	Virginia
	Drupal	Vermont
	Drupal, MCMS 2002	Washington
	Jahia	Wyoming
	Percussion CM1	Kansas
	RedDot	Indiana
	SharePoint	Kentucky, Louisiana
	Sitefinity	Arizona
Somewhat easy	DNN Evoq	Iowa
	Drupal	DLI, MPCA
	Oracle APEX (proprietary system)	Utah
	SharePoint	DPS, Mississippi, North Carolina, Pennsylvania
	SharePoint, SDL Tridion	DEED
	Vignette	Michigan
	visionLive	Nevada
Somewhat difficult	Sitecore	MDA

Respondents' Assessment of Changing Web Page Design		
Performance Assessment	**CMS**	**State/Agency**
Very easy	Jahia	Wyoming
	Kentico	Metropolitan Council
	SharePoint	Louisiana
Somewhat easy	Drupal	DLI, Vermont
	Drupal, MCMS 2002	Washington
	Drupal, WordPress	DNR
	Oracle APEX (proprietary system)	Utah
	Percussion CM1	Kansas
	RedDot	Indiana
	SharePoint	DPS, North Carolina, Pennsylvania
Somewhat difficult	Crownpeak	Virginia
	DNN Evoq	Iowa
	Drupal	MPCA
	SharePoint	Kentucky
	SharePoint, SDL Tridion	DEED
	Sitefinity	Arizona
	Vignette	Michigan
Very difficult	SharePoint	Mississippi
	Sitecore	MDA
	visionLive	Nevada

Respondents' Assessment of Making Website Administrative Changes		
Performance Assessment	**CMS**	**State/Agency**
Very easy	Crownpeak	Virginia
	Drupal	Vermont
Somewhat easy	DNN Evoq	Iowa
	Drupal	DLI
	Drupal, MCMS 2002	Washington
	Drupal, WordPress	DNR
	Jahia	Wyoming
	Kentico	Metropolitan Council
	Oracle APEX (proprietary system)	Utah
	RedDot	Indiana
	SharePoint	North Carolina
	Sitecore	MDA
Somewhat difficult	Percussion CM1	Kansas
	SharePoint	DPS, Kentucky, Louisiana, Pennsylvania
	SharePoint, SDL Tridion	DEED
	Sitefinity	Arizona
Very difficult	SharePoint	Mississippi
	Vignette	Michigan
	visionLive	Nevada

Future Plans

Several respondents provided details about future plans for the agency CMS:

- The respondent from Arizona DOT, which uses Sitefinity, noted that a project is underway to convert to a Drupal site, with a planned rollout in the third quarter of 2019. The agency is moving to Drupal primarily because it provides much more flexibility and adds functionality without the need for a high level of technical support. Arizona DOT's intranet has used a Drupal CMS for about three years and while there have been some challenges, the agency is generally satisfied with the system. The agency is also

building the new platform in-house so that team members have a greater understanding of how it works.

- DLI is using Drupal 8 to build its first-ever CMS.

- Indiana DOT's IT team is currently reviewing new CMS options since OpenText is no longer supporting OpenText RedDot. Since OpenText has other CMS platforms, the agency will most likely stay with the vendor.

- MDA is currently transitioning from Sitecore to Drupal.

Content Management System Costs and Funding

Content Management System Costs

Most respondents did not provide cost information for the purchase and installation of their CMS. Three respondents reported a cost in the range of $28,000 to $30,000 (MDA, $30,000; Nevada DOT, $28,160; Wyoming DOT, $28,000). DNR estimated costs at approximately $50,000. Washington State DOT also reported upfront costs of $50,000 along with $30,000 per year for off-site hosting. The Vermont respondent reported no initial costs because the agency used open source software hosted by Vermont Information Consortium (which is funded through the state's Department of Motor Vehicles). Iowa DOT paid $200,000 in consulting fees for migration and training.

Several respondents reported that their agencies pay a continuing licensing fee or user fee for their CMS platform. Four of these respondents (MDA, Indiana, Kansas and Wyoming) were unable to provide fee information. Eight respondents (DPS, Metropolitan Council, Michigan, MPCA, Nevada, Utah, Vermont and Washington) reported that their agencies do not pay a continuing licensing fee or user fee for their CMS platform. Six respondents (DLI, Kentucky, Louisiana, North Carolina, Pennsylvania and Virginia) were unsure if their agencies paid these fees.

Information from respondents who reported agency CMS costs is summarized in the table below.

Costs Associated With Agency CMS			
State/Agency	**System**	**Initial Costs**	**Ongoing Costs**
Arizona	Sitefinity	N/A	• Approximately $5,000/year for platform with no user limit (only supports one website). • Consultant technical support and maintenance costs additional.
DEED	SharePoint, SDL Tridion	N/A	Approximately $35,000/year for hosting/server and SDL Tridion licensing.
DNR	Drupal, WordPress	Approximately $50,000	Approximately $50,000/year for Acquia Drupal hosting with no user limit. Does not include distributed denial of service (DDoS) protection.
Iowa	DNN Evoq	N/A*	$24,000/year licensing fee.
MDA	Sitecore	Approximately $30,000	Annual maintenance fee (details unavailable).
Mississippi	SharePoint	N/A	$37,500/year for 1,800 users and six servers.

Costs Associated With Agency CMS			
State/Agency	**System**	**Initial Costs**	**Ongoing Costs**
Nevada	visionLive	$28,160	None.
Washington	Drupal, MCMS 2002	$50,000	$30,000/year for off-site hosting.
Wyoming	Jahia	$28,000	Yes (details unavailable).

*Iowa DOT paid $200,000 in consulting fees for migration and training.

Content Management System Funding

At most agencies, the IT department budgets for website operation costs and upgrades. Three respondents—DEED, DLI and Iowa—reported that their communications department provides the funding. The Metropolitan Council, MPCA, Virginia and Washington cited both departments as the source of funding; costs are shared by all divisions at DNR, DPS and the Metropolitan Council. The Indiana Office of Technology (an agency outside of Indiana DOT) budgets for these costs in that state. The table below summarizes survey responses.

Budgeting Responsibility for Website Costs and Operations	
Division/Department Responsible for Funding	**State/Agency**
Information Technology	Arizona, Arkansas, Indiana, Kansas, Kentucky, Michigan, Mississippi, Montana, Nevada, North Carolina, North Dakota, Wyoming
Communications	DEED, DLI, Iowa
Information Technology and Communications	Metropolitan Council,* MPCA, Virginia, Washington
All Divisions	DPS
Administration/Operation Services	Alaska, DNR,** Louisiana, New Hampshire, Pennsylvania***

*Communications and Information Services budget for website operation costs and upgrades, with costs distributed among all divisions.
**Operation Services Division budgets for website operation costs and upgrades, with costs distributed among all business units.
***Costs are part of a contract for the entire commonwealth that is handled by the Office of Administration.

Processes and Workflow of Website Operations and Maintenance

Staff and Web Support

Respondents were asked to identify the staff responsible for providing web support in six areas:

- Web design.
- Creation of new web pages and content.
- Updates to existing web pages and content.
- Website down.
- General maintenance.

- Web tools and solutions (such as plug-ins, web parts, modules, new features and integration with third-party systems).

While most agencies cited the same staff for creating or updating web pages and content, web design was sometimes performed by other staff. Technical tasks, such as addressing a failed website, performing technical web maintenance or implementing tools and solutions, were performed by IT staff in almost all agencies.

The following tables summarize survey responses by each topic area.

Staff Positions Providing Web Design Support			
State/Agency	Web Design	Creating New Pages/Content	Updating Existing Pages/Content
Alaska	Internet specialist II	Various positions	Various positions
Arizona	Communications web team	Communications web team and others	Communications web team and agencywide staff
Arkansas	Graphic design coordinator	Digital content coordinator	Digital content coordinator
DEED	Management analyst III, Communications web team	Management analyst III, Communications web team	Management analyst III, Communications web team
DLI	Communications staff	Communications staff	Communications staff
DNR	MNIT web designer	Various agency and MNIT staff	Various agency and MNIT staff
DPS	Webmaster, MNIT; website information officer, Communications	Website information officer, Communications	Website information officer, Communications
Indiana	IT specialist, contract manager, external communications staff, internal communications staff	IT specialist, external Communications staff	IT specialist, contract manager, external communications staff, internal communications staff
Iowa	Strategic Communications web team	Strategic Communications web team	Strategic Communications web team, three content managers
Kansas	Web administrator's team	Public involvement and district public liaison officers	Public involvement and district public liaison officers
Kentucky	Webmaster	Department content manager	Department content manager
Louisiana	IT programmer/analyst	IT programmer/analyst	IT programmer/analyst
MDA	Web coordinator	Web coordinator, administrative staff, Sitecore users	Web coordinator, administrative staff, Sitecore users
Metropolitan Council	Senior graphic designer, Communications	Senior web editor, Communications	Various agency staff, from administrators to planners

Staff Positions Providing Web Design Support			
State/Agency	Web Design	Creating New Pages/Content	Updating Existing Pages/Content
Michigan	Site administrators	Site administrators, site authors	Site administrators, site authors
Mississippi	Systems analyst II, Information Systems	Systems analyst II, Information Systems	Systems analyst II, Information Systems
Montana	Web developers, Information Services	Web developers, Information Services	Web developers, Information Services
MPCA	Information officer and SPAP, Communications	Information officer and SPAP, Communications	Information officer and SPAP, Communications
Nevada	Public information officers	Web editors (content), public information officers (pages)	Division web editor
New Hampshire	IT staff	IT staff	Various staff
North Carolina	Graphic designer, Communications	Web content staff, IT	Web content staff, IT
North Dakota	Programmer/analyst III, IT; Communications staff	Programmer/analyst III, IT; Communications staff	Programmer/analyst III, IT; Communications staff
Pennsylvania	Digital director and deputy digital director, Central Press Office; consultants	Digital director and deputy digital director, Central Press Office; various staff	Various staff
Utah	[No response]	Communications systems administrator, Communications	Various staff
Vermont	Digital outreach coordinator, Public Outreach; IT systems developer, Digital Services	Public outreach manager/digital outreach coordinator, Public Outreach; IT systems developers, Digital Services	Public outreach manager/digital outreach coordinator, Public Outreach; IT systems developers, Digital Services
Virginia	Web developer	Web staff (pages), various staff (content)	Web staff, trained contributors
Washington	IT specialist II, Communications	Staff statewide	Staff statewide
Wyoming	IT Development staff	Public Affairs Office and content management users	Public Affairs Office and content management users

Staff Positions Providing Web Technical Support			
State/Agency	Website Failure	General Maintenance	Web Tools and Solutions
Alaska	IT staff	Internet specialist II, IT staff	Internet specialist II, IT staff
Arizona	IT staff, consultant technical support	IT staff, consultant technical support	N/A
Arkansas	Division head, Computer Services	Digital content coordinator	Digital content coordinator
DEED	MNIT	Management analyst III Communications web team	Management analyst III Communications web team
DLI	MNIT webmasters	MNIT webmasters	MNIT webmasters
DNR	Drupal developer and analyst, MNIT	MNIT web team	MNIT web team
DPS	Webmaster, MNIT	Webmaster, MNIT	Webmaster, MNIT
Indiana	IT specialist	IT specialist, external communications	IT specialist
Iowa	IT staff	IT staff	Strategic Communications web team, consultant
Kansas	Web administrator's team	Web administrator's team	Web administrator's team
Kentucky	Webmaster	Webmaster, SharePoint administrator	SharePoint administrator
Louisiana	IT programmer/analyst, technical support	IT programmer/analyst	N/A
MDA	MNIT staff	[No response]	N/A
Metropolitan Council	[No response]	Developer, Information Services	Developer, Information Services
Michigan	Network administration team, Technology, Management and Budget	Network administration team, Technology, Management and Budget	Network administration team, Technology, Management and Budget
Mississippi	Systems analyst II, Information Systems	Systems analyst II, Information Systems	Systems analyst II, Information Systems
Montana	Server administrator, Information Services	Web developers, Information Services	Server administrator and web developers, Information Services
MPCA	MNIT webmaster	MNIT staff	MNIT staff
Nevada	Public information officers, IT help desk, CMS technical support	Public information officers, IT help desk, CMS technical support	Public information officers, CMS technical support
New Hampshire	IT staff	IT staff	IT staff

Staff Positions Providing Web Technical Support			
State/Agency	**Website Failure**	**General Maintenance**	**Web Tools and Solutions**
North Carolina	IT staff	IT staff	IT staff
North Dakota	DOT help desk, IT staff	DOT help desk, IT staff	Programmer/analyst III, IT, and Communications staff
Pennsylvania	Digital director and deputy digital director, Central Press Office; consultants	Consultants	Consultants
Utah	Communications systems administrator, Communications	Communications systems administrator, Communications	Communications systems administrator, Communications
Vermont	IT systems developers, Digital Services	IT systems developers, Digital Services	IT systems developers, Digital Services
Virginia	IT staff, Crownpeak technical support	IT staff, Crownpeak technical support	Various staff
Washington	IT staff	IT staff	IT staff
Wyoming	IT Development staff	IT Development staff	IT Development staff

Web Request Process

Nineteen respondents don't use forms for website changes or to update web content. Agencies that don't use a form typically send web-related requests by email.

While there was little consensus among respondents in the process used for updating content or creating new web pages, some common practices were identified:

- Content updates are usually executed by a web content person from each department or division.

- At least one layer of approval is required for both content updates and new page creation.

- New pages are created using existing templates.

- New website projects require an assigned web staff member to manage the request.

Web Request Practices by Agency		
State/Agency	**Web Request Form**	**Web Request Process**
Alaska	No	A content manager delivers final content to web editor. Web editor reviews content and prepares the appropriate layout using a family of approved templates. Website is built in testing area of server. Once site is approved by content manager, site is moved to production area and uploaded to public-facing side of server.
Arizona	No	Some web users are set up to allow login and change content. Once changes are complete, they submit them to the web team for review and publication.

Web Request Practices by Agency		
State/Agency	**Web Request Form**	**Web Request Process**
		A limited number of staff can publish their own updates based on need and position (e.g., 24-hour staff posting news releases and traffic alerts). Other users who don't have the need or desire to update themselves submit requests via email to a central mailbox for update by the web team.
Arkansas	No	Division submits a request via email. For new page requests, the digital content coordinator gathers and record requirements, creates a wire frame and then creates a draft web page (in Dreamweaver) for requestor's approval.
DEED	Yes	[No response.]
DLI	No	The agency is currently reviewing DNR practices before creating and implementing an approval process.
DNR	No	We have a web policy that dictates the process. Requests are funneled through either division web contacts or the enterprise media coordinator.
DPS	No	• **New page:** The website information officer (IO) creates each new page with title, navigation or other standard DPS web parts and then hands it off to the division public information officer (PIO) or a division content editor for completion. The web IO and division PIO review the page/content before it's published. • **Existing content:** Division PIOs or division content editors update basic content (text, images, links, attached documents) as needed. Requests for any major changes, layout changes, web parts or navigation adjustments must be made to the web IO.
Indiana	Yes	A ticket is submitted to external communications manager. Content is updated in CMS fairly easily by opening text box and editing. Publishing page takes 1 to 3 minutes. New pages are created from an existing page.
Iowa	No	The web team has a group email where requests for a new web page or update are received. Each web team member is assigned a specific office as customers. When a web team member receives an update request from a customer, he or she makes the requested update or creates the requested page. (If the staff member is out of the office, another team member makes the update or takes on the project.) If the requested project is a completely new website, the web team leader assigns it to a team member.
Kansas	No	The public involvement officers perform these tasks. They have signed an agreement that they are responsible for the content that's created under their name and are approved to publish web pages directly to production. They log in to CM1, add links, create new pages, archive pages, view changes in a test environment and publish final content.
Kentucky	No	Each content manager is responsible for an area's content and reports directly to the individual leadership team. The Office of Public Affairs controls the common areas of the site.

Web Request Practices by Agency		
State/Agency	**Web Request Form**	**Web Request Process**
Louisiana	No	Email request is sent to content manager or IT programmer/analyst.
MDA	No	User is given access to Sitecore and allowed to create pages (from templates), edit content and upload images. The user then submits page(s) for review. They are then published by user with administrator rights.
Metropolitan Council	No	• **New content:** For minor or temporary projects (just a few pages), CMS users create pages and Communications staff reviews. For larger or critical projects, requestor completes an online request form that is reviewed by a Communications staff member who consults with the requestor to determine need, audience, templates and design, and provide support as needed. • **Existing content:** CMS users in different areas update existing content as needed. Communications staff is automatically alerted and reviews updated content for quality and adherence to standards.
Michigan	No	[No response.]
Mississippi	Yes	Requests for new content, images, copy, etc., are sent to a systems analyst who completes the request.
Montana	Yes	Users complete a web request form that includes user email, priority, request type, webpage address, details and supporting files. The request is submitted to a main service desk (or an email mailbox) and is given to a web developer who makes the changes in test and then asks a server administrator to promote changes to production.
MPCA	No	Requests are sent via email. Programs that request larger projects meet with a project manager.
Nevada	No	• **New page:** Designated web editors contact the public information officer (PIO) to create a new web page for the web editor to populate with content. • **Existing content:** Web editors can edit their own division's web page(s). The PIO must review and publish the updated content before the changes go live.
New Hampshire	Yes	User sends an email request to the IT department where staff creates new pages from a Dreamweaver template. Once the page is set up, the requestor can add information in content areas.
North Carolina	Yes	User submits a request to the Communications Office. A communications officer or web content coordinator reviews the request and then works with the requestor to ensure it meets agency style and governance policies, is written for the general public and is optimized for the web.
North Dakota	Yes	User submits a request that is assigned to the web team lead who reviews the requirements and assigns the request to a staff member. If necessary, meetings are held to determine requirements. Then a prototype is created, and the users approve the page before production.

Web Request Practices by Agency		
State/Agency	**Web Request Form**	**Web Request Process**
Pennsylvania	Yes	Each district and business area has designated content editors who can make basic changes to pages. Each page goes through an approval workflow before it actually is published, with final approval falling to the Central Press Office team, mainly the digital director. When new pages need to be created, editors consult with the digital director first; then they can generally make the pages on their own, using the same approval process. More complex changes are made by the digital director or deputy digital director. New features, style changes, etc., are sent to a consultant that handles all agency websites throughout the Commonwealth. The consultant performs all major coding and backend system maintenance.
Utah	No	Divisions perform day-to-day maintenance. The Communications systems administrator follows up and assists as needed.
Vermont	No	A draft web page is created using Drupal's interface. When complete, the web page is published and goes live to the website. Any administrator can then update content at any time when logged in to the website as a user.
Virginia	Yes	Two methods: • A detailed email to the web content manager. • Access to the widget (a SharePoint page that is frequently checked).
Washington	No	Staff creates new web pages. A central office approves pages to ensure consistency.
Wyoming	No	• **New page:** Public Affairs typically creates new pages to ensure that unnecessary pages are not created. Web content management users must consult with Public Affairs before adding new pages. • **Existing content:** Web content management users can make changes to their web pages.

Governance of Website Operations and Management

Website Content Structure

Respondents were asked to identify whether their website content management structure was centralized or decentralized. Eighteen respondents reported a centralized structure, eight reported a decentralized structure, and two respondents didn't provide a response. Survey responses are provided in the table on page 24.

Management of Website and Web Infrastructure

In most agencies surveyed, the IT department oversees the web infrastructure. Other departments reported to have infrastructure oversight were communications and public information. In some agencies, oversight is shared by IT and communications, or IT and a vendor.

Similarly, the overall website responsibility is assigned to a staff member in IT, communications or public information. DPS, Louisiana and North Carolina utilize a dual structure where staff from IT oversees the technical aspects of the website and staff from public information or communications is responsible for the web content. Mississippi DOT is currently developing a new public-facing website that will follow this shared management practice.

DNR has a homepage policy that defines management responsibility for the homepage and each section of the page, including the type of content for each block, the length of time content can remain on the page and long-term navigation changes. The agency also has a web policy that outlines roles and responsibilities for the web team and the division web liaisons. (Divisions retain a good deal of autonomy on how they manage their part of the website.) For more than 10 years, division web liaisons have held weekly meetings to discuss changes to the homepage, upcoming or hot web topics, new web content, social media updates, CMS issues and other web-related matters. This broad, cross-department communication ensures that everyone stays informed and updated.

Survey responses are provided in the table below.

Management of Website and Web Infrastructure			
State/Agency	**Overall Website Responsibility**	**Centralized/ Decentralized**	**Web Infrastructure Oversight**
Alaska	Internet specialist II, IT staff, site managers from 3 other major functions	Decentralized	IT
Arizona	Web project manager	—	IT
Arkansas	Digital content coordinator	Centralized	Public Information
DEED	Creative director, Communications	Centralized	Communications
DLI	Director, Communications	Centralized	Communications
DNR	Director, Communications	Decentralized	IT
DPS	Webmaster, MNIT (platform); website information officer, Office of Communications (content)	Centralized	IT
Indiana	External communications manager	Centralized	IT
Iowa	Web team, Office of Strategic Communications and Policy	Centralized	IT
Kansas	Internet/intranet supervisor	Centralized	IT
Kentucky	Webmaster, IT	Centralized	IT
Louisiana	IT/Public Affairs	—	IT
MDA	Web coordinator	Centralized	Communications
Metropolitan Council	Web and multimedia manager, Communications	Decentralized	IT and Communications
Michigan	Site administrators	Centralized	IT

Management of Website and Web Infrastructure			
State/Agency	**Overall Website Responsibility**	**Centralized/ Decentralized**	**Web Infrastructure Oversight**
Mississippi	Systems analyst, Information Systems	Centralized	IT
Montana	Applications supervisor, Information Services; public information officer, Director's Office	Centralized	IT
MPCA	Communications	Centralized	MNIT and Communications
Nevada	Public information officer, Public Information Office	Centralized	Communications
New Hampshire	Public information officer, Executive Office	Decentralized	IT
North Carolina	Communications Office (content), IT (technical)	Centralized	IT
North Dakota	Programmer analyst III, IT	Centralized	IT
Pennsylvania	Digital director, Central Press Office	Decentralized	Communications
Utah	System administrator, Communications	Decentralized	IT
Vermont	Manager, Public Outreach	Centralized	IT
Virginia	Web content manager, other departments	Decentralized	IT and Crownpeak
Washington	Web manager, Communications (reports to assistant director, Communications)	Decentralized	IT
Wyoming	Public Affairs Office	Centralized	IT

Website Performance Measures

Survey respondents were asked to indicate which of the following key performance indicators and metrics were used to assess the performance of their agency's website:

- Total number of page hits or pageviews.
- Total number of visitors.
- Total number of sessions.
- Bounce rates.
- Percentage of new and old visitors.

- Number of document downloads.
- User satisfaction via online survey.
- Polls.
- Maintenance or operation costs.
- Other.

The most frequently cited metrics used were total number of page hits or pageviews and total number of visitors. Bounce rates, total number of sessions, number of document downloads and user satisfaction were

used by approximately one-third of respondents. Polls and maintenance and operation costs were the least frequently used metrics for measuring performance. Other metrics reported by respondents were quality assurance and accessibility measurements (Arizona) and Google Analytics and Siteimprove (Montana).

Results from survey respondents are summarized in the bar graph below.
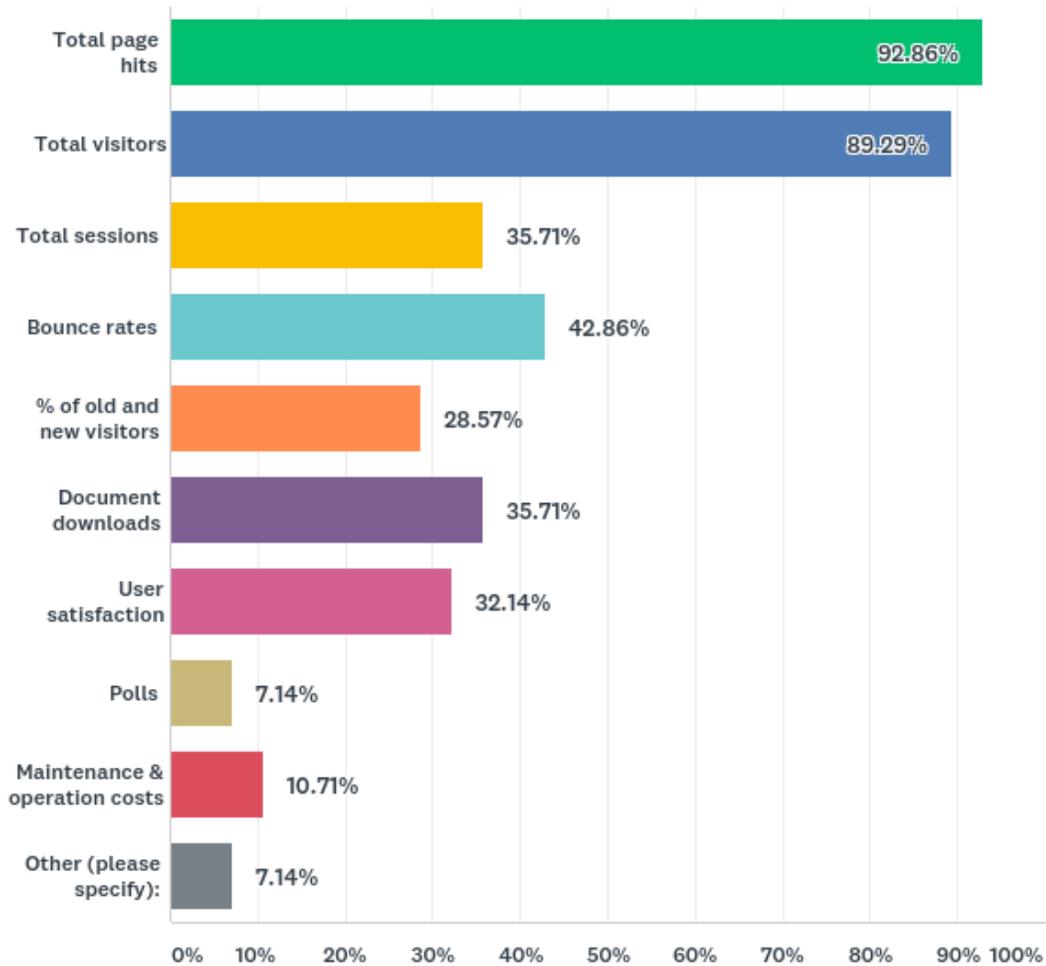

Figure 4 Key Performance Indicators Used to Assess Website Performance

Other Website Technology Tools

Mapping Feature

Respondents were asked to indicate the technology used to implement mapping features on the agency's website. The four most frequently reported technologies were Google, custom geographic information systems (GIS), Bing and Environmental Systems Research Institute (ESRI). Other tools cited were MapServer, Oracle, Siteimprove and Tableau. Most agencies use several mapping technologies, depending on who is implementing the map or on agency needs. Survey results are summarized in the table below.

State/Agency	Mapping Tool								
Mapping Tools Used by Agency	Bing	Custom GIS	ESRI	Google	MapServer	Oracle	Siteimprove	Tableau	Other
Alaska			X	X					
Arizona		X							
Arkansas				X					
DEED	X	X		X				X	
DLI				X					
DNR			X	X	X				
DPS	X								
Indiana		X		X					
Iowa			X						
Kansas		X							
Kentucky		X		X					
Louisiana	X								X
MDA		X							
Metropolitan Council		X							
Michigan									X
Mississippi				X					
Montana				X					
MPCA						X			
Nevada		X							
North Carolina	X	X							
North Dakota		X		X					
Pennsylvania		X							
Utah		X							
Vermont		X							
Virginia	X	X		X					
Washington			X						
Wyoming			X			X			

Related Resources:

ArcGIS, ESRI, 2018.
https://www.esri.com
From the product website: ArcGIS offers a unique set of capabilities for applying location-based analytics to your business practices. Gain greater insights using contextual tools to visualize and analyze your data. Collaborate with others and share your insights via maps, apps and reports.

Bing Maps, Microsoft Corporation, 2018.
https://www.microsoft.com/en-us/maps/licensing/bing-maps-api-features-overview
Bing Maps, a geospatial mapping platform product from Microsoft, include the following services: Bing Maps Aerial, Bing Maps Hybrid and Bing Maps Road. *From the product website:* Bing Maps aerial and satellite imagery is among the best available for online mapping platforms, with global coverage imagery up to 30cm/pixel resolution. … Bing Maps has a strong developer community [that has] built excellent tools that can be used to enhance the functionality of Bing Maps.

Google Maps, Google, 2018.
https://www.google.com/maps/about/
Google Maps provides various web mapping services, including satellite imagery, street maps, real-time traffic conditions and multimodal route planning.

MapServer, Open Source Geospatial Foundation, 2018.
http://mapserver.org
From the product website: MapServer is an Open Source platform for publishing spatial data and interactive mapping applications to the web. Originally developed in the mid-1990's at the University of Minnesota, MapServer is released under an MIT-style license, and runs on all major platforms (Windows, Linux, Mac OS X). MapServer is not a full-featured GIS system, nor does it aspire to be.

Oracle Fusion Middleware MapViewer, Oracle Corporation, 2018.
http://www.oracle.com/technetwork/middleware/mapviewer/overview/index.html
From the product website: Oracle Fusion Middleware MapViewer enables developers to incorporate highly interactive maps and spatial analysis into business applications. A component of Oracle Fusion Middleware, it lets you combine application content with maps and data from a variety of web services and data formats. It is also fully integrated with Oracle Spatial and Graph. In addition, it is included in Oracle products such as Oracle Business Intelligence and Oracle applications such as Utilities, Transportation, and Communications.

Oracle Spatial and Graph, Oracle Corporation, 2018.
http://www.oracle.com/technetwork/database/options/spatialandgraph/overview/spatialandgraph-1707409.html
From the product website: Oracle Spatial and Graph includes high performance, enterprise-scale, commercial spatial and graph database and analytics for Oracle Database 18c, in the cloud and on premises. It supports enterprise business, business intelligence, large-scale Geographic Information Systems, and location services applications. A general-purpose property graph database and analytic features support applications for social networks, Internet of Things, fraud detection, and recommendation systems. A special-purpose RDF [Resource Description Framework] graph database supports linked data applications.

Siteimprove, Siteimprove, 2018.
https://siteimprove.com/en-us/content-accessibility/
From the product website: Siteimprove Content & Accessibility lets you see every page, link, media file and email address in a clean list format. At a glance, you can locate accessibility issues and quality errors like broken links and misspellings, so your organization's credibility is never compromised.

Tableau, Tableau Software, 2018.
https://www.tableau.com/solutions/maps
From the product website: Tableau is designed to make the most of geographical data, so you can get to the "where" as well as the "why." With instant geocoding, Tableau automatically turns the location data and information you already have into rich, interactive maps with 16 levels of zoom—or use custom geocodes to map what matters to your business. Census-based population, income, and other standard demographic

datasets are built in. In the visual environment of Tableau, you can explore the world through data and share what you find in just a few clicks. You can even import geographic data from R or GIS (or whatever other spatial files or custom geocode data you have) and make it more easily accessible, interactive, and shareable via Tableau Online, Tableau Public, and Tableau Server.

511 Service

Note: This question was applicable only to state DOTs. Percentages reflect the responses of these 21 agencies.

Respondents were asked how their agency integrates the state's 511 service into their website.

- 29 percent reported no integration.
- 33 percent uses 511 information to autopopulate maps on their website.
- 19 percent uses dynamic feeds.
- 10 percent uses 511 information feeds as a list.
- 5 percent conducts 511 information transaction by transaction.

Three states use combined methods. Arizona and North Carolina DOTs use 511 information to autopopulate maps and use 511 information feeds as a list. Kansas DOT uses 511 information to autopopulate maps and uses dynamic feeds.

Four respondents (Arizona, Kentucky, Montana and New Hampshire) reported that the state's 511 site is standalone. Arizona's site is linked to the agency's website, and Kentucky's site has GIS features. In Montana, information is fed into a separate road reporting application that is linked from the agency's website.

In Alaska, the 511 site is hosted by a contractor and interfaces with Nixle (a notification system used by public agencies to communicate emergency alerts and advisories) and the National Oceanic and Atmospheric Administration. Maintenance and Operations staff at Alaska Department of Transportation and Public Facilities also manually update the site.

Michigan DOT doesn't have a 511 site, but the agency does employ similar technologies and services.

The table below summarizes survey responses from state DOTs.

Integration of State 511 Service Into Agency Website						
State	No Integration	Dynamic Feeds	Transaction by Transaction	511 Information Autopopulates Maps on Agency Website	511 Information Feeds as a List	Other
Alaska						X
Arizona				X	X	X
Arkansas	X					
Indiana				X		
Iowa	X					
Kansas		X		X		
Kentucky						X
Louisiana				X		
Michigan						X
Mississippi		X				
Montana		X				X
Nevada				X		
New Hampshire						X
North Carolina				X	X	
North Dakota	X					
Pennsylvania	X					
Utah	X					
Vermont		X				
Virginia			X			
Washington				X		
Wyoming	X					

Automated Content Feeds

When asked if agencies have any web content that automatically generates or feeds into social media or newsletter content, 21 respondents cited they don't have such a system. Four respondents—DNR, Iowa, Kentucky and North Dakota—use GovDelivery to push content to their newsletter and social media accounts.

Iowa DOT also uses Typepad, a tool that generates RSS (Rich Site Summary) feeds from content postings. The RSS feeds are then used to trigger GovDelivery notices to subscribers informing them of new content postings.

Typepad also allows users to automatically feed new content postings into social media accounts such as Twitter.

Related Resources:

> **GovDelivery**, Granicus Inc., 2018.
> https://insights.govdelivery.com
> *From product website*: Whether you are connecting people to important resources during a natural disaster, help[ing] voters find polling places, ensuring public transit runs smoothly, or encouraging families to get vaccinated, communication is key. The resources on this site are aimed at helping government communicators enhance their marketing and communications techniques to reach their communities and drive action. Our resources include trend surveys, benchmark metrics, guides on best practices, success stories, and support for clients using our platforms.

> **Typepad**, Typepad, Inc., 2018.
> http://www.typepad.com
> Typepad is a blogging platform that offers file hosting and supports multiple users. It features customizable themes that can be edited by users without coding experience, widgets that can display interactive information from third-party services, photo gallery hosting and posting from mobile devices.

Related Resources

Below are brief summaries and links to more information about CMS used by survey respondents.

Crownpeak Web Content Management System, Crownpeak Technology, Inc., 2018.
https://www.crownpeak.com
From the product website: [Crownpeak's Web Content Management System allows users to] create, manage and deploy digital experiences across all digital touchpoints from a single intuitive platform. … [It] enable[s] non-technical users to intuitively create and manage enterprise websites, mobile sites, landing pages and more.

DNN Evoq, DNN Software, 2018.
http://www.dnnsoftware.com/
From the product website: Evoq enables and empowers marketers to achieve business goals by creating, distributing and measuring content. [IT managers] find it easier to build custom applications on top of Evoq compared to competitive platforms. In addition, they love that marketing can independently manage their content and campaigns.

Drupal, Drupal Association, 2018.
https://www.drupal.org/
From the product website: Drupal is the open source content management framework behind millions of websites and applications. … It's built for easily creating versatile, structured content and connecting powerful integration tools.

Jahia Digital Experience Manager, Jahia Solutions Group SA, 2018.
https://www.jahia.com
From the product website: [Digital Experience Manager provides] an agile customizable platform that manages [an] entire digital ecosystem to innovate and deliver great customer experience, foster internal collaboration and support dynamic business needs for sustainable growth.

Kentico Web Content Management, Kentico Software, 2018.

https://www.kentico.com

From the product website: Kentico's .NET Web Content Management solution leverages features such as ready-to-use web parts, widgets, multiple language support, and mobile previews and device detection, to free time and resources so [users] can accomplish more. In addition, the WCM is fully integrated with Kentico's Online Marketing solution [that allows users to] automatically deliver consistently outstanding experiences via multiple channels on all devices.

Microsoft Content Management Server (MCMS) 2002, Microsoft Corporation, 2018.

https://www.microsoft.com/en-us/download/details.aspx?id=22775

From the product website: The web content management capabilities of MCMS 2002 have been integrated into Microsoft Office SharePoint Server 2007. *From the product website:* Microsoft Content Management Server (MCMS) 2002 provides a fast and cost-effective way to create, deploy and maintain mission-critical, content-rich Web sites. Business users can create and publish Web content from the browser or directly from within Microsoft Word 2002 through a seamless integration that connects directly into the MCMS workflow process. Developers and system administrators can quickly build and deploy ASP.NET Web sites and Web services by leveraging the integration of MCMS with Visual Studio.NET and other Microsoft servers such as Commerce Server, SharePoint Portal Server and Application Center.

Oracle Application Express (APEX), Oracle Corporation, 2018.

http://www.oracle.com

From the product website: Oracle Application Express (Oracle APEX) is the low code web application development tool for the Oracle Database. Application Express enables [users] to design, develop and deploy beautiful, responsive, database-driven applications, either on-premises or in the cloud. Using only a web browser and limited programming experience, [users] can rapidly develop and deploy professional applications that are both fast and secure for any device, from desktop to mobile. Oracle Application Express combines the qualities of a low code tool, productivity, ease of use and flexibility with the qualities of an enterprise development tool: security, integrity, scalability, availability and built for the web.

Percussion CM1, Percussion Software, 2018.

https://www.percussion.com

From the product website: Percussion CMS was designed to help marketer[s] publish effective, engaging content quickly and easily. [Users] don't need technical skills to contribute or publish content, and [the] easy to use system lets [users] empower contributors while enforcing editorial and brand integrity. … [The system provides a] friendly interface, intuitive editing tools, built-in blogs, responsive mobile templates, SEO-friendly meta data management and fast migration with LiveFirst.

RedDot (now OpenText Web Site Management), OpenText Corporation, 2018.

https://www.opentext.com

From the product website: OpenText acquired RedDot as part of its acquisition of Hummingbird Ltd. and rebranded it to OpenText Web Solutions. After the acquisition of Vignette, Web Solutions was rebranded again to become OpenText Web Site Management. OpenText Web Site Management is a powerful Web site application that empowers business users with rapid deployment of web pages, as well as support for multilingual web environments. It has specific integrations to Microsoft SharePoint and SAP NetWeaver Portal, improving content richness and facilitating content management in these portal applications.

SDL Tridion, SDL, 2018.

https://www.sdl.com

From the product website: SDL Tridion Sites (formerly SDL Web), is a powerful web experience management solution that enables companies to effectively manage a complex environment of marketing and commerce-led content across web, mobile and other digital touchpoints to deliver continuous digital experiences.

SharePoint, Microsoft Corporation, 2018.

https://products.office.com/en-us/sharepoint/collaboration

From the product website: [SharePoint allows users to share] and manage content, knowledge, and applications to empower teamwork, quickly find information, and seamlessly collaborate across the organization.

Sitecore, Sitecore Corporation, 2018.

https://www.sitecore.com

From the product website: [Sitecore] content management system was built from the ground up as an integrated platform to support global, multilingual content at scale and provide the flexibility that enterprises demand. It's easy for marketers to use but also open and powerful for IT teams who want to customize, manage, integrate and secure even the most demanding of websites.

Sitefinity, Progress Software Corporation, 2018.

https://www.sitefinity.com

From the product website: Easily create, edit, preview and publish great content on your websites. Build pages and forms faster with an amazing drag-and-drop user experience. Make fast updates with powerful inline editing. Ensure content quality and governance with approval workflows, granular permissions and version history.

Vignette (now OpenText Web Experience Management), OpenText Corporation, 2018.

https://www.opentext.com

From the product website: In 2009, OpenText acquired Vignette. Vignette offered a comprehensive portfolio of web solutions to meet the broad range of market requirements, many of which have since been branded under new OpenText names. OpenText continues to support Vignette's products and installed base, including the former Vignette Content Management, as well as OpenText's existing Web Site Management products. The combined product line provides a full set of feature options, from an easy-to-use, fast-to-deploy web publishing application, to a fully integrated, enterprise-class e-business platform for large-scale deployments.

visonLive, Vision, 2018.

http://www.visioninternet.com

From the product website: visionLive is a subscription-based Content Management System and service plan that equips you with the technology, support, training and insights to keep your website relevant and effective—now and in the future.

WordPress, WordPress, 2018.

https://wordpress.com

From the product website: WordPress is a free open source blogging tool and a content management system (CMS) based on PHP and MySQL, which runs on a web hosting service. Features include a plugin architecture and a template system.

Appendix A

Content Management Systems and Website Practices: Survey Questions

The following survey was distributed to selected state departments of transportation and other state agencies expected to have experience with content management systems.

Staffing

1. How many people are on your central website team?

2. Please estimate the number of staff members who have access to the backend website in the following roles:

   - Can make content changes only.
   - Can make changes to web page design (layout, create/delete pages, etc.).
   - Have full administrative rights to manage website and make any changes.

Technology

3. What CMS or platform is currently used to operate your agency's website? Select all that apply.

   - Drupal.
   - SDL Tridion.
   - SharePoint.
   - WordPress.
   - Not currently using a CMS.
   - Other (please specify).

4. How long has your agency used the current CMS system?

   - Less than 1 year.
   - 2 to 4 years.
   - 5 years or more.
   - Other (please specify).

5. What CMS or platform was used before switching to the current system? Select all that apply.

   - Drupal.
   - SDL Tridion.
   - SharePoint.
   - WordPress.
   - This is the agency's first CMS.
   - Other (please specify).

6. Which database system(s), if any, was used with the previous CMS/platform?

7. Did your agency continue to use the same database system(s)? If no, please list new database system(s).

8. Are there any other third-party systems such as content relation management (CRM) or sales/marketing tools or systems that are integrated with the current CMS system? If yes, please specify.

9. Were there any problems during the transition from the agency's previous CMS to the new CMS? If yes, please describe the main issues.

10. Who assisted with the transition?

- Outside consultant.
- In-house IT team.
- Both.
- Other.

11. Please rate the ease of use when performing the following tasks on your agency's current CMS:

- Updating web page content.
- Making changes to web page design (layout, create/delete pages, etc.).
- Making website administrative changes (permissions, install upgrades, modules, plug-ins, etc.).

Processes and Workflows

12. Please list staff positions who provide web support in the following cases (include title and department):

- Web design.
- Creating new web pages and content.
- Updating existing web pages and content.
- Website is down.
- General technical maintenance of website.
- Web tools and solutions (e.g., plug-ins, web parts, modules, new features, integration with third-party systems).

13. Do you have a specific website update request form?

14. Please describe the process for creating new web pages or updating existing content.

15. When updating or adding content to certain pages of the website, does any of that content automatically generate any social media content or automatically get inserted into an email newsletter? For example, adding content to a company news page may also trigger a system task that automatically generates a tweet based on that same piece of content. If yes, please describe.

Funding

16. What was the initial upfront cost to purchase and install the current CMS system?

17. Is there a continuing license and/or user fee for the CMS platform? If yes, what are the annual, quarterly or monthly fees and for how many users?

18. Which unit or department budgets for your agency's website operation costs and upgrades?

Governance

19. Is your website content centralized or decentralized?

20. Who is responsible for the overall website? List person's title and department.

21. Which department oversees the website infrastructure?

- Communications.
- IT.

- Other (please specify).

22. What key performance indicators/metrics are used to measure your agency's website performance? Please select all that apply.

- Total number of page hits or pageviews.
- Total number of visitors.
- Total number of sessions.
- Bounce rates.
- Percentage of new and old visitors.
- Number of document downloads.
- User satisfaction via online survey.
- Polls.
- Maintenance or operational costs.
- Other (please specify).

Mapping Features and 511 Service Integration

23. What technology is used to implement the mapping (static/dynamic) feature on your agency's website?

- Google.
- Bing.
- Custom geographic information system (GIS).
- Other (please specify).

24. Which of the following captures the integration of your state's 511 service into your agency's website? Please select all that apply.

- No integration.
- Dynamic feeds are used.
- Transaction by transaction.
- 511 information autopopulates maps on our agency's website.
- 511 information feeds into our agency's website as a list.
- Other (please describe).

Wrap-Up

25. Please use this space to provide any comments or additional information about your previous responses.

Appendix B

Content Management Systems and Website Practices: Contact Information

Below is the contact information for the individuals responding to the survey for this report.

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