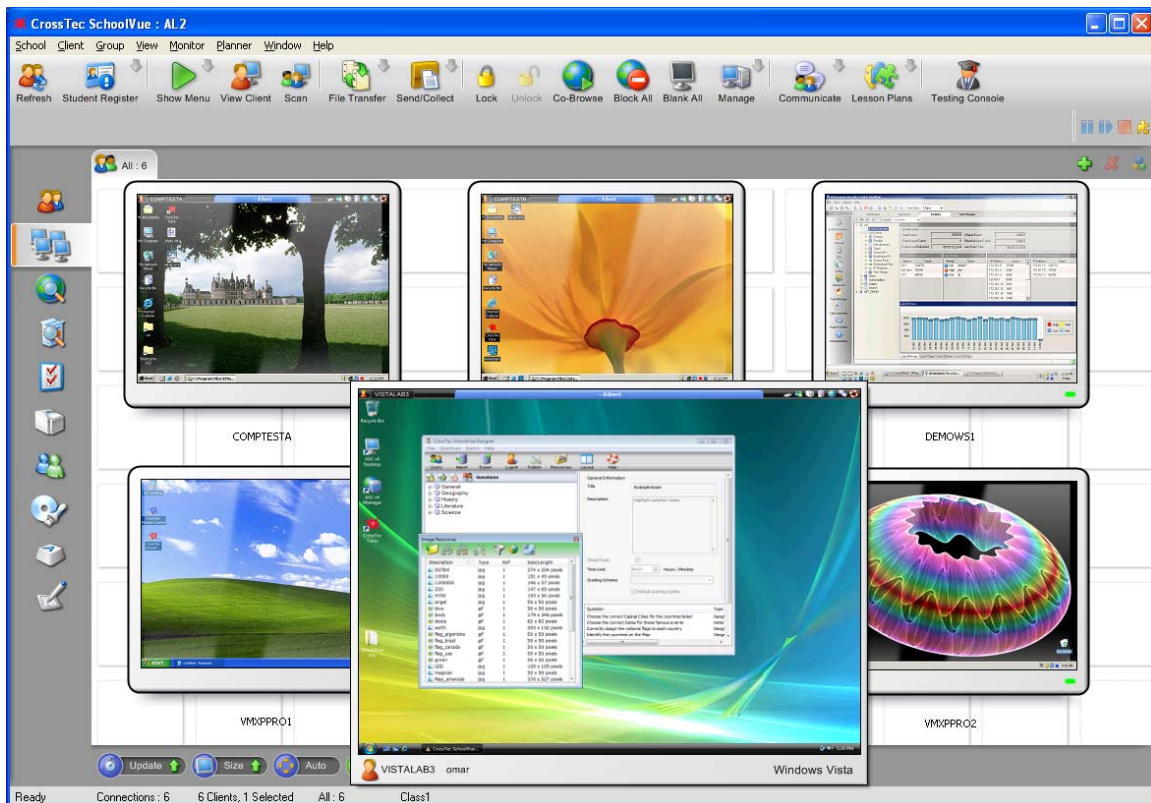


CrossTec SchoolVue v9

One-to-one Wireless and Multi-subnets



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SchoolVue 9 One-to-one Wireless and Multi-subnets

Abstract

A wireless one-to-one environment in a school indicates that every student will be assigned a school owned laptop for the current semester. Every semester teachers will need to build a brand new list of classes for a completely different set of groups of student computers. Schools with a one-to-one environment face several challenges, ranging from students with local administrative rights to administering a wireless network with many access points and subnets across a large campus. All of this requires some design planning to successfully run lab management software.

Resolving computer names to IP addresses over subnets and VLANs are one aspect that complicates the building of class lists in real-time, primarily because it is not possible to get a complete list of all student computers from a network browse. Only those that are turned on and connected to the wireless network at that moment will appear in a typical network browse. Furthermore, many teachers only get trained on the usage of the software once or twice before the first day of class, so if they were to try and browse either a Gateway or the network and retrieve a list of one thousand computers named by their serial number, there is little chance they will be able to build six different class groups every semester.

Schools will typically have a Windows Active Directory or a Novell eDirectory environment, as well as a Student Information System which houses all of the information necessary to create class lists from a database or spreadsheet. Using these data, administrators in schools can build class lists for the teachers prior to the first day of class, enabling them to USE the program instead of troubleshoot it. The challenges of highest priority that are effectively addressed by SchoolVue 9.0 are:

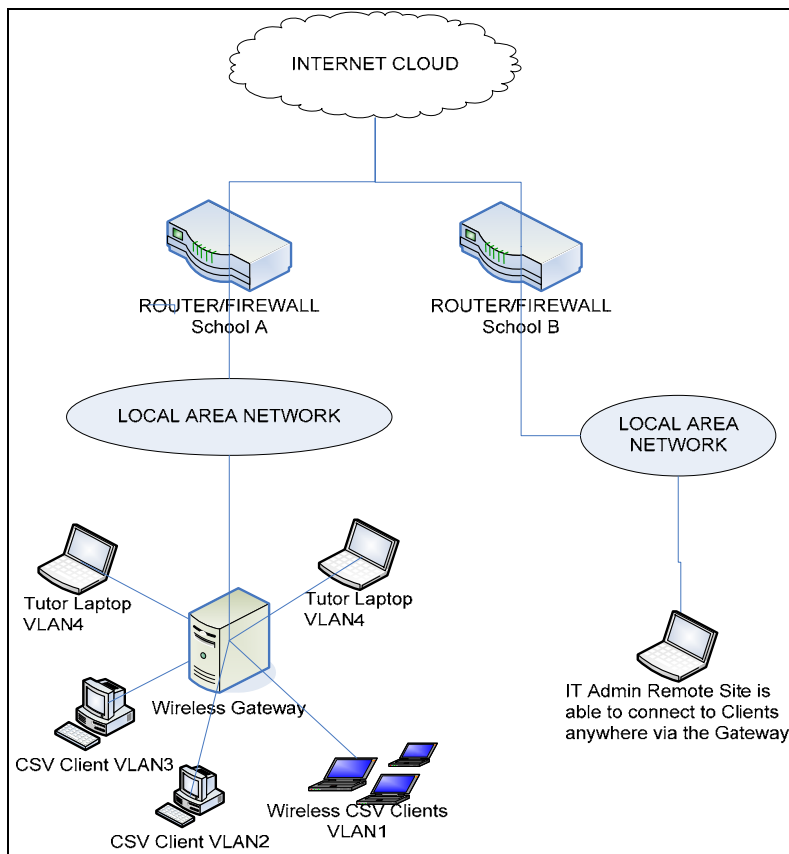
- 1. Reliably and quickly connecting to DHCP Clients over subnets and VLANs.**
- 2. Building Class Lists without Tutor/Client interaction.**
- 3. Staying connected to Clients even if there is a less than optimal wireless infrastructure.**

The first challenge above is addressed by adding support for the Connectivity Gateway to the SchoolVue Tutor and Client programs, enabling the Tutor to browse a Gateway for the most current Client IP information instead of the whole network, increasing connection speeds and reliability in multi-subnet environments. Specifications on how we can currently address number two follow in this document as well with the use of the Class List Processor utility included in the SchoolVue 9 program folder. The third challenge will of course be on-going as wireless network standards continue to evolve and begin to standardize; however, with our constantly progressive use of TCP communications instead of UDP, and traffic throttling enhancements for wireless networks, we show you how to make the best possible use of your available bandwidth.

Section 1 Connectivity Gateway - Reliably connecting to DHCP Clients over subnets and VLANs is easier said than done.

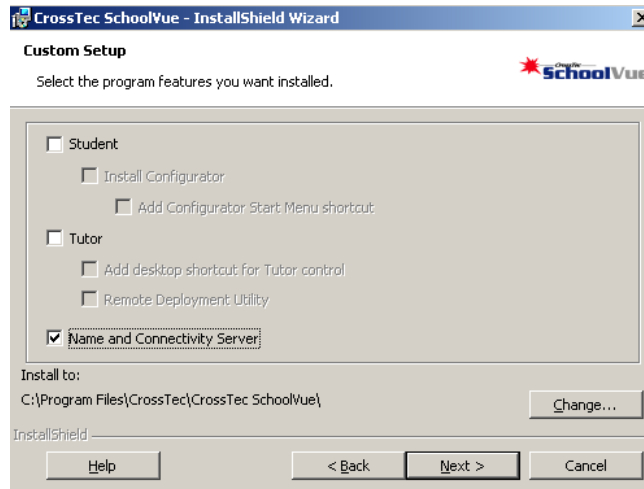
The CrossTec Connectivity Gateway is a component originally in CrossTec Remote Control, which has been ported to work with the SchoolVue product specifically to address the increasing size and complexity of today’s educational networks. The Connectivity Gateway, or just Gateway, provides a stable and secure method for connecting Clients and Tutors across multiple subnets using HTTPS (port 443 TCP), and drastically increases connection times by eliminating the need to browse the entire network just to connect to a few machines. All this can be accomplished without the need for modifications to existing firewall or router configurations or dedicated servers.

The Gateway acts as a go between for a CrossTec Tutor and Client when establishing a connection. A user at a CrossTec Tutor can then connect to the Gateway using the HTTP Protocol and retrieve IP information for available Clients. Then connect to any number of Clients attached to that Gateway by using the most current registered IP address. The Gateway can be located in various different network locations depending on the need, but most commonly in schools the Gateway will be deployed on an internal system to provide address resolution of private DHCP addresses across campuses, or even schools participating in a WAN, as shown in the diagram below. Important to note is that an IT admin, principal or teacher can be configured access to monitor Clients that are at a completely different location as depicted in the diagram:

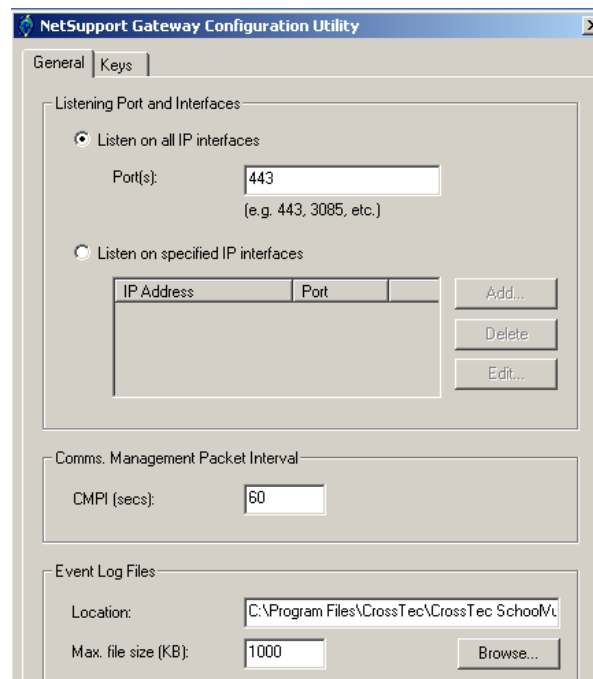


Installing the Gateway

The Name and Connectivity Server (or Connectivity Gateway) is not installed by default. To install the Gateway run the standard CrossTec SchoolVue installation package. When the Custom Setup screen appears select Name and Connectivity Server then click **Next**.



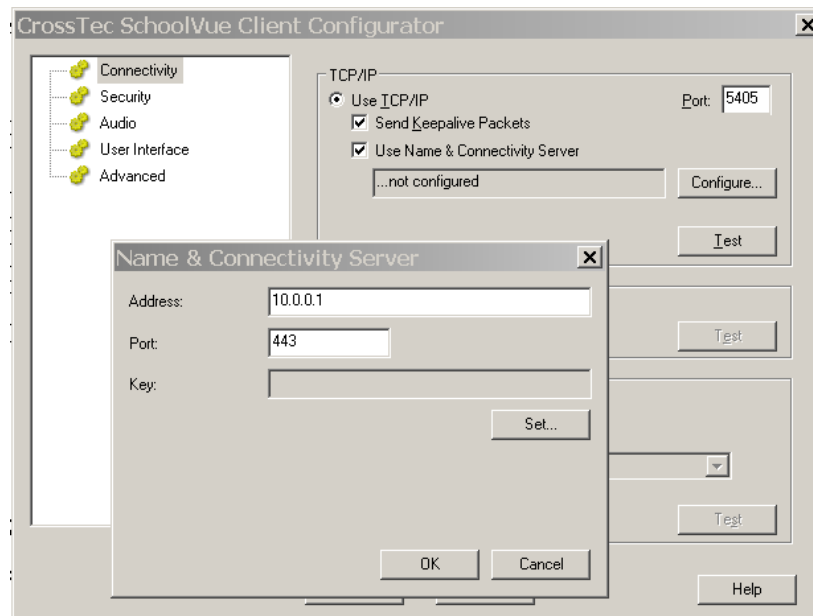
Once the Name and Connectivity Gateway is finished installing it presents a dialog where you can set the port that the Gateway will accept connections on, the default port is 443. You can specify the location and maximum size of the log files, having the ability to monitor all connections. Gateway keys are required and used to authenticate CrossTec Clients and Tutors, ensuring that unauthorized users cannot use the Gateway. You must set at least one Gateway Key before you can apply the configuration to the Gateway; otherwise it will not accept any connections.



Setting up Clients to Use the Gateway

To configure a Client to use the HTTP protocol you will need to run the CrossTec SchoolVue Configurator from Program Files. Open the “Connectivity” section and select “Use Name and Connectivity Server” then click Configure.

1. Enter the port number, which the Gateway you are going to use is configured for, the default being 443.
2. Enter the TCP/IP address of the CrossTec Gateway.
3. Press the “Set” Button to set a Gateway Key, the key you set must be identical to one of the Gateway Keys added to the Gateway.

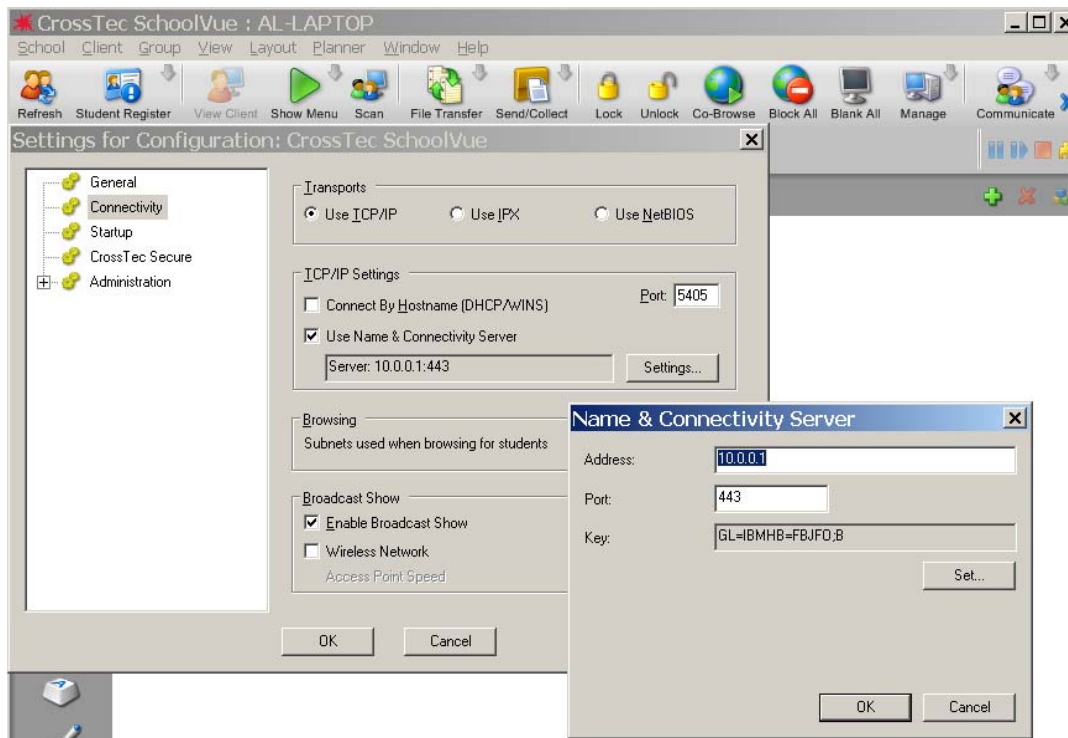


Once you have completed the configuration save the configuration and restart the CrossTec Client. The Client should then register to the Gateway. The entire configuration for a CrossTec Client is stored in the Configuration file and this can be easily copied or Deployed (Using CrossTec SchoolVue Deploy) to other CrossTec Clients, for details see the Online Help, Quick Install and Deployment Guide or the product manual.

Setting up a Tutor to use the Gateway

Before you can connect to a CrossTec Client using a CrossTec Gateway you must add that Gateway settings to your CrossTec Tutor. To do this, follow the steps below.

1. From the Tutor program click on School > Configuration > Connectivity.
2. Select Use Name and Connectivity Server
3. Click Settings
4. Enter the IP Address of the Gateway and the Port that the gateway is configured for (Default is 443)
5. Then click “Set” and set the Gateway Key that you will use. See picture below.



NOTE: If the Gateway is configured with multiple Gateway Keys then when you browse for Clients on this Gateway you will only see Clients that are using the same Gateway Key that you enter here.

Securing, Logging and Monitoring the Gateway

The Gateway can support multiple Gateway keys, each Key must be a minimum of 8 characters, and Gateway Keys can be added to the Gateway dynamically without disrupting any Current Connections. The Gateway will not accept connections from a CrossTec Tutor or Client unless a Gateway key has also been entered at the Gateway. All Gateway Key data is sent encrypted between the Client, Tutor and Gateway. Once connected to the Gateway all Client and Control security such as user names, Security Keys, etc... will function normally.

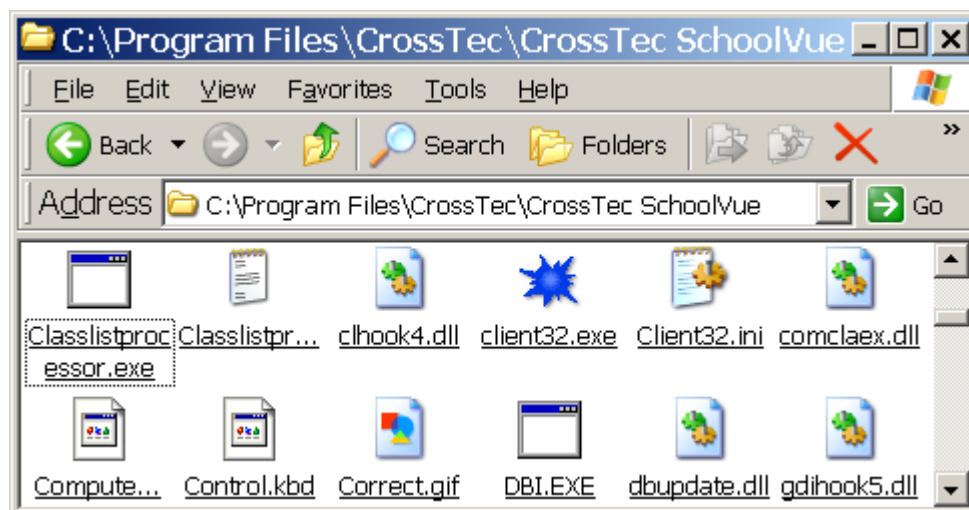
The Gateway runs as a service and is displayed as an icon in the system tray. If you right click on this Icon a shortcut menu is displayed giving options to “Open”, “Configure” or “About”. If you select Open the CrossTec Gateway Status window is displayed The “Clients” Tab will show a list of all the CrossTec Clients currently connected to this Gateway. The “Active Sessions” tab displays a list of current connections between a CrossTec Control and a CrossTec Client with the date and time that the connection started. The CrossTec Gateway creates a log file that records activity through the Gateway. The log file name is gw001.log and is stored in the locations specified in the Gateway configuration dialog.

Section 2 Class Building

Before the first day of class it is sometimes necessary to have built and populated a list of classes for each professor in the school using the SchoolVue program, especially if it is a large one-to-one implementation. These student laptops are usually reimaged and not turned on until the first day of class, at which time the network goes from a hundred machines to thousands, from one day to the next. To build a class list for each professor you must know some information about the clients and which class they will belong to. It involves putting this information into a set of text files in the correct format as indicated below. The text files created during the class building process include a ClassList.nss file and one client_classname.nss and group_classname.nss file for each class created. Once these text files are created they can be copied into the program folder of the Tutor for the professor to use throughout the semester. *In Version 9 of SchoolVue there has been a new utility added called ClassListProcessor.exe to ease the process of creating these classes prior to the first day of school.*

The NEW Class List Processor

The New Class List Processor is a command-line application that converts tab-delimited database files to Class List files. Input files for ClassListProcessor.exe must contain some standard data, but this data can be in any order. ClassListProcessor.exe can be found in the SchoolVue folder, usually: C:\Program Files\CrossTec\CrossTec SchoolVue. Along with the executable there is a Classlistprocessordocumentation.txt file that contains most of the necessary information.



Class List Processor Input Data Requirements

First you must create a file that is tab delimited containing information about the teacher's name, student's name, class, and corresponding computer name to have all the necessary information to pre build classes for your teachers.



Minimum required information to build classes:

1. Teacher names
2. Class periods for each teacher
3. Student Computer Names or IP Addresses for each class period
4. (Optional) a Display Name can be added so that the Tutor interface can show the Student's actual name in addition to the computer name. This is useful in the case where neither Computer Name nor Logon Name is descriptive of the actual student user.

Data must be inputted into the Class List Processor as a tab-delimited database file. As fields are tab-delimited and records are newline-delimited, these characters cannot appear in fields. They also cannot appear in escaped form. A line of this file including every field would look like this ([TAB] and [Newline] indicate the tab and newline characters:

Tutor [TAB] Class [TAB] Computer Name [TAB] IP [TAB] Transport [TAB] Location [TAB] Location Name [TAB] Display Name [TAB] Desc [TAB] Contact [TAB] Phone [TAB] Mac [Newline]

NOTE: The Tutor, Class, Display Name and either the Computer Name or IP must be included. If these are not included the Class List Processor will refuse to run. Each of these required fields can contain information as follows in between the tabs:

Tutor: The name of the tutor in your preferred format. e.g.: A. Adams
Adams A.
Alison Adams
Adams, Alison

Class: The class name or number you would like to call your class. e.g.:
lab2
Modern History VII Period1
English SummerA

Computer Name: Usually the Computer Name or the Connectivity Gateway identifier.
e.g.: 123-ABC-JKLM
west_dist_prim_000457
PC123

IP: The Internet Protocol Number for the PC, if fixed. e.g.: 123.4.56.789

Transport: The transport number. 2 for HTTP/TCP, if no transport is provided, the number 2 is assumed.

Display Name: The student's real name.

Optional fields include: *Location:* A location identifier, *Location Name:* The name of the location, *Desc:* The description, *Contact:* The student's contact details, *Phone:* The student's contact phone number, *Mac:* The laptop's MAC address.



Exporting Data for the Class List Processor

Using MSSQL or MySQL

Make sure that you set the column separator (or field delimiter) to tab:

SQL Server: Use the -s '\t' option.

MYSQL: use the --batch flag.

If all the information is contained in a single table, use a simple select statement.

```
SELECT      tutor, class, computer_name, student_name
            FROM Classes
            WHERE year = 2008
            AND  semester = 1;
```

If information is stored in two or more tables then a more complex statement is required.

```
SELECT      Class.tutor, Class.class, Student.computer_name, Student.student_name
            FROM Class, Student
            WHERE      year = 2008
            AND        semester = 1
            AND        Class.studentID = Student.studentID;
```

```
SELECT      Tutors.name, Classes.class, Students.name, Laptops.name
            FROM Tutors, Classes, Students, Laptops
            WHERE      year = 2008
            AND        semester = 1
            AND        Tutors.tutorID = Classes.tutorID
            AND        Classes.studentID = Students.studentID
            AND        Laptops.studentID = Students.studentID;
```

The output of the Select can be copied or redirected to a file. Ensure that this file does not have the column titles on its first row and that it does not have any empty lines.

Using Microsoft Access

Construct a query that selects the data you wish to export, and then use the Export wizard to export a Delimited File with **Tab** as the Delimiter and the **Text Qualifier** as None.

Using Microsoft Excel

If all the information is stored in a single sheet, this can be saved as a tab delimited file by choosing "Save As" from the "File" menu and selecting "Text (Tab delimited)" from the "Save as Type" pop-up menu in the resulting dialog. Make sure the columns are in the correct order for the Classlistprocessor (see "Data Format" above). It may be

necessary to take a copy of your original worksheet and re-order the columns to match this. If the information is stored in Excel workspaces in separate sheets then it will be necessary to merge them. This can be done with a third-party spreadsheet combining utility or with a Visual Basic script. The exact structure of the Visual Basic script will depend on the structure of your spreadsheets.

Using the Class List Processor

The Processor is a command-line application. This allows it to be incorporated into a pipeline for creating class lists en masse or to be run on individual files. Processing a single input file will create multiple output files, one for each class and an additional class list file for distribution to teacher machines prior to the beginning of class. Remember the tab delimited file can be in ANY format so you can define the format of the data in your text file at the time of importing with the /format switch.

Example Input Data File:

ComputerA	"Harvey, Paul J"	U.S. HIST	"Smith, Mary M"
ComputerB	"Halliburton, Dale E"	U.S. HIST	"Smith, Mary M"
ComputerC	"Fernandez, Jesus B"	READING 2	"Smith, Mary M"
ComputerD	"Halliburton, Dick D"	READING 2	"Smith, Mary M"
ComputerA	"Arpa, Bianca C"	READING 1	"Smith, Mary M"
ComputerB	"Coronation, King M"	READING 1)	"Smith, Mary M"
ComputerA	"Pitts, Burg S"	ALGEBRA 2	"Boswell, Brian"
ComputerB	"Sasser, Georgia B"	ALGEBRA 2	"Boswell, Brian"
ComputerC	"Perry, Mason D"	MATH MOD	"Boswell, Brian"
ComputerB	"Ballet, Shues C"	READING	"Boswell, Brian"
ComputerC	"Cooper, Tyre S"	READING	"Boswell, Brian"

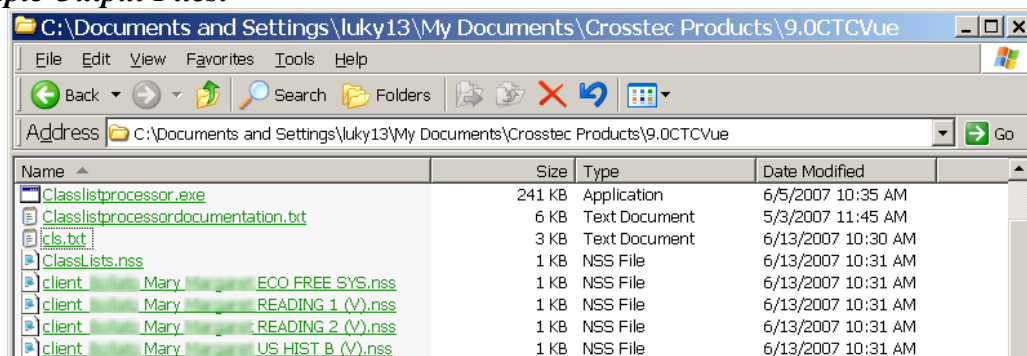
This is the *command to process the file in the format above*: **ClassListProcessor.exe /format "COMPUTER DISPLAY CLASS TUTOR" "selectoutput.txt"**

Other Command Examples:

ClassListProcessor.exe "selectoutput.txt"

ClassListProcessor.exe /suffix "_term4_seniorCollege" /skip 2 alldetails.txt

Sample Output Files:



Class List Processor Switches

/suffix: The suffix for the files created by the processor. This is not the file extension; rather it is a way of ensuring that the file is easily identified. Ex: "_Semester3", "_mathsCollege" or some other useful identifier. The default is to have no suffix.

/format: The order of the columns within the file to be processed. The default assumes the full set in the order given in "Data Format" above, equivalent to \format="TUTOR CLASS COMPUTER IP TRANSPORT LOCATION LOCATION_NAME DISPLAY DESC CONTACT PHONE MAC"

/skip: How many lines the processor should skip at the start of the file. The default is 0.

/transports: The transports to use. This will be overridden by any values in the input file. Defaults to 2 (TCP/IP).

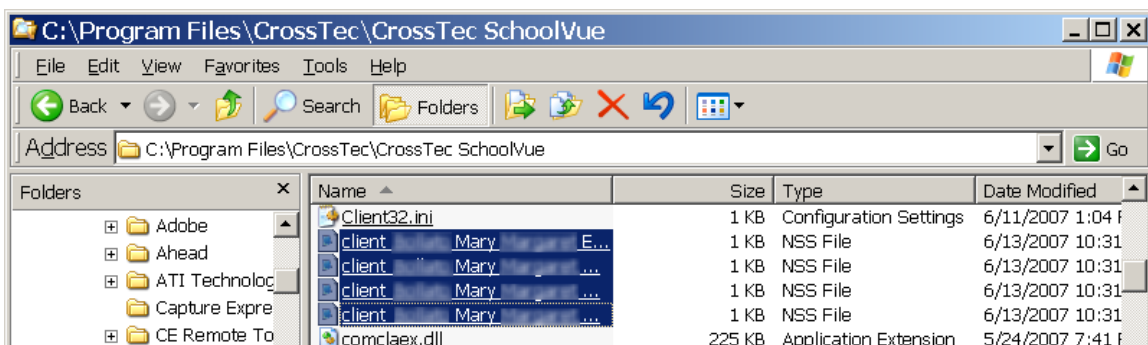
/odir: The directory path in which to save generated files. This directory must already exist, and must not contain existing class list files. If generated files already exist in this directory, ClassListProcessor will refuse to run until they are removed.

Section 3 Configuring the Tutor

To configure the Tutor to use the Connectivity Gateway please see: Section 1 Part 3. Below we go through the steps of distributing class lists to Tutors and connecting to a new class.

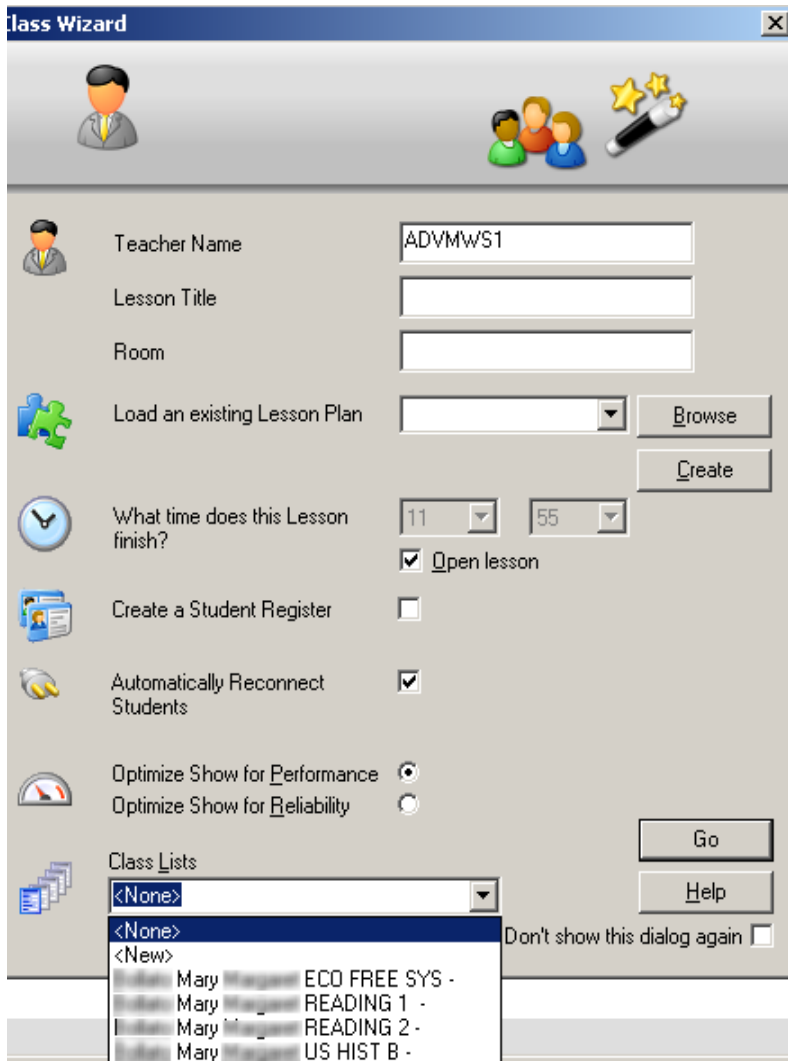
Distributing Class Lists

Simply copy the newly created class list files into the program folder of the desired Tutor. By default the classlist.nss and <classname>.nss files are to be placed here: C:\Program Files\CrossTec\CrossTec SchoolVue. After copying all the files generated above by the Class List Processor for the instructor "Bollato, Mary" into their program folder like this:



Connecting to a Class

Once the Tutor machine has these files in the Program Folder the Wizard that starts when the Tutor application opens allows the instructor to select the list of students that corresponds to their current period.



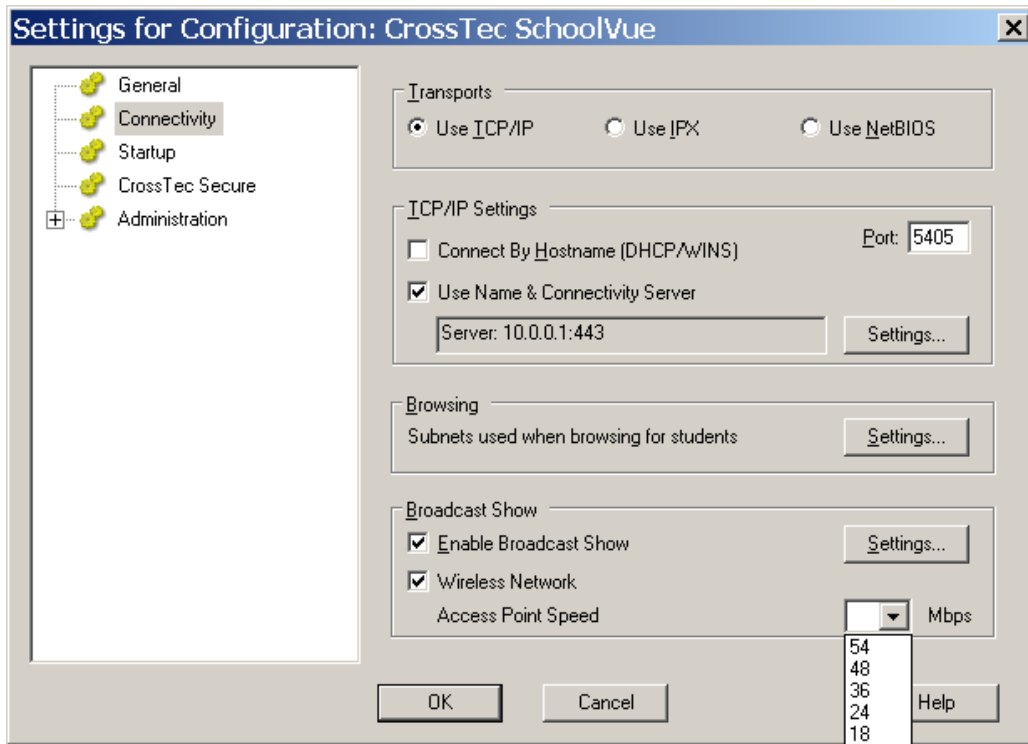
The screenshot shows the 'Class Wizard' dialog box with the following fields and options:

- Teacher Name:** Text box containing 'ADVMWS1'
- Lesson Title:** Empty text box
- Room:** Empty text box
- Load an existing Lesson Plan:** Dropdown menu with a 'Browse' button next to it.
- Buttons:** 'Create' button
- What time does this Lesson finish?:** Two dropdown menus showing '11' and '55'. Below them is a checked checkbox for 'Open lesson'.
- Create a Student Register:** An unchecked checkbox.
- Automatically Reconnect Students:** A checked checkbox.
- Optimize Show for Performance:** A selected radio button.
- Optimize Show for Reliability:** An unselected radio button.
- Class Lists:** A dropdown menu showing '<None>', '<New>', and a list of class names: 'Mary Program ECO FREE SYS -', 'Mary Program READING 1 -', 'Mary Program READING 2 -', and 'Mary Program US HIST B -'.
- Buttons:** 'Go' and 'Help' buttons.
- Don't show this dialog again:** An unchecked checkbox.

Wireless Optimizations

To take advantage of Wireless communications we throttle the amount of packets being sent by the Tutor program to your access points. Go to School > Configuration > Connectivity and select the average amount of bandwidth typically available in your wireless environment (recommended 10 or lower for 802.11b and 54 or 48 for 802.11g networks).

NOTE: To run more than 25 Clients consistently connected to a single access points could reduce performance. The Connectivity Gateway is always recommended when using wireless machines in a multi-subnet environment.



Conclusion

This guide walked you step-by-step through installing the CrossTec SchoolVue Connectivity and Name Server (Gateway) for a wireless one-to-one environment as well as creating class lists before the first day of class using the ClassListProcessor.exe. With this guide you can also help optimize the settings for a wireless environment and have a better understanding of how to technically design the creation and distribution of class lists.. If you would like to learn more about how to use CrossTec SchoolVue, please contact your account manager and find out when there will be a training course in your area, get on-line training, or purchase a training CD that covers everything that you need to know about how to instruct with SchoolVue.

Toll free technical support is available both pre and post sale at no cost from 8:30am to 5pm EST M-F at 1-800-675-0729 or by email at tech@crossteccorp.com

Sales and purchasing information can be obtained by contacting your account manager. If you are not sure who your account manager is, call 800-675-0729, or send an email to services@crossteccorp.com. Enjoy your experience with CrossTec SchoolVue!