SoftChalk CLOUD

Technical Information

The SoftChalk Cloud service is built on the Amazon Web Services (AWS) platform which provides a highly reliable and scalable infrastructure, allowing for tremendous flexibility, security, and high availability. Because the AWS platform is distributed, the chance of service outages is greatly reduced, as there is no single point of hardware failure.

Infrastructure

SoftChalk Cloud uses Amazon Elastic Compute Cloud (Amazon EC2) for its application and file servers. Since these are virtual servers, it makes it possible to easily deploy additional servers within minutes, increasing our ability to provide redundancy and scalability. This flexibility means that we can handle increased demand quickly and can expand our infrastructure in minutes, not hours or days. Using cloud servers also removes our need to manage hardware directly or deal with hardware failures, which in turn substantially reduces the chance of service outages. To provide maximum redundancy, we have servers on both the East coast, in Northern Virginia, and on the West coast, in Northern California. Deploying servers in multiple data centers enables us to continue to provide our service in the event that one of the data centers experiences an outage.

A high availability service can require numerous application servers to handle requests quickly and efficiently. Using multiple application servers requires a load balancer. SoftChalk Cloud utilizes Amazon Elastic Load Balancing (ELB) to distribute traffic across our application servers. Using a load balancer enables us to add additional servers as needed in order to scale the application to handle growth and traffic spikes, and allows us to scale our service to as many servers as we need to keep the application running smoothly. The servers behind the load balancer can be increased, or replaced if ever there is an issue with a particular server, without any interruption to the service.

Another essential part of the cloud service is the database server. SoftChalk Cloud utilizes the Amazon Relational Database System (RDS) as its database storage system. Using the RDS service enables SoftChalk to insure high reliability for our mission critical production databases, and the ability to easily scale our databases to handle increased demand. It also provides automated point-in-time backups, instant scaling, automated security patching, and automated rollover in cases of hardware failure. Our database infrastructure is also deployed across multiple data centers to minimize the risk of service outages.

Security

SoftChalk is committed to ensuring the security of our data and servers as well as meeting the critical requirements of FERPA, regarding student data privacy. A large part of security is ensuring access to servers is as secure as possible. We follow best security practices on all production and development servers. All server access is restricted to the absolute minimum number of people that require direct access to our servers. Server connections are made using secure shell (SSH), a cryptographic network protocol. Our servers can only be accessed through password protected, encrypted keys, and do not accept username/password combination logins.

To increase the security of the data coming into and out of the application, all traffic to the SoftChalk Cloud services is encrypted using industry standard security with high grade encryption (AES-255 bit keys). All sensitive data, including passwords for user accounts, is stored as a hash created with a one way algorithm, using a complex salt that is unique for each user.

Physical access to our servers is also very important. Because of the type of service Amazon provides, they have made tremendous investments in the physical security of their data centers. Amazon has in the past successfully completed multiple SAS70 Type II audits, and now publishes a Service Organization Controls 1 (SOC 1) report, published under both the SSAE 16 and the ISAE 3402 professional standards. In addition, AWS has achieved ISO 27001 certification, and has been successfully validated as a Level 1 service provider under the Payment Card Industry (PCI) Data Security Standard (DSS). In the realm of public sector certifications, AWS has received authorization from the U.S. General Services Administration to operate at the FISMA Moderate level, and is also the

platform for applications with Authorities to Operate (ATOs) under the Defense Information Assurance Certification and Accreditation Program (DIACAP).

Storage

SoftChalk Cloud uses Amazon Elastic Block Store (EBS) for storing all data and user files. Files stored on these volumes persist independently from the life of an instance and are not stored directly on a server. Amazon EBS volumes are highly available, highly reliable volumes that are automatically replicated. This prevents data loss due to failure of any single hardware component.

EBS also provides the ability to create point-in-time snapshots to protect files for long-term durability. Since all content files are stored directly on EBS volumes, the risk of data loss or corruption is substantially reduced. However, because of importance of the files we store, there are also incremental snapshots of the files taken every 24 hours. The snapshots of the files are stored in a file storage system outside of the EBS service for increased protection against loss, corruption, and accidental deletion.

Integration with Learning Management Systems

SoftChalk Cloud integrates with Learning Management Systems such as Blackboard, Moodle, Canvas, and Desire2Learn (among others) via an industry standard communications protocol called IMS Learning Tools Interoperability (LTI). SoftChalk was a very early adopter and advocate of the IMS Learning Tools Interoperability (LTI) data exchange specification. The SoftChalk Cloud's interoperability with industry learning management systems (LMS) was built specifically for use with LTI and is an LTI certified service. SoftChalk Cloud is fully compliant with LTI v1.0 and LTI v1.1, and supports transactions with either version of the standard.

All requests between an LMS and SoftChalk Cloud are SSL encrypted https requests. In addition to the security provided by the SSL encryption, the LTI specification requires all incoming and outgoing transactions to use the OAuth authorization standard. Using OAuth allows for much more secure exchange of information between SoftChalk Cloud Learning Management systems that implement LTI. OAuth helps guarantee that transactions are coming from a trusted source and that all information is exchanged securely.

SoftChalk Cloud enables instructors to store their content outside of a centralized LMS, but still be able to use the content stored on the SoftChalk Cloud in an integrated way with their institution's LMS. Student's access SoftChalk content through their institution's LMS. All authentication is handled by the institution's LMS. When a student clicks on a SoftChalk content link in the LMS, SoftChalk Cloud can track detailed information about the activities and progress of the student through the content. The properties of the score content are recorded on SoftChalk Cloud, as well as a student's answers and their point values for each activity. The final grade for the content is recorded, and is then passed from SoftChalk Cloud to the institution's LMS as the student's overall grade using an encrypted LTI transaction between SoftChalk Cloud and the LMS.

For LTI to work, when a student accesses a SoftChalk Cloud item in the institutional LMS, the LMS sends SoftChalk Cloud information about the content. This includes a course identifier, a content item identifier, the unique OAuth identifier for the LMS system, and a student identifier from the LMS. These values are all system level identifiers, typically the primary key in the database for the items. LTI v1.1 allows for a content system to also send the student's first and last names. Sending the student's first and last name is a configuration option and is enabled by the administrators or the instructors. For the purpose of an instructor to easily identify their students when reviewing attempt details, ScoreCenter stores the students name and associates them with student's id that is sent from the content system as part of the LTI transaction. No other personal information related to the instructors or students, such as usernames or passwords, is sent or stored by SoftChalk Cloud. It is possible, though not recommended, to exclude the student name information from being passed to SoftChalk Cloud. Student name information is necessary to allow the course instructor to view student detailed score result data. Final score results can still be tracked and passed to the institution's LMS even if student name information is not made available to SoftChalk Cloud.

More Information

If additional information about any aspect of SoftChalk Cloud's technical configuration or operation is needed, please contact your regional sales director at sales@softchalk.com.

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