



Bluehill® Central – What you need to know

Introduction

This document is intended to outline what lab managers and IT administrators should consider when deciding if Bluehill Central is a good fit for your lab.

Bluehill Central is a lab management tool developed to eliminate the burden of locally managing each Instron system. Bluehill Central allows lab managers to remotely manage all Bluehill Universal users, test templates, results, file revision approvals, and audit trail data from multiple Instron systems.

For the lab manager

Network compatibility

Bluehill Central's data sharing requires all systems to be connected to the same network domain. It is important to identify the current network connectivity of the systems you intend to connect to Bluehill Central. If your Instron systems are not connected to the domain, you should engage your IT group to determine feasibility. While most IT groups prefer networked data sharing to enable more efficient and secure data management, there may be policies / infrastructural limitations that will inhibit connection to Bluehill Central. Please forward this document for your IT team to review the product requirements.

Teams

Teams are groups of users who share files, file review settings, and audit trails. Multiple teams are recommended when Instron users (1) require access to different files and folders, (2) require different approval requirements, (3) require their own audit trail. For example, your R&D team may require different file approval workflows than your quality control team.

When creating a team, you will need make some decisions, notably:

- a) Modules
- b) Security type
- c) Members of team
- d) User permissions
- e) Traceability signature settings

Modules

Lab Management, Traceability, and TrendTracker are the three available modules that have corresponding "plug-ins" on each license of Bluehill Universal. The plug-in enables access to that function in Bluehill Central. Traceability and Lab Management are purchased together, whereas TrendTracker is a standalone module. Features of each module are detailed in other documents, please request if you cannot locate on the Instron webpage. Team administrators can enable the modules that are applicable to each team. It is most common to enable any purchased modules for all teams.

Security type

Bluehill Central requires security to be enabled on all connected systems and provides two options: Bluehill security and Windows® Active Directory. Active Directory supports user accounts on your domain (managed by IT) for logging in and electronically signing files. Bluehill security allows team administrators to create users specific to Bluehill applications (managed

within Bluehill Central). Security applies to both Bluehill Central and Bluehill Universal and is required when using Traceability to track user actions. Note: If only using the TrendTracker module and security is not desired to control user permissions when operating a system, security is not required in Bluehill Universal.

Members of a team

Teams are groups of users who need access to the team. Users must be added to the team individually. Users can be added or removed at any time by team administrators.

User permissions

User permissions dictate actions a user can or cannot perform when logging in. If using Bluehill security, permissions are configured for individual users. If using Active Directory, permissions are linked to AD user groups on the domain. This is important as users must be added to appropriate user groups to manage security. Instron recommends configuring all necessary user groups prior to the system installation. Please review Instron's Active Directory whitepaper for the list of permissions and setup considerations.

Traceability signature settings

When the Traceability module is enabled, signature settings must be configured for each team. Four file types support signatures: report templates, methods, samples, and PDF reports. You can specify the number of signatures required for each file type, as they are likely going to be different. You can choose none, one, two, or three signatures. The first signature is always the submitter of the file, so up to two peer reviews are supported.

The users performing secondary and tertiary signature is dictated by the Reviewer Group selected, as shown below. Similar to other Active Directory permissions, Reviewer Groups A, B and C are linked to user groups and should be configured by your IT group prior to system operation.

The screenshot shows the 'Signatures' configuration page in the Bluehill Central interface. The page is organized into several sections:

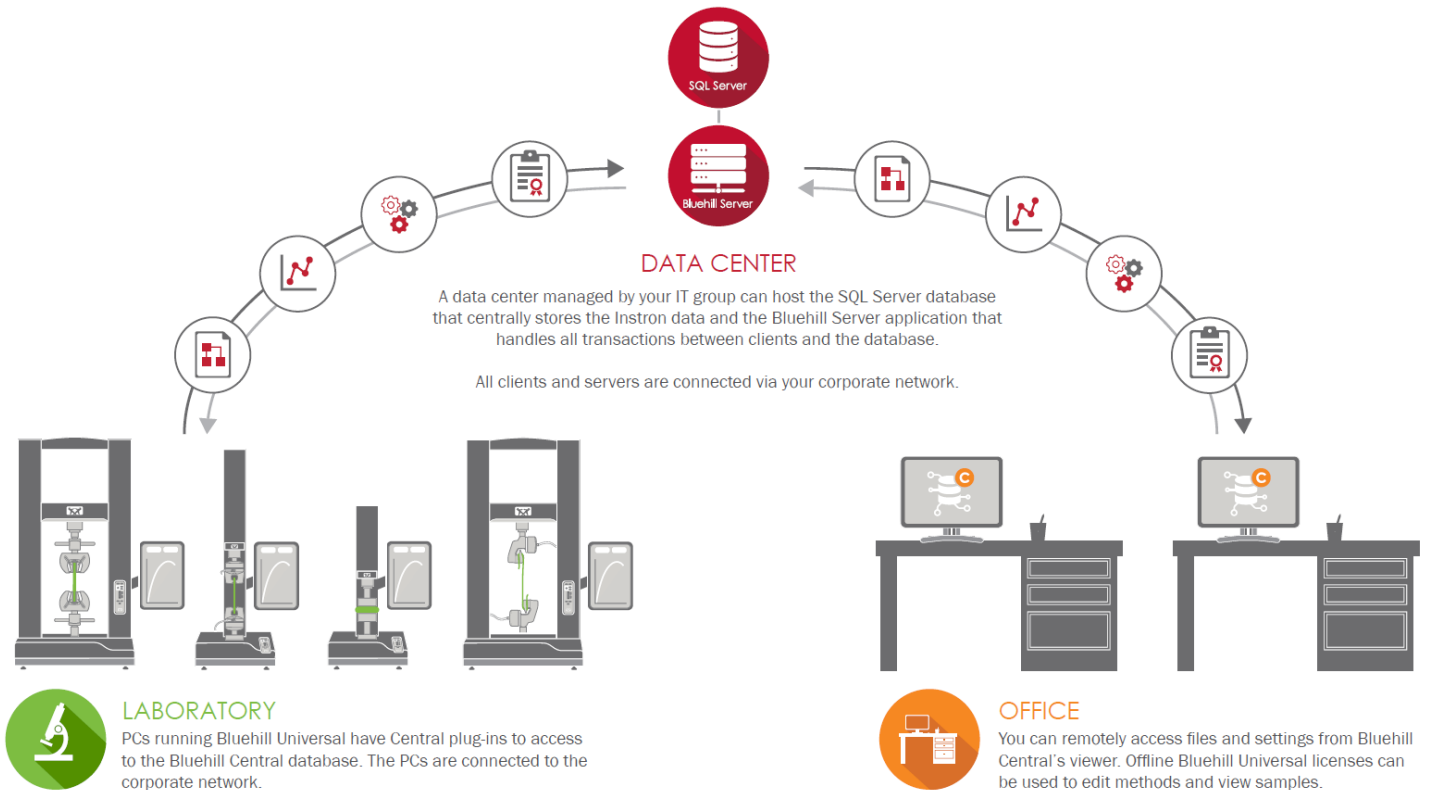
- Report templates:** Two signatures (dropdown), Secondary signature: Group C reviewer (dropdown).
- Methods:** Three signatures (dropdown), Secondary signature: Group A reviewer (dropdown), Tertiary signature: Group B reviewer (dropdown).
- Enforce signature order:** Toggle switch (off).
- Samples:** No signature required (dropdown).
- PDF file:** Two signatures (dropdown), Secondary signature: Group C reviewer (dropdown).
- Options:** Require a comment when submitting or approving a document: Toggle switch (off).

For the IT administrator

Bluehill Central uses a client / server network to store all shared data, files, and settings on a Microsoft® SQL Server database. When Bluehill Universal is connected to your lab's Bluehill Central server, each testing system sends and receives data from the centralized database, eliminating the risk of variation and the burden of locally managing each system. Detailed installation instructions can be provided upon request.

Architecture

A client / server architecture is used to connect all devices. Refer to diagram below for visual representation.



System Requirements

Please refer to table at the end of this document for hardware and software requirements.

SQL Server database

Microsoft SQL Server databases are used to store all data (files, audit trail, settings, and TrendTracker specimen data). Users have the option to (1) use an existing SQL Server license or (2) for Instron to provide Microsoft's free license, SQL Server Express. Please note, SQL Server Express has limited scalability and should only be implemented in labs with low volume output, typically three or fewer test systems.

The TrendTracker module allows for one or more additional databases to be configured to exclusively store specimen data.

Backup and restore functions are integrated into Bluehill Central, with exception databases configured exclusively for TrendTracker. Backup and restore functions are not automated or schedulable.

Bluehill Server application

Bluehill Central is supplied with a server application to handle transactions between all connected clients and the database.

Bluehill® Universal clients

Bluehill Universal controls Instron system operation and data exporting. Bluehill Universal (v4.28 or greater) is the only Instron software platform that supports Bluehill Central. Licenses of Bluehill Universal are linked to each system. Each system to be connected to Bluehill Central requires its Bluehill Universal client to have a compatible version and Bluehill Central plug-in.

Bluehill Central clients

Lab management actions for Instron systems are performed in the Bluehill Central viewer, a client that can be installed on any computer with access to the domain. When purchasing Bluehill Central, lab managers choose how many Bluehill Central viewer licenses they require. License management of Bluehill Central viewers is performed on the Bluehill Server application.

Security type

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If Active Directory is preferred, you must communicate with the lab manager to determine required user group creation to manage user permissions properly. Please review Instron's Active Directory whitepaper for the list of permissions and other setup considerations.

Installation expectations

The installation of the SQL Server database and Bluehill Server application is the responsibility of your IT group. Instron service engineers cannot perform this configuration as your IT group controls the data center that will host relevant servers. The only exception to the above statement is if the server application and database are intended to be installed in a local configuration on Instron-supplied computers (i.e. no networking requirements).

Performance

The recommended hardware settings will achieve the following performance before degradation:

- Traceability and Lab Management
 - up to 50 simultaneous transactions (a simultaneous transaction occurs when multiple clients make a call to perform an action or request information at the same time)
 - up to 2.5 million audit log transactions
 - up to 1 million medium sample files (medium = 50 specimens with 5-minute test duration using default data collection)
- TrendTracker
 - Query performance degrades when the number of specimen records exceeds 100,000 with 50 associated search columns. Instron recommends that you organize test results by separate databases or limit the number of search columns to improve the query performance.

System Requirements

The software versions supported are as follows:

- SQL Server 2017 or greater
- Bluehill Universal V4.28 or greater
- Bluehill Central V1.12 or greater
- Bluehill Server V1.12 or greater

Component	Recommended Hardware	Supported Operating Systems
Application Server	<ul style="list-style-type: none"> • X64 processor: > 2.0GHz - 8 cores • 16GB RAM or greater • SSD with 10GB of free disk space 	<ul style="list-style-type: none"> • Windows Server 2019 • Windows Server 2016 • Windows 10 Build 1607 or greater
Data Server (Traceability and Lab Management)	<ul style="list-style-type: none"> • X64 processor: > 2.0GHz minimum 4 cores with CPU settings to support virtualization, if required • 16GB RAM or greater • SSD for fast drive access with 2TB of free disk space. The actual requirements vary depending on volume of data generated 	<ul style="list-style-type: none"> • Windows Server 2016 or greater • Windows 10 or greater
Data Server (TrendTracker)	<ul style="list-style-type: none"> • X64 processor: > 2.0GHz minimum 4 cores with CPU settings to support virtualization, if required • 4GB RAM or greater • 16GB of free space. The actual requirements vary depending on volume of data generated – refer to Microsoft documentation based on the version of SQL Server 	<ul style="list-style-type: none"> • Windows Server 2016 or greater • Windows 10 or greater
Bluehill Universal Client	<ul style="list-style-type: none"> • X64 processor: > 2.0GHz • 8GB RAM or greater • USB port (for software installation) • Hard drive with 1GB of free space. The actual requirements vary depending on volume of data generated 	<ul style="list-style-type: none"> • Windows 10 Build 1607 or greater
Bluehill Central Client	<ul style="list-style-type: none"> • X64 processor: > 2.0GHz • 8GB RAM or greater • USB port (for software installation) • hard drive with 1GB of free space • 1 unused network connection for network accessibility 	<ul style="list-style-type: none"> • Windows Server 2016 • Windows 10 Build 1607 or greater
Mail Server (optional)	<p>The mail server is the computer system that sends and receives email, as follows: Exchange or a standard SMTP mail server supporting:</p> <ul style="list-style-type: none"> • Encryption types: None, Auto, SSL, TLS • Authentication types: None, Login 	
Virtualization	<p>Virtualization is supported for Bluehill Server, Bluehill Central and SQL Server. Please follow best practices for configuring hardware to provide equivalent recommended hardware performance.</p> <p><i>Note that a Bluehill Central site license is required when virtualizing Bluehill Central.</i></p>	

Terminology

Term	Meaning	Product
Application server	A computer system that allows multiple systems to connect to a common software application.	Bluehill® Server
Data server	A computer system that provides a platform to host database services.	SQL Server
Mail server	A computer system that sends and receives email. Email notifications can be sent by the Bluehill® Server when files are submitted for review, approved or rejected.	Microsoft Exchange or a standard SMTP server
Client systems	Customer-supplied computer system(s) that host client applications that communicate with the software on the Application server.	Bluehill® Central or Bluehill® Universal
Windows service account	A user account that is created explicitly to provide a security context for services running on a Windows operating system. The security context determines the service's ability to access local and network resources.	Windows 10 Windows Server
Microsoft SQL Server Management Studio	SQL Server Management Studio (SSMS) is an integrated environment for managing any SQL infrastructure. SSMS provides tools to configure, monitor and administer instances of SQL Server and databases.	SQL Server