

Cloud Computing

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Louisiana

ITS Technology Survey results

22 responses from 21 jurisdictions

3 ITS, 1 ITS/STS, 4 STS, 2 BOS, 3 STS/BOS

Utilizing CLOUD based services

6 Used by jurisdictions

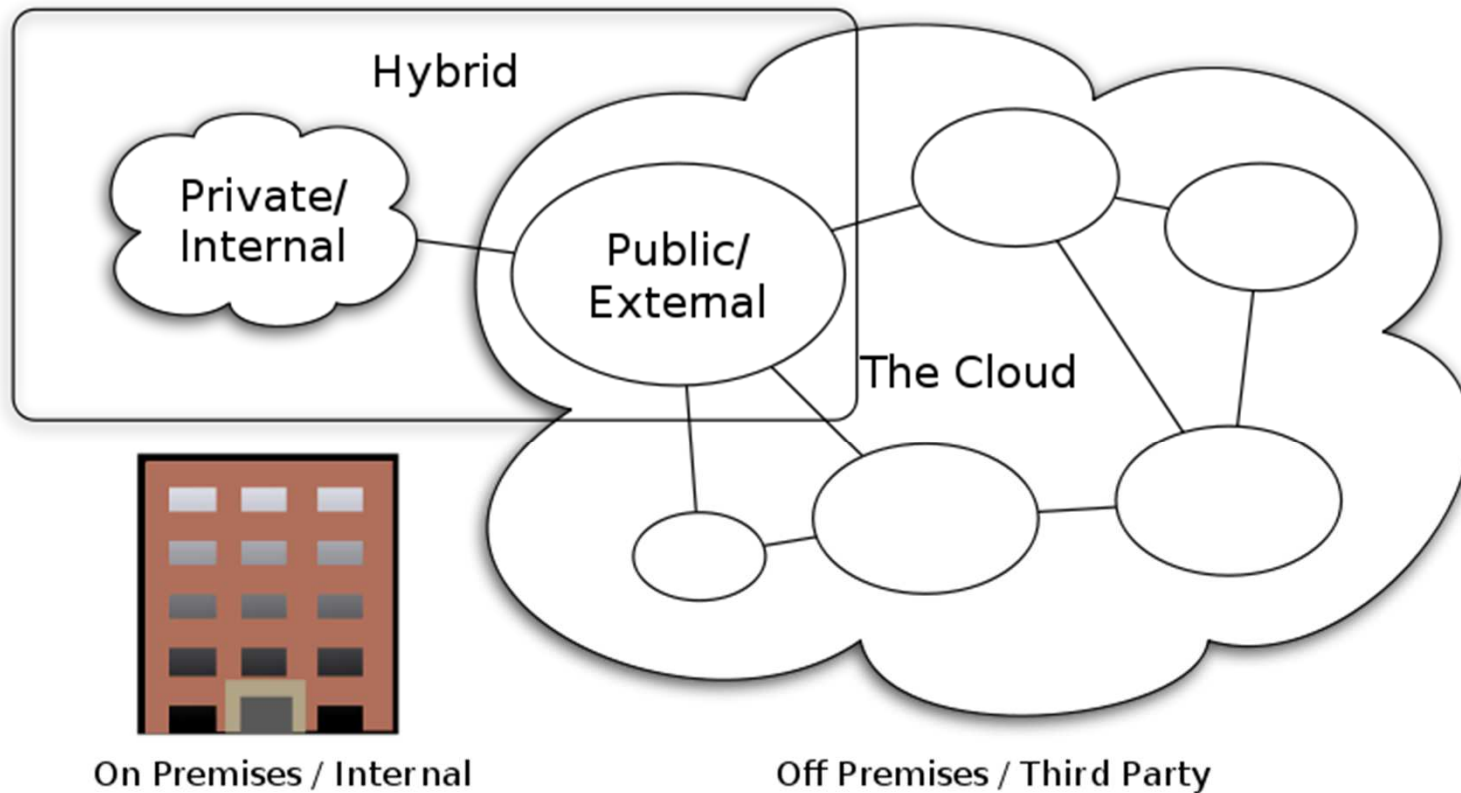
SurveyMonkey, HostedTest, GovDelivery, Email

Virtual servers, Redundant storage

1 Created by jurisdictions

Comments: Not for sensitive data; Contract signed, not implemented; Servers are virtual

ITS Technology Survey



Cloud Computing Types

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ITS Technology Survey results

Reasons not used

4 No obvious use or available solutions not right fit

3 Never considered

3 Technology, security, privacy, or other non-financial concerns

1 Financial concerns

Other: Not there yet; Being investigated; Ownership & retention of records

Case Studies

Explore Issues of Security, Integration, Backup,
Building Applications, Government Entities

Graphical Election Results

State Archives Multimedia Assessment

Public Facing Website Assessment

Graphical Election Results

Statewide elections after polls close

Even ½ hour outage unacceptable in 4-5 hour window

Have had issues related to load and just bad luck

Not sensitive data

Azure chosen

- Had developer who was familiar


- Simple to deploy

- Highly available

- Only pay for what you need

- Can be scaled up for election night

Graphical Election Results



Tom Schedler
LOUISIANA SECRETARY OF STATE
www.sos.la.gov

STATE OF LOUISIANA
UNION • JUSTICE
CONFIDENCE
SECRETARY OF STATE

Unofficial Results - Site may contain test data prior to day of election

Election: Sat May 19 2012

Parish Statistics Print

Select a Parish from the map or dropdown below to view races in that parish.

NOT SELECTED

Submit



Legend:

- All Precincts Reporting
- Outstanding Precincts
- Selected Parish
- No Races

Graphical Election Results

Azure SDK add-in to Visual Studio

Parent project stores configuration

Web Role project

Publish process

Zip file uploaded, web role instance update/create

Has built in test environment that simulates cloud

Must code to get site metrics and performance

Graphical Election Results

```
Imports System
Imports Microsoft.WindowsAzure.Diagnostics
Imports Microsoft.WindowsAzure.ServiceRuntime

Public Class WebRole
    Inherits RoleEntryPoint

    ''' <summary>
    ''' Called once when the webrole starts
    ''' </summary>
    Public Overrides Function OnStart() As Boolean

        ' For information on handling configuration changes
        ' see the MSDN topic at http://go.microsoft.com/fwlink/?LinkId=166357.

        Try
            Dim configuration As DiagnosticMonitorConfiguration = DiagnosticMonitor.GetDefaultInitialConfiguration()
            configuration.Directories.BufferQuotaInMB = 20
            configuration.Directories.ScheduledTransferPeriod = TimeSpan.FromMinutes(5)

            'Add in configuration settings for several performance counters.
            configuration.PerformanceCounters.BufferQuotaInMB = 10
            configuration.PerformanceCounters.ScheduledTransferPeriod = TimeSpan.FromMinutes(5)

            Dim sampleRate As TimeSpan = TimeSpan.FromSeconds(60)

            'Note: if you add or remove performance counter configurations here, the role may use the
            'old configuration still stored in the wad-control-container blobs. To ensure that the new
            'configuration here in the code is used, delete those blobs before publishing.

            'The new configuration will be stored in was-control-container when the role is restarted, and
            'the xml file can be checked to ensure that the configuration is what was expected.
        End Try
    End Function
End Class
```

Graphical Election Results

Management tools offer diagnostics

Memory use, available bytes, processor time

Production environment

1 extra small web role scaled to 2

Staging environment

1 extra small web role

Graphical Election Results

Choose Columns				Filter hosted services	Properties
Name	Type	Status	Environment	Environment	
Louisiana Secretary of State	Subscription	Active		Production	
Production	Hosted Service	Created		Name	
Certificates				SOSWebRole_IN_0	
ERIN.Azure - 2012.05.10 9:31:54 AM	Deployment	Ready	Production	Start result	
SOSWebRole	Role	Ready	Production	Started	
SOSWebRole_IN_0	Instance	Ready	Production	Start time	
Staging	Hosted Service	Created		5/10/2012 2:37:45 PM UTC	
Certificates				Size	
Windows Azure Tools	Service Certificate	Created		Extra Small	
ERIN.Azure - 2012.05.08 11:52:15 AM	Deployment	Ready	Production	Status	
SOSWebRole	Role	Ready	Production	Ready	
SOSWebRole_IN_0	Instance	Ready	Production	Update domain	
				0	
				Type	
				Instance	

Graphical Election Results

Adobe Flash application

client side application swf file

election results in json file

download only information needed for current page

domain windows service updates results every 2 min.

timestamp on file determines cache refresh

Graphical Election Results

```
Flash - ElectionResults_Development/src/SOSElection.mxml - Flash Builder
File Edit Source Navigate Search Project Data Run Window Help

Package Explorer
ElectionResults_Development
  src
    (default package)
      SOSElection.mxml
        SOSElection
          _model: ElectionModelLocator
          _helper: ElectionHelper
          CSVIcon: Class
          RSSIcon: Class
          RSSIcon2: Class
          BackgroundImage: Class
          _instance: SOSElection
          getInstance(): SOSElection
          preinitializeHandler(FlexEvent): void
          showWaitPopup(): void
          dispatchAndWait(CairngormEvent, int): void
          ensurePopupClosed(): void
          deferPopupClose(int): void
          footerMenuSetup(): void
          electionSetup(GenerateTabsViewEvent): void
          refreshTimer(): void
          timerComplete(TimerEvent): void
          loadDefaultElection(GetElectionConfigurationCompletedViewE
          LoadElection(ElectionVO): void
          isLiveChanged(Event): void
          siteMessageChanged(Event): void
          buildElectionDate(Date): String
          RSSItemClick(MenuEvent): void
          CSVMenuClick(MouseEvent): void
          cbElectionDates_Changed(Event): void
          goToURL(MouseEvent): void
          creationCompleteHandler(FlexEvent): void
          configService_resultHandler(ResultEvent): void
          ...

Outline
! Root

Source Design
Welcome SOSElection.mxml

_model.errorURI = config.errorURI;
_model.rssLocation = config.RSSLocation;
_model.postElectionStatsLink = config.StatsLocation;
_model.retryCount = config.RetryCount;

// now load the rest of the configuration from the file server
var getElectionConfigurationEvent : GetElectionConfigurationEvent = new GetElectionConfigurationEvent(false);
CairngormEventDispatcher.getInstance().dispatchEvent(getElectionConfigurationEvent);

// handles failure to load the config file
protected function configService_faultHandler(event:FaultEvent):void
{
    viewStack1.selectedChild = maintenanceCanvas;
}

protected function applicationCompleteHandler(event:FlexEvent):void
{
    // todo: the next version of flex and flash player 10.1 has the ability to catch
    // unhandled exceptions globally, which would be nice for reporting purposes

    // http://stackoverflow.com/questions/4053581/flex-4-wont-recognise-flash-events-uncaughterrorevent
    // http://www.adobe.com/devnet/flex/articles/global-exception-handling.html

    // hook unhandled exceptions globally:
    // LoaderInfo.uncaughtErrorEvents.addEventListener(UncaughtErrorEvent.UNCAUGHT_ERROR, onUncaughtError);
}

// private function onUncaughtError(e : UncaughtErrorEvent):void
// {
//     // Do something with your error.
// }

}]>
</mx:Script>

<mx:HTTPService id="configService" fault="configService_faultHandler(event)"
    result="configService_resultHandler(event)" resultFormat="e4x" url="Config.xml"/>
<!-- the FrontController, containing Commands specific to this application -->
<control:ElectionController id="controller"/>
<control:ElectionViewController GenerateTabsViewEvent="electionSetup(event)"
    GetElectionConfigurationCompletedViewEvent="LoadDefaultElection(event);"/>
<mx:Box id="mainWindow" width="100%" height="100%" backgroundAlpha="1" horizontalAlign="center"
    name="mainWindow">
    <mx:VBox width="100%" height="100%" backgroundColor="#FFFFFF" horizontalAlign="center">
```

State Archives Multimedia Assessment

Last major application still on mainframe

Application co-developed by another state entity

Options to store video at other state agency, in cloud or internally

AWS S3

supported natively by enterprise backup products

GovCloud

Keeps data segregated from public

Screening to confirm US governmental agency

FIPS 140-2 compliant

State Archives Multimedia Assessment

AWS S3 (con't)

- can choose 1 or multiple datacenters

- can make snapshots and choose location for storage

- can be scripted

- pay for download and monthly prorated use only

Azure BLOB

- not supported by as many vendors

- newer at this than Amazon

State Archives Multimedia Assessment

Buy storage ourselves

- High upfront cost

- Not fully utilized for several years

- Must have backup capability

- Have to support it

Leaning towards AWS S3

- Pay as they create content

- Third party tools to upload content

- A little cheaper

State Archives Multimedia Assessment

Cloud Storage	Storage Cost	Cloud Bandwidth (250GB)	Total Monthly Cost	Total Annual Cost	Hours of HQ Video*
1TB	\$ 110.00	\$ 30.00	\$ 140.00	\$ 1,680.00	500
2TB	\$ 220.00	\$ 30.00	\$ 250.00	\$ 3,000.00	1,000
10TB	\$ 1,100.00	\$ 30.00	\$ 1,130.00	\$ 13,560.00	5,000
51TB	\$ 4,896.00	\$ 30.00	\$ 4,926.00	\$ 59,112.00	25,500
100TB	\$ 9,600.00	\$ 30.00	\$ 9,630.00	\$ 115,560.00	50,000

Storage	Storage Cost	Bandwidth (N/A)	Total Monthly Cost	Total Annual Cost	Hours of HQ Video*
1TB	\$ 250.00	\$ -	\$ 250.00	\$ 3,000.00	500
2TB	\$ 500.00	\$ -	\$ 500.00	\$ 6,000.00	1,000
10TB	\$ 2,500.00	\$ -	\$ 2,500.00	\$ 30,000.00	5,000
51TB	\$ 12,750.00	\$ -	\$ 12,750.00	\$ 153,000.00	25,500
100TB	\$ 25,000.00	\$ -	\$ 25,000.00	\$ 300,000.00	50,000

LASOS Hosted Storage Example

RAW Storage	Usable Storage	Type of Storage	Purchase Cost	DR Cost*	Total Purchase Cost	Estimated Annual Maintenance
36TB	27TB	Direct Attached	\$ 8,000.00	\$ 8,000.00	\$ 16,000.00	\$ 2,000.00
36TB	26TB	SAN	\$ 18,000.00	\$ 8,000.00	\$ 26,000.00	\$ 3,500.00

*DR Cost does not include traditional backup. This cost is for a one way replication of the data to our Disaster Recovery site.

Public Facing Website Assessment

DNN site 7 years old

Not upgradable due to open source modules used

SharePoint to be used

Cloud would allow availability in outage

Cloud would allow scaling for election night

Public Facing website designed with Iframes

- Separate web applications in DMZ

- Access to databases that may contain sensitive information

 - Sensitive information not kept in DMZ

Public Facing Website Assessment

Considered AWS but were concerned about state procurement

Azure not quite there yet for SharePoint

Target for presidential election

Not sensitive data

Will probably use local datacenter as public cloud

On state contract