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CUSigns: A Dynamic Solution for Digital Signage

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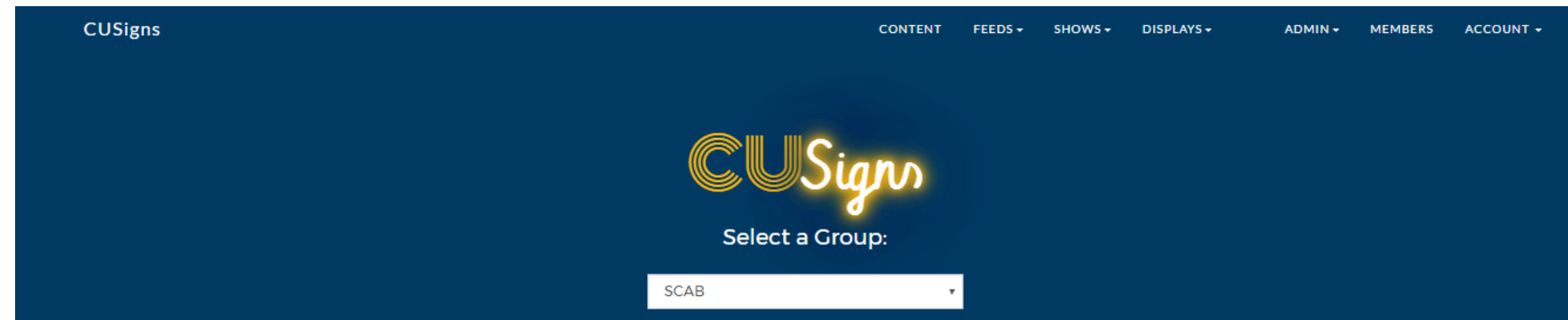
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CUSigns: A Dynamic Solution for Digital Signage

Jon Easterday, Wesley Kelly, Todd Landis and Nicole Perez

User Interface Design

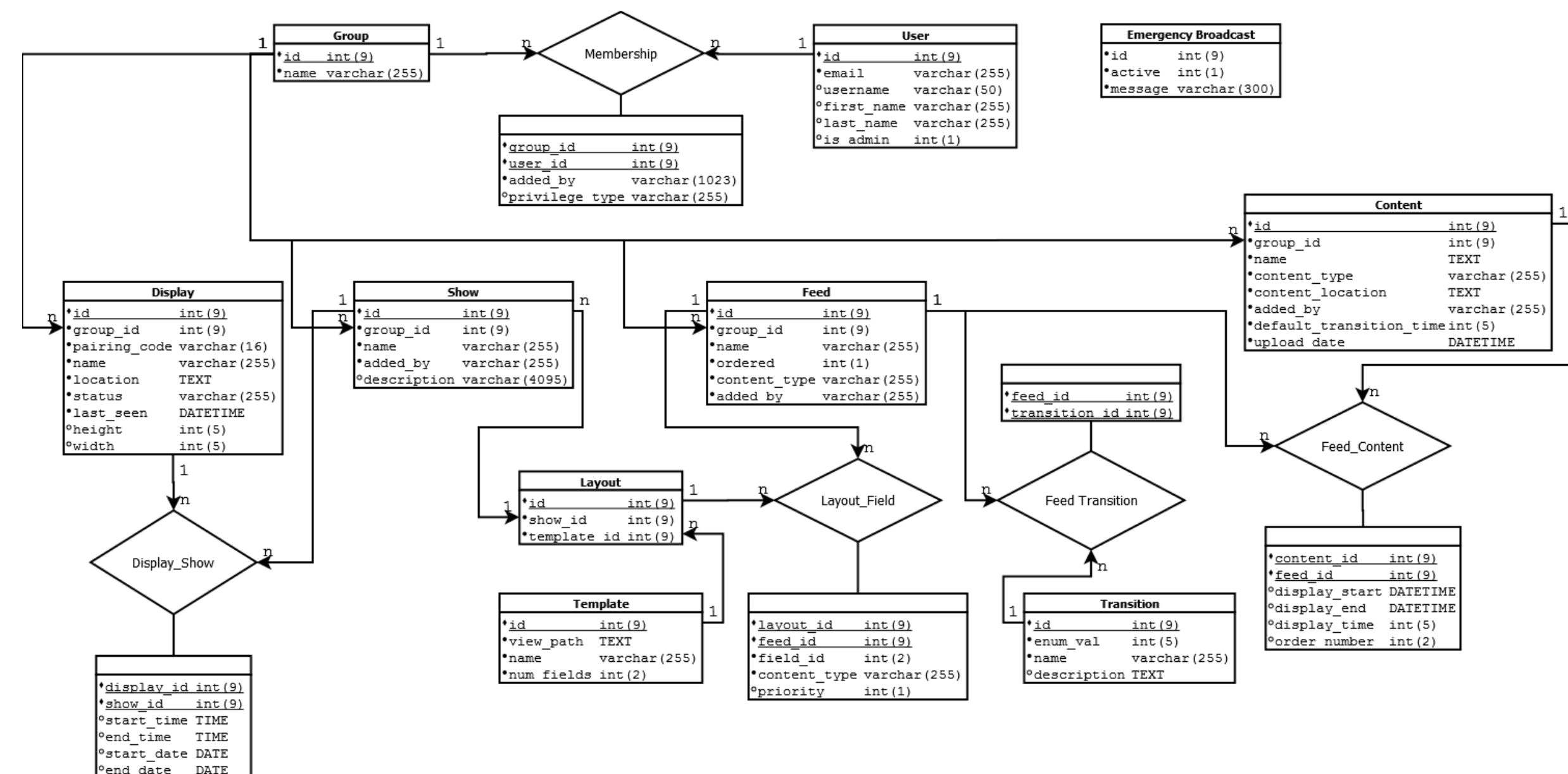


Group-Centric Design

There are multiple privilege levels that can be assigned to a user. One person can have multiple different privileges. Only tabs a user has the privilege to use will be visible to them.

- **Site Administrator:** This level is usually reserved for IT Personnel. They create and delete Groups and Displays and manage other users of the site. They also assign a Group Administrator to each newly created Group.
- **Group Administrator:** This person can distribute lower privileges to members of their group.
- **Display Administrator:** This person can select a show to play on their physical display.
- **Show Administrator:** This person can create a show and select the feeds that will be part of their show.
- **Feed Administrator:** This person can create a feed and select the content they want to have in their feed.
- **Content Provider:** This person can upload content into the site.

Database Design



Object Relationships

- **Membership:** Groups have memberships with Users, Displays, Shows, Feeds and Content.
- **Display_Show:** Displays have specific Shows that they are associated with.
- **Layout_Field:** Shows have a Template and the slots in the Template are known as fields. These fields have a relationship with the Feeds that will be shown in them.
- **Feed Transition:** Each Feed can be associated with multiple different Transition options.
- **Feed_Content:** A feed has multiple pieces of content in it.

Abstract

Cedarville University has computer monitors located throughout campus in order to show advertisements and important information to students, faculty, and staff. The slides shown on these displays are scheduled using Concerto: web-based software which manages digital signage. Though the Concerto software is currently used to manage digital signage, Cedarville University's IT department desires features which Concerto does not provide, including the ability to play videos, a better slide randomization algorithm, emergency broadcasting features, and an intuitive user interface. We have created a new solution for digital signage called CUSigns with the goal of providing the existing functionality of Concerto while also providing the additional features. Numerous in-depth interviews with members of Cedarville's faculty and staff who are currently using Concerto have led to cycles of design and redesign allowing CUSigns to meet the user requirements necessary to replace Concerto. CUSigns is currently in Beta testing on three displays in the Engineering and Science building to ensure system stability as it is prepared to be released for widespread use at the end of April.

Requirements

Through interviews with current Concerto users we were able to formulate a list of requirements for CUSigns.

Requirements

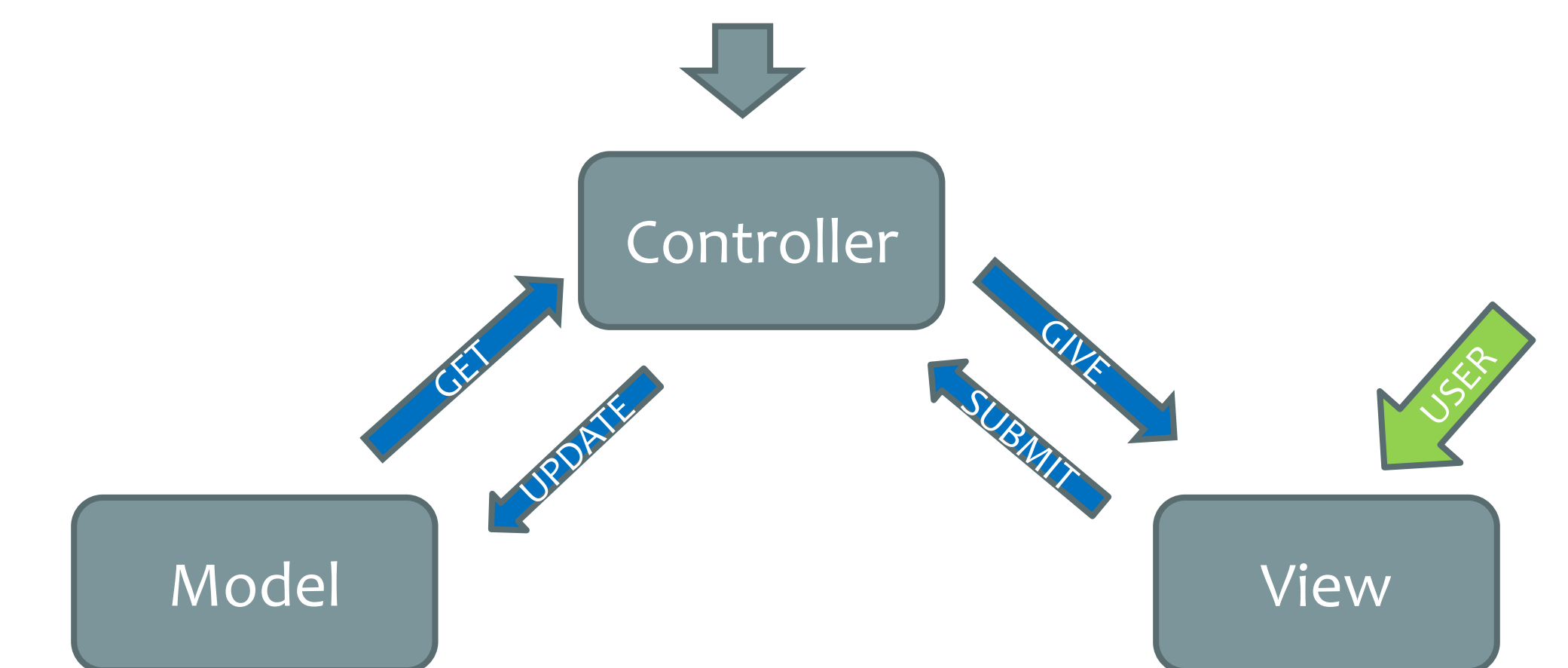
- Low cost system
- Emergency broadcast ability
- Browser based (support Chrome, Chromium, and Safari)
- Compatible with different operating systems including Ubuntu, Arch Linux, Mac and Windows
- Compatible with different hardware platforms including Gigabyte, Mac Mini, and Raspberry Pi
- Intuitive User-Interface
- Supports multiple content types such as Image, Video, Weather, Clock/Date, RSS Feeds
- Slide Transitions
- Multiple Permission Levels
- Multiple Layouts to support different types of content
- Better randomization algorithm

Object Example

- **Group:** Engineering
- **Display:** ENS Atrium -> Physical screen
- **Show:** "September 2016" -> Layout template and Feeds together make a show
- **Feed:** -> Multiple pieces of content
 - Cardboard Canoe Advertisements
 - CU Branding
- **Content:** -> Jpg files
 - PhotoOfStudents.jpg
 - PhotoOfCanoeCourse.jpg

Backend Design

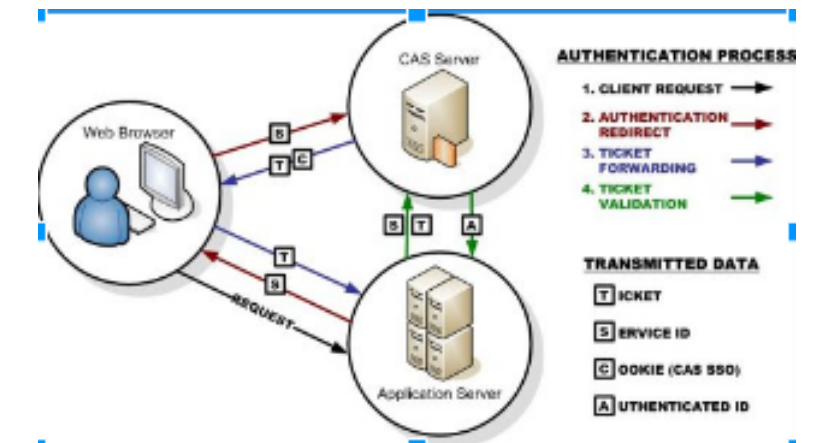
- CUSigns is hosted by an Apache Web Server
- We chose to create CUSigns using PHP which is a scripting language that can be embedded in HTML.
- We chose the CodeIgniter Framework which allowed us to easily interact with our database and use MVC to relate the user interface to the design model.
- Model View Controller (MVC)



- We used an ORM (Object Relational Mapping) called Eloquent that allowed us to directly interact with the tables in our database.

- Database Entry Example: Group Table

Field	Type	Null	Key	Default	Extra
id	int(9)	NO	PRI	NULL	auto_increment
name	varchar(255)	NO		NULL	



- User Authentication done with CAS (Central Authentication Service) which is how Cedarville University does most of their logins.

This display's pairing code is:

8e2b04

Enter it in the display creation dialog to register this display

- Authenticating a display is done by generating a random pairing code on a web browser on the new display machine. Next, the user updates the new display information using the User Interface and enters the pairing code. The new display waits until the code has been stored in the database and then generates a longer code that is stored. After a few seconds the screen on the display refreshes to "Screen Offline" until a show is scheduled on it.

Testing and Conclusions

CUSigns is currently in Beta testing in the Engineering and Science building to ensure that the system is stable before we release it at the end of April. At that point, IT will have the software and be free to set up other buildings to use the system.