

SYSTEM OVERVIEW AND DISASTER RECOVERY

The Think Through Math (TTM) software infrastructure has been designed to minimize downtime and speed up recovery should something go wrong. We've set up the system to ensure that any number of students can work on Think Through Math with minimal impact on our performance. Additionally, in an unlikely event taking down our main office, our customer support and instructional coaching team can be up and running off-site.

CLOUD-BASED INFRASTRUCTURE

TTM leverages a cloud infrastructure. This approach allows us to increase platform resources to support additional user load in a matter of minutes so that the system can scale quickly and efficiently. TTM is load tested annually at twice its expected peak concurrent user load for the projected school year.

PERFORMANCE MONITORING

TTM uses a third party to continuously monitor several performance metrics, including uptime, average page load time, and database transaction time. IT staff are alerted if any of these metrics fall outside of our internal standards.

DISTRIBUTED DATA CENTERS

TTM maintains relationships with multiple datacenter providers in geographically distributed locations. In the event of a disaster that completely disables the facility that houses the primary application, Think Through Math's Disaster Recovery Plan is designed to restore full application functionality within 24 hours. TTM's application source code and other critical business documents are backed up nightly and stored in multiple, geographically dispersed locations.

WEB-BASED APPLICATION

As a hosted web-based application, all customer support, teaching and administrative functions for the platform can be provided from any location with Internet access and would be supported by TTM personnel from alternate locations should there be any business interruption at TTM's office facilities. This environment establishes continuity of service to our customers.

WEB-BASED COMMUNICATIONS

Communications (email) and customer resource management (CRM) applications are web-based applications. In the event of an office facility business interruption, these internal systems would be accessed from alternate locations without interruption to our business. In addition to email, all TTM personnel have access to a web-based text message service and a web-stored company phone directory to provide multiple modes of communication within our organization in the event of any disruption to office facilities.

IP CONFIGURATION

TTM uses cloud-based infrastructure to provide scalability to ensure student wait times are minimized. Because of this, it is not possible to predict the IP addresses that will be used to serve content in the application. White listing based on IP address is not a supported configuration, as source IP addresses can change over the course of student usage.

TECHNICAL REQUIREMENTS

TTM supports the following as minimum technical requirements.

OPERATING SYSTEMS AND BROWSERS

DESKTOP COMPUTERS, LAPTOP COMPUTERS OR GOOGLE CHROMEBOOKS

TTM supports the following operating systems and browser configurations in the chart below. TTM recommends **Safari, Firefox** and **Chrome** run in 'evergreen' (auto-update) configuration. This ensures that browsers are kept up-to-date with the latest security and performance patches.

DEVICE	OPERATING SYSTEM	BROWSER
Laptop Computer Desktop Computer	Microsoft Windows	Internet Explorer 9+ Firefox 27+ Chrome 31+
	Apple OSX	Safari 6+ Firefox 27+ Chrome 31+
	Chrome OS	Chrome 27+
iPad 2	iOS	Safari 3.2+
iPad Mini (2nd generation)	iOS	Safari 3.2+
Galaxy Tab	Android	Android Browser 3.0+ Chrome 31+
Kindle Fire	Android	Android Browser 3.0+ Chrome 31+
Surface	Windows	Internet Explorer

Internet Explorer 8 is supported as a deprecated experience only. Users who rely on Internet Explorer 8 will be unable to experience many new TTM features. Please contact TTM Customer Support for specifics.

If using **Firefox** to access TTM, installing **Adobe Flash** may enhance your experience when engaging with live certified math teachers, and allows students to customize avatars. To enable Adobe Flash to work properly with TTM, ensure that content is permitted from the domain fms.thinkthroughmath.com on the following protocols (ports): TCP (1935) and TCP (80).

TABLETS/MOBILE DEVICES

TTM supports **7" devices** (e.g. Kindle Fire) in landscape configuration and **10" or larger devices** (e.g. iPad) in both landscape and portrait configurations. The application is delivered through the browser without requiring a separate app download. TTM is supported in the following device, operating system and browser configurations. Experience may vary across other Android or Windows devices.

DISPLAY RESOLUTION

TTM supports the following display resolutions in the chart below.

DEVICE	RESOLUTION (PIXELS)
Desktop Computer Laptop Computer Google Chromebook	1024x768
Tablet Mobile Device	7" devices (landscape only) 10" or larger devices (landscape and portrait)

NETWORK AND PERFORMANCE

TTM recommends a **broadband speed greater than 1Mbps** between the school or student's device and the internet. TTM uses no synchronous media or video. Actual application performance depends on concurrent student use at any location.

CACHE SERVER/CONTENT FILTERING

Content on TTM may be loaded from any of the following domains in the chart below.

DOMAIN	PROTOCOL (PORT)	USAGE
*.thinkthroughmath.com	HTTP (80) HTTPS (443)	General application content
*.bunchball.net	HTTP (80) HTTPS (443)	Student motivation and rewards
thinkthroughlearning.zendesk.com	HTTPS (443)	Customer support ticketing and chat

If website restrictions are enforced on iOS devices, <https://lms.thinkthroughmath.com> should be added to the list of allowed websites.