The Gotemba City Board of Education intends to replace all PCs for teachers with thin client systems by FY2012 to prevent the critical data loss. The plan includes all 16 elementary and junior high schools in the Gotemba City. After receiving the Board’s request, NEC proposed its desktop consolidation solution called “VirtualPCCenter.” As a result, the Gotemba City has already successfully deployed VirtualPCCenter in 2 schools, Gotemba elementary school and Fujioka elementary school. The other 14 schools will soon follow.

Tell us about the Gotemba City and the elementary and junior high schools in the city.

The Gotemba City in the Shizuoka prefecture is located near Mt. Fuji, with a population of about 90,600. The city name is derived from “Goten”, which means a Japanese castle. This was named after Tokugawa Ieyasu, who was the founder and first Commander of the Foros of the Tokugawa shogunate back in 1600s. Today, there are 10 elementary schools and 6 junior high schools in the city. There are about 5,400 elementary school students and 2,500 junior high school students.

Provide us with an overview of the “Thin client deployment project for schools”.

In 2008, the Board of Education decided to replace all of the PCs with thin client systems at the 16 elementary and junior high schools in the Gotemba City. The project overview is as follows.

<table>
<thead>
<tr>
<th>Item</th>
<th>Goal</th>
<th>Target Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Between FY2008 and FY2012</td>
<td>All elementary and junior high schools in the Gotemba City (16 schools)</td>
</tr>
<tr>
<td>Others</td>
<td>NEC Corporation 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan URL:<a href="http://www.nec.com/vpcc/">http://www.nec.com/vpcc/</a></td>
<td>The network connection between the schools and the prefecture’s data center, and thin client systems were already installed. Currently the VPN connection between the teachers’ PCs and the data center have been tested.</td>
</tr>
</tbody>
</table>
The Gotemba City Board of Education

3. Teachers can continue to work at home.
4. The system design cannot limit the use of different types of software.

As the first requirement
What does No data storage on PCs really mean?
Currently, the Gotemba City distributes a PC to each teacher. The teacher’s work data is stored on their laptops. In other words, if a teacher loses their PC, the data is lost or stolen as well. To help mitigate this risk, today each school owns a file server for data storage and its use is required as a rule. However, as long as teachers can also store data on laptops, there is a high risk of data loss.

Therefore, the new IT infrastructure is necessary to meet the requirement to prevent data storage on PCs.

As the second requirement
What does No use of external storages such as USB keys really mean?
The acceptance of the USB key usage is a security concern based on the reasons outlined earlier. The new IT infrastructure must exclude the use of external USB keys.

As the third requirement
What does Teachers can continue to work at home really mean?
The exclusion of use for the USB key also excludes the teacher’s ability to do their work at home. However, we did not want to reduce the teachers’ enthusiasm about their jobs. Therefore, the new infrastructure solution must allow teachers to continue their work at home even without using external storage devices.

As the forth requirement
What does The system design cannot limit the use of different types of software really mean?
It is assumed that any new system must fulfill the previous requirements may introduce functionality restrictions. However, functional limitations must be avoided. For instance, elementary and junior high schools in the Gotemba City use “Takechiyo”, a student score management software tool. It is essential that teachers continue to use this software on the new system. Moreover, teachers for each subject need to use the software appropriate for course materials used in their classes. Therefore, the deployment of the new system must allow the usage of any software originally designed to run on the PC so that there could be no disruption of teaching capability.

NEC and the local SI companies proposed the following four ideas after hearing these requirements:
1. A thin client system is the best solution in terms of data loss prevention.
2. Several types of thin client systems are available including "presentation virtualization", "net boot", and "desktop consolidation.
3. The desktop consolidation solution allows teachers to maintain their personal PC environment from any thin client devices, including from home.
4. The desktop consolidation solution meets all of the Gotemba City’s requirements.

To NEC:
How does NEC’s desktop consolidation solution fulfill the all requirements of the Board of Education while presentation virtualization or net boot type do not?

(Answers from NEC):
Among the City’s requirements, two of them – not storing data on PCs and prohibiting the use of external storage devices such as USB keys – can be solved by presentation virtualization and net boot type thin client systems. However, the net boot thin client system does not meet the third requirement which is to allow teachers continue their work at home. Additionally, presentation virtualization is not able to meet the fourth requirement to allow teachers to use different software applications. Presentation virtualization requires applications which support multi-user access which thus limits the available software.

To satisfy all of the requirements of the Board of Education, the best solution is a desktop consolidation system which builds multiple virtual PCs on a virtualization infrastructure. A desktop consolidation solution separates each virtual client and provides better usability for teachers with fewer limitations on applications.

From these reasons, NEC proposed a desktop consolidation solution, "VirtualPCCenter," to the Board of Education.

NEC’s proposal, VirtualPCCenter, met all of the city’s requirements. However, the Board of Education hesitated to adopt the solution without testing it first.

What caused the Board of Education to hesitate even though NEC’s proposal met all requirements?
The biggest concern was that as far as we knew, there was no similar deployment of a desktop consolidation solution by a school system. NEC delivered a presentation and a demonstration. However, the demonstration and the actual deployment would differ in numerous details. The Board of Education was not sure if the proposed system would operate satisfactorily when many teachers used it.

In this specification, the servers and clients are miles apart – servers are placed in the prefecture’s data center and clients are located at schools in Gotemba. Have the thin client systems reduced the speed of PCs and printers?
As of today, there are no complaints about a time-lag.* The network environment is optical communication for Gotemba elementary school and a 47 MB ADSL for Fujioka elementary school. There seem to be no problems with response times.

As for the printers, printer commands from thin client terminals are executed on the servers in the data center, and then this process returns to each teacher’s printer. While this might seem indirect, this does not decrease speed. Moreover, there are no changes required on site for printer settings.

Why did you resolve your concern?
First of all, we learned about desktop consolidation solutions. Then we asked detailed questions to NEC and the local SI companies. NEC and the local SI companies responded with acceptable answers. Yet there was a concern that there were no similar implementations in a school, NEC’s proposal satisfied all of our requirements in terms of logic and specifications. Moreover, preventing data loss was the most pressing issue in the education environment.

In August 2008, the Board of Education decided to introduce the desktop consolidation solution in Gotemba elementary school and Fujioka elementary school.

Three months have passed since the initial installation at schools in December 2008. How is the system working?
NEC has met all our requirements with VirtualPCCenter. There are no issues. The data loss prevention infrastructure is working well.

(Comments from NEC): In the Gotemba City, all of the client systems that is transmitted from clients to server is small. This information only includes the location information of mouse and input information from the keyboard. Screen information also is transmitted from server to client. However this transmission only includes changes. Therefore it does not account for very much data.

If there is enough network bandwidth, operational speed never lags with thin client systems.