

CASE STUDY



CPL Online™ builds next-generation e-learning platform to handle rapid business growth



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SUMMARY

To stay ahead of the competition, e-learning technology company CPL Online tracks and analyzes detailed student interaction data, which it uses to improve its courses and deliver sophisticated reports to clients. As the rapidly growing volume of online courses generated a flood of data, the company's original SQL-based e-learning platform simply could not keep up. By taking advantage of the performance, ease of use and integration of HPCC Systems, CPL Online now supports its growth with half the developers it originally anticipated. The company has also developed sophisticated new capabilities including next-generation courses, data visualization tools, and cheating detection.

CPL Online™ Case Study

CPL Online, a Division of CPL Training Group™, utilizes big data to track student interaction data, improve its courses and deliver sophisticated reports to clients.

CHALLENGE:

The company has grown rapidly since its 2010 inception, becoming a leader in e-learning courses and technology for hospitality and health care industries in the United Kingdom. In its first year, the company's e-learning system handled just 20,000 completed courses; within two years, the volume had swelled to roughly 160,000 courses and a million user logins.

Unlike other e-learning companies, CPL Online doesn't just monitor pass/fail data; it generates 200-5,000 rows of data for each completed course, and it tracks every button clicked and time spent on each question. The company uses all that information to develop better courses and deliver detailed reports and analysis to its clients. Consequently, the rapid growth generated a flood of data that quickly overloaded the company's SQL-based e-learning platform.

As the volume of data swelled, the SQL-based system struggled, suffering poor performance and frequent record locks. Furthermore, the company realized it would not be able to add the future capabilities it had always planned. "We were getting terrible performance, no matter how many times we rewrote functions to go faster" says David Dasher, CPL Online's Managing Director.

SOLUTION:

CPL Online looked for a big-data solution that could handle future growth and enable the company to add next-generation e-learning capabilities. But most options were either too expensive or too complex for its small development team. When CPL Online evaluated HPCC Systems® from LexisNexis® Risk Solutions, however, "We realized this was a platform that would grow with us," Dasher says. The evaluation showed HPCC Systems technology could provide the required performance and let its developers quickly build planned new features.

HPCC Systems is a fully integrated high-performance big data analytics platform proven in the field through 10 years of development and operational use at parent LexisNexis Risk Solutions. It was placed in the public domain in 2011 as an Apache licensed open source project. It's a highly scalable end-to-end solution whose ease of use enables surprisingly fast application development. Running on clusters of commodity hardware, HPCC Systems provides a single architecture with a unified data-centric programming language (ECL) and two high-performance platforms: Thor, a data refinery optimized for ingesting and transforming data; and ROXIE, a data delivery engine for online analytics and queries.

HPCC Systems now handles all the "heavy lifting," as Dasher puts it — supporting all CPL Online's applications, web traffic, statistical analysis and reporting. Thor ingests the flood of user-generated events such as mouse clicks, while ROXIE provides the high performance required for intensive analysis and reporting. A SQL database remains in use for the basic job of recording transactions.

HIGH PERFORMANCE AND SCALABILITY


CPL Online has found that HPCC Systems provides high performance while easily handling its business growth. In 2015, volume grew to more than 4.5 million user session starts and 1.1 million completed courses. The system has more than 600,000 users, generating 50,000-100,000 ROXIE requests per day. For large, complex reports, CPL Online has found that HPCC Systems is nearly 95% faster than SQL, Dasher says. Furthermore, CPL Online is able to provide much more detailed reports than were previously possible.

EASE OF USE AND RAPID DEVELOPMENT WITH ECL

HPCC Systems ECL programming language has enabled the company's small development team to do the work of a much larger department, resulting in considerable cost savings. "We couldn't believe the productivity enhancements," Dasher says. "When we started as a company, I originally estimated we'd probably need at least 10 SQL programmers. With ECL, we have just 4.5 developers, and we can do it better, faster. Once developers start using ECL they love it, and we can produce better results with more innovation."

SMALLER TEAM - BETTER RESULTS

Using the HPCC Systems ECL language, a team of 4.5 ECL developers can do work that CPL Online originally estimated would take 10 SQL programmers.

	Logins	Completed courses	Team size needed for a job
SQL (2010)	5,000	20,000	
ECL (2015)	4,500,000	1,000,000	

SOPHISTICATED ANALYSIS

With HPCC Systems, CPL Online has developed cutting-edge capabilities that maintain the company’s competitive edge, including a new generation of e-learning courses and a sophisticated data visualization dashboard.

The system collects statistics such as time spent on pages and questions, skipped questions, specific responses, and whether or not users have changed their minds. It then uses the information to generate detailed graphical reports. For example, the system regularly imports client companies’ organizational structure from their payroll systems. Managers at those companies can then see a hierarchical breakdown of their employees’ e-learning activities.

With HPCC Systems, CPL Online generates visual reports for its clients that let managers assess at a glance their employees’ in-progress and completed tests, certifications, and certificate renewal dates. “Some of our clients have 20,000 employees, all doing five courses each — and they’ve got to be 95% compliant,” Dasher says. These features also help prove regulatory compliance when necessary; if an inspector questions a worker’s certification, managers have the data to show legitimate course completion.

Big data analysis also helps detect cheating. By collecting data during each course and comparing it to thousands of legitimately completed courses, the system can flag anomalous, suspicious activity, such as people that have completed a course too quickly or could have been aided by another person. It can then withhold certificates. “We look at every single page of every course,” explains Dasher. “When did you start that page? When did you finish it? So we’ve got a really, really accurate idea of how long it should take.”

HPCC Systems enables CPL Online to generate innovative heat maps of user activity based on tracking on-screen mouse movements. The heat maps provide additional insights into how users work their way through courses, and help CPL Online continuously improve its courses for the future.

RESULTS

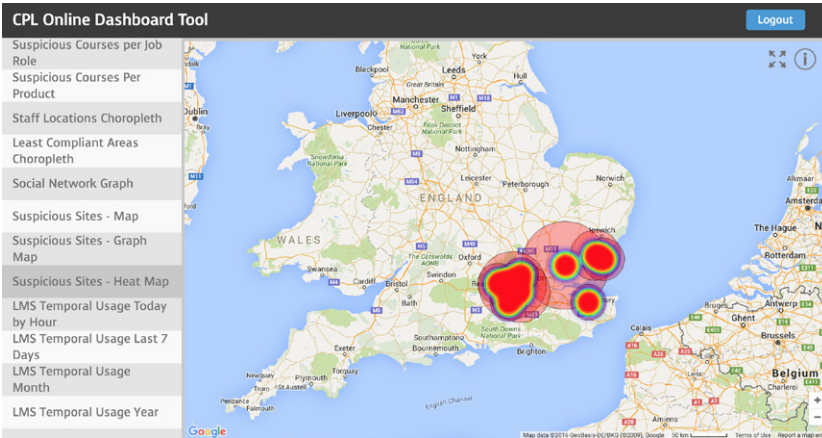
HPCC Systems also powers CPL Online’s sizeable business as a technology provider to other companies, and is enabling the e-learning company to offer a growing range of value-added reporting and data analysis functions. With HPCC Systems, CPL Online believes it is well positioned for continued future growth and has a big data platform that can easily scale to meet its growing data needs. “For us, HPCC Systems has been a game changer,” Dasher says. “I cannot think of any other technology that has delivered as big a breakthrough.”

How HPCC Systems helps CPL Online scale e-learning

- 1. Ease of Use:** Developers quickly learn ECL; integrated system enables rapid development.
- 2. Productivity:** The company requires less than half the developers it originally anticipated.
- 3. Scalability:** Supports rapid growth to more than 1 million courses a year, plus the addition of sophisticated new capabilities.
- 4. Performance:** Complex queries execute nearly twice as fast as SQL.

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Big-data analysis using HPCC Systems enables CPL Online to detect and map occurrences of anomalous behavior that indicate possible cheating.

ABOUT HPCC SYSTEMS

HPCC Systems incorporates a software architecture implemented on commodity shared-nothing computing clusters to provide high-performance, data-parallel processing and delivery for applications utilizing Big Data. The HPCC Systems platform includes system configurations to support both parallel batch data processing (Thor) and high-performance data delivery applications using indexed data files (ROXIE). It also includes a high level and implicitly parallel data-centric declarative programming language for parallel data processing, called Enterprise Control Language (ECL).

The HPCC Systems technology was designed by data scientists. The programming language, ECL, is a declarative, collaborative and extensible, high-level language that allows the programmer to describe the desired outcome instead of programming tedious and ambiguous scripting.



For more information, call 866.528.0780 or visit hpccsystems.com

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