



Cluster Computing

Accelerate Imaging

Automate Analysis

Scale with Confidence



Cluster Computing Key Features

Unlock faster, smarter image analysis with NIS-Elements Cluster Computing. Designed to streamline complex workflows, enhance productivity, and maximize efficiency, this scalable solution offers the flexibility to meet the evolving needs of research labs, core facilities, and high-throughput environments. Explore key features that bring performance and precision to the forefront of your imaging applications.



High Performance

Unlock the power of parallel processing by distributing analysis recipes, AI training, and complex image processing tasks across multiple computing nodes. This enables significantly faster data analysis and streamlined performance. Perfect for data-heavy workflows that include performing basic image denoising or running advanced, one-click analysis pipelines that integrate tools like deconvolution, AI-based segmentation, and more.



Flexible by Design

NIS-Elements Cluster Computing supports a wide range of imaging workflows, from routine processing to advanced AI-based analysis. It can be configured with any server setup, whether in a small lab or a large-scale data center. Seamless integration with NIS-Elements allows users to easily offload data directly from their acquisition or analysis environment, enabling high-performance processing. This flexibility ensures that the system scales to meet the needs of individual researchers, core facilities, and enterprise-level operations alike.



Scalable

NIS-Elements Cluster Computing is designed to scale effortlessly alongside your research. Compute nodes can be added at any time to boost processing power without the need to upgrade individual machines. The tiered software licensing model allows you to scale the number of parallel tasks that can run simultaneously, making it easy to expand capacity as demands increase.



Resource Optimization

Cluster computing intelligently distributes processing tasks across all available computing nodes, ensuring optimal use of system resources. By balancing workloads in real time, it prevents bottlenecks, avoids overloading individual machines, and maximizes overall efficiency. This dynamic allocation of compute power enables smooth making it ideal for multi-user environments or high-throughput analysis pipelines.



Workflow Automation

The cluster provides a centralized platform for executing analysis pipelines at scale, enabling high-throughput automation with consistent and reliable results. By running all processing through the same environment, it ensures uniformity across datasets, experiments, and users.

Powerful Applications

3D Deconvolution

Process large Z-stacks and multi-channel datasets faster than ever. Ideal for confocal and high-resolution volumetric imaging.

AI-Based Segmentation

Apply deep learning models across thousands of images simultaneously. Perfect for tissue classification, cell segmentation, phenotype analysis and more.

High-Content Imaging

Scale your multi-well plate experiments by offloading stitching, analysis and quantification to the cluster.

Time-Lapse Analysis

Accelerate complex time-series experiments for dynamic studies such as cell migration, division, and differentiation by offloading data intensive processing and analysis to the cluster.

Image Stitching

Rapidly generate large, seamless image composites from tiled images.

Batch Analysis, Quantification & Reporting

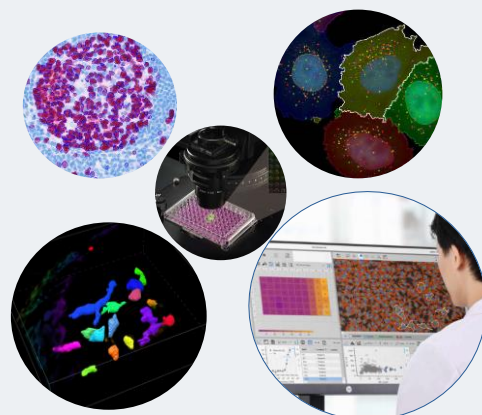
Automate measurements and data extraction at scale, ensuring consistency across experiments and streamlined reporting.

One-Click Smart Experiment Assays

Run advanced, pre-configured analysis recipes with a single click. Perfect for high-throughput labs using standardized, multi-step AI workflows.

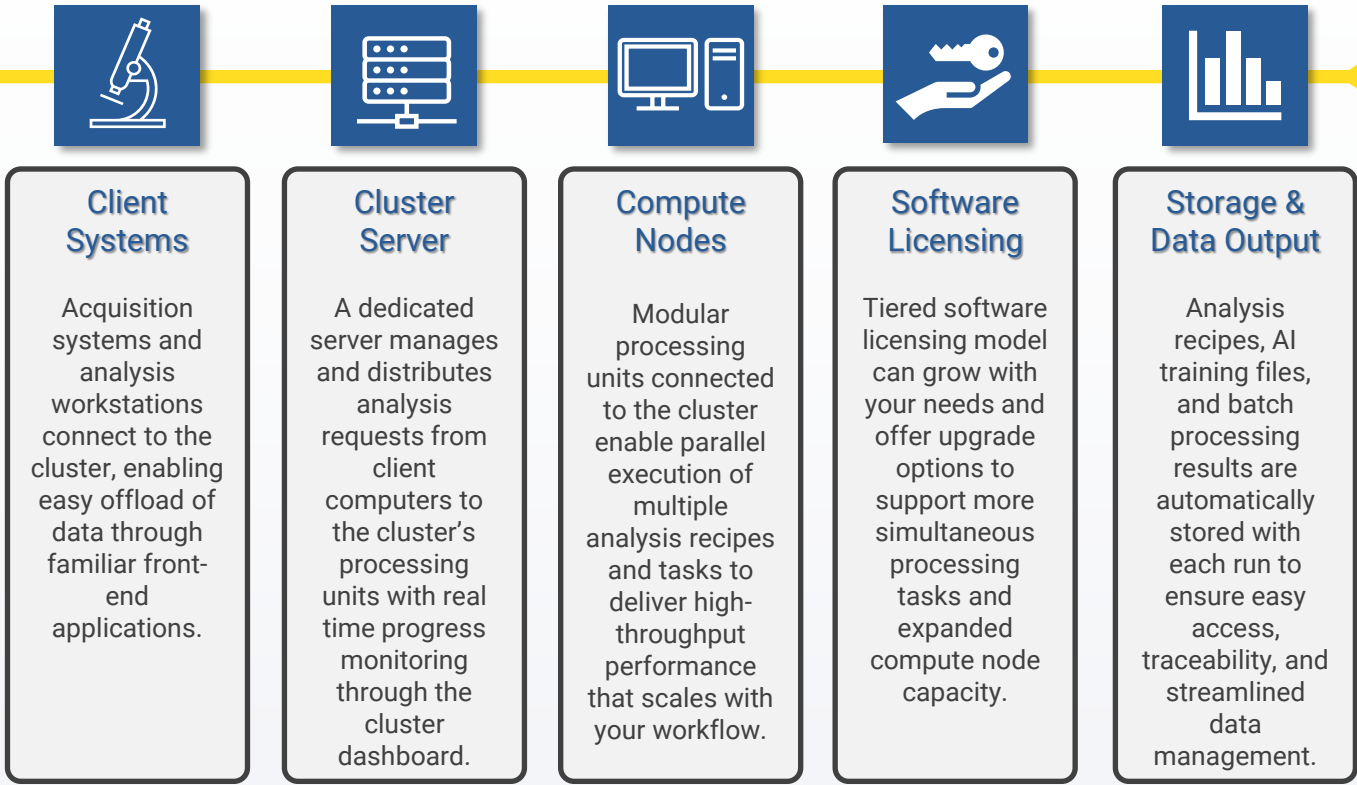
Multi-User Analysis Support

Run multiple processing tasks simultaneously, enabling collaborative and efficient use of computing resources across labs or teams.



NIS-Elements Cluster Computing Building Blocks

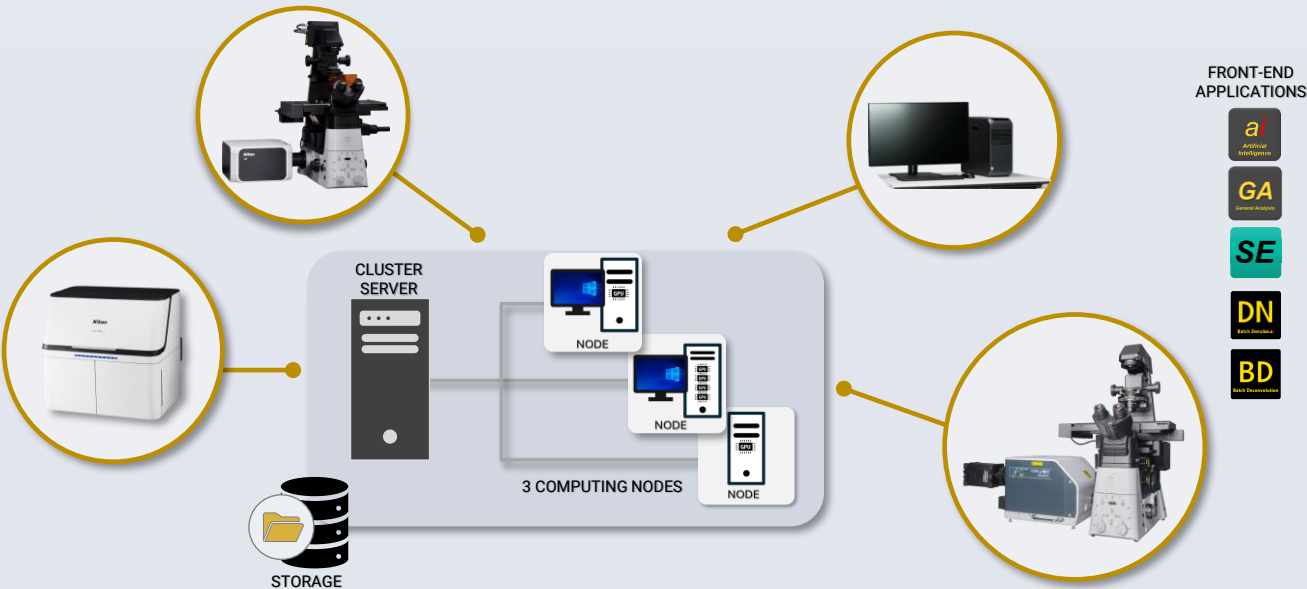
Cluster computing delivers high-performance processing by distributing **workloads from imaging and analysis stations** across multiple **connected nodes** via a **dedicated server**. This enables faster execution of complex tasks and **large datasets from multiple users**. When connected with a **shared storage**, it provides scalability, seamless accessibility, and unified integration with image processing pipelines, making it ideal for data-intensive workflows and **high-throughput data output**.



Cluster Computing Configuration

Example Configuration of NIS-Elements Cluster Computing

In this setup, imaging and analysis systems (**Client Systems**) are all connected to a central server. Workloads from NIS-Elements front-end applications are offloaded from Client computers onto multiple compute nodes (only three shown here) for analysis. Each compute node can consist of multiple processing units each processing different tasks in parallel. This architecture accelerates the execution of complex tasks and enables efficient processing of large datasets.



Cluster Computing Supported NIS-Elements Applications

Leverage on powerful **front-end applications** to reduce bottlenecks, maximize productivity and seamlessly **scale your analysis**. Streamline your imaging pipeline by **automating complex workflows** and **batch processing** large datasets. Cluster computing enables hands-free analysis at scale that saves time and ensures consistency across experiments.

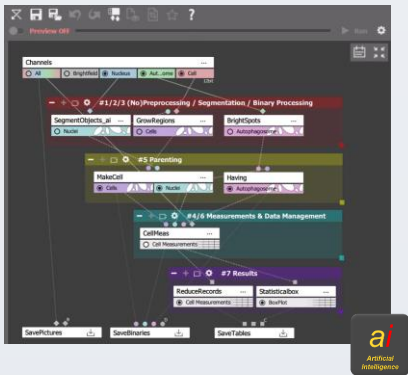


Automated One-click Analysis at Scale

The NIS-Elements General Analysis (GA3) engine delivers powerful image processing and analysis tools designed for performance and ease of use. With customizable, one-click analysis recipes that leverage AI-tools, you can tailor workflows to your unique applications and apply them consistently across large datasets.

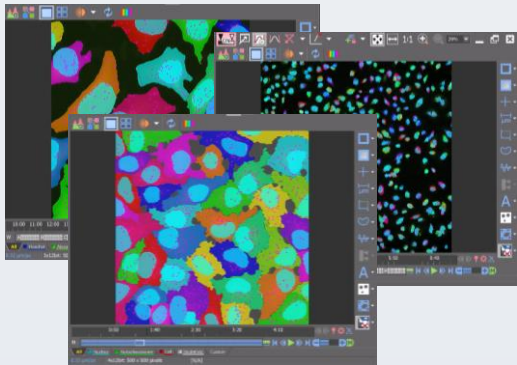
ONE RECIPE

For repeatable data analysis



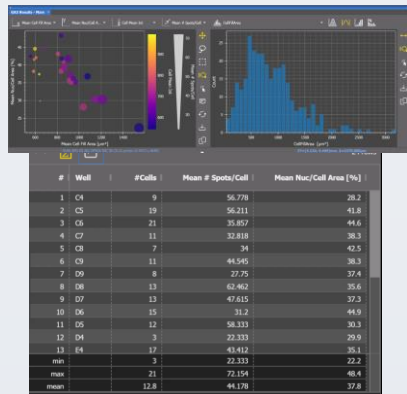
MULTIPLE DATASETS

Run the same recipe on many datasets



RELIABLE DATA OUTPUT

Automated and reliable data output



OFFLOAD ANALYSIS ON THE CLUSTER

With a dedicated **batch GA3 distributed** interface within NIS-Elements, send your data to the compute cluster for fast, scalable analysis. This powerful feature instantly detects and routes images from any acquisition system to your processing cluster without extra clicks or delays. Eliminate manual steps and let the cluster handle the heavy lifting, delivering reliable, repeatable data outputs faster and more efficiently than ever.



Automated Image Denoising

Streamline your workflow by connecting to the cluster directly through the **Batch Denoise interface**. Offload intensive processing from your local machine to powerful cluster resources—freeing up your hardware for other tasks while ensuring fast, efficient, and automated image enhancement at scale.



Cluster-driven Deconvolution

The **Batch Deconvolution interface** seamlessly integrates with the compute cluster, enabling accelerated processing and ensuring optimal throughput for demanding workflows. Whether applying Richardson-Lucy, Landweber, Blind or any other deconvolution method supported in NIS-Elements, the interface ensures consistent, high-fidelity results while offloading compute-intensive tasks to the cluster for uninterrupted productivity and minimized local resource usage.



Collect data **on any system**



Save images into a **Watched folder**



Images are offloaded to the cluster for automated **denoising** and **deconvolution**

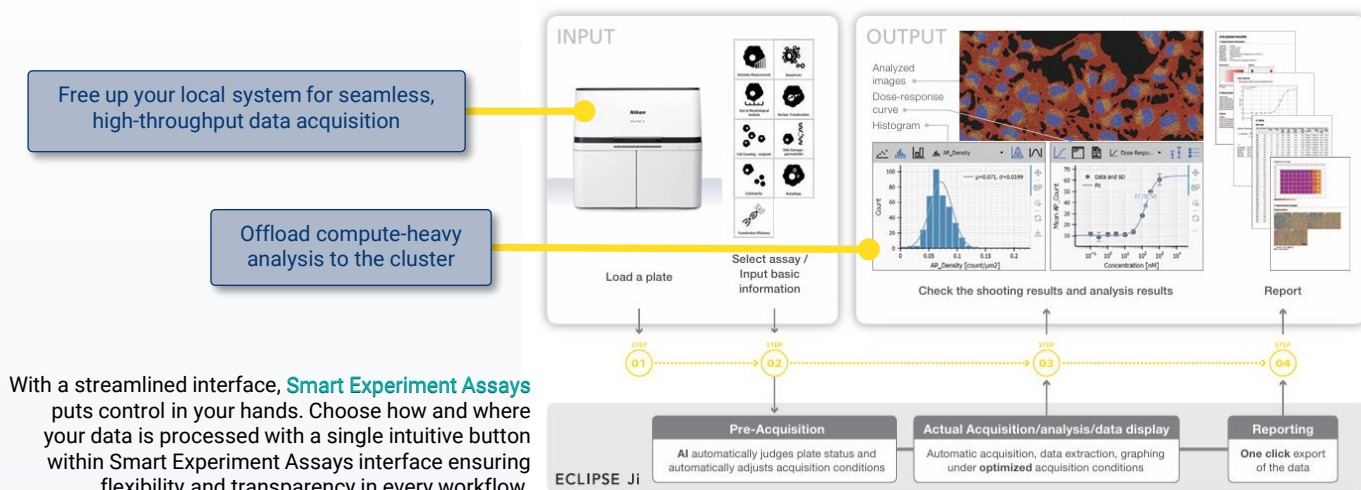
Cluster Computing Supported Software Applications

Smart Experiment Assays seamlessly integrate with the cluster to **enable fully automated acquisition-to-analysis pipelines**. Train **AI classifiers** directly on the cluster and deploy them across one-click batch workflows for fast, scalable, and reproducible AI-driven analysis.



Accelerate Analysis, Maximize Throughput

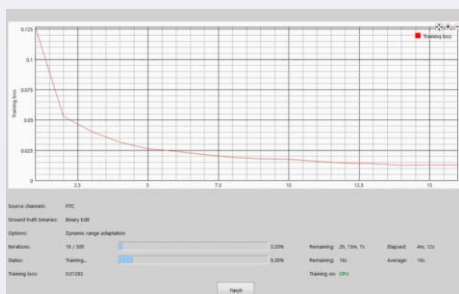
The Eclipse Ji Smart Experiment Assays come with an interface that's fully compatible with NIS-Elements Cluster Computing allowing you to offload your data analysis after each run directly to the cluster. This reduces computational bottlenecks and frees you to focus on collecting more data and accelerating discovery.



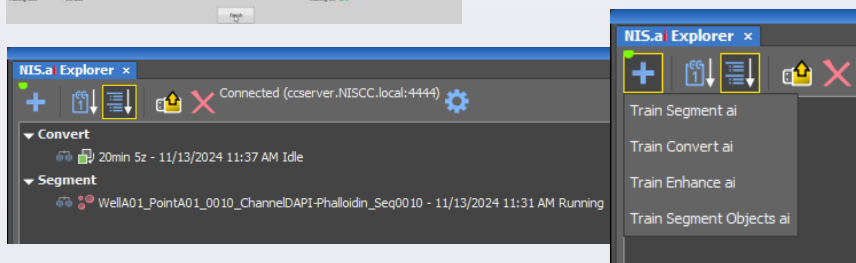
Optimized AI Workloads

Accelerate your AI training workflows by harnessing NIS-Elements' **powerful AI tools** to seamlessly scale with your data. The training interface for Segment.ai, Segment Objects.ai, Enhance.ai and Convert.ai connect directly to the cluster to offload training classifiers. While your models train, you stay focused on high-value imaging tasks and creating analysis recipes to maximize productivity without complexity.

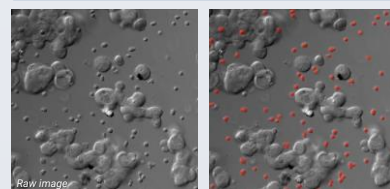
OFFLOAD AI TRAINING ON THE CLUSTER



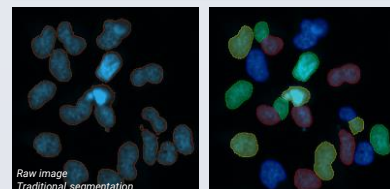
Effortlessly send datasets for training directly to the cluster through a dedicated **NIS.ai Explorer** interface, enabling efficient background training of classifiers.



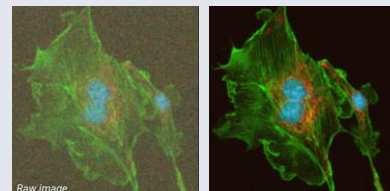
SEGMENT.AI



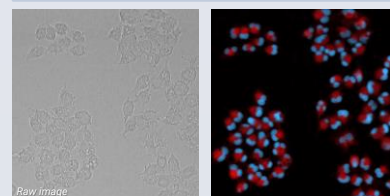
SEGMENT OBJECTS.AI



ENHANCE.AI



CONVERT.AI



NIS-Elements Cluster Computing **Server Package & Options**

NIS-Elements' Cluster Computing solution provides **versatile integration capabilities**, allowing seamless incorporation into your institution's existing infrastructure and hardware or deployment as a standalone system on its own network. Different hardware and software licensing offerings are available to provide complete solutions, leverage on your existing hardware components or provide flexible upgrade paths to expand over time.

BASIC SERVER PACKAGE

The Basic Server Package provides the foundational infrastructure for the NIS-Elements Cluster Computing. It includes essential components such as network connectivity, management tools and configuration settings for seamless node connectivity and facilitate scalability, ensuring your system can grow to meet increasing processing needs.



Dedicated **Server Computer** with Windows Server licensing



Network Switch for seamless cluster node connectivity



Network Key for wireless connectivity and for holding the *NIS-Elements Licensing**

* NIS-Elements Licensing is available for purchase separately, with flexible tiered options to suit every user and application.

ADDITIONAL SELECTIONS



Compute Nodes

- ☐ A powerful compute node is available with 4 processing units (GPUs) to process 4 tasks simultaneously.
- ☐ Any workstation* that meets the minimum requirements for processing NIS-Elements applications can be purchased and connected to cluster.



Software licensing

- ☐ Select the NIS-Elements Cluster Computing Licensing that meets your computing needs from tiered options.
- ☐ Upgradable options available.

* Existing workstations can also be added to the network to serve as additional nodes. The corresponding number of software licenses need to be purchased to match the required number of simultaneous processing tasks

Notes

- ☐ NIS-Elements cluster computing is highly flexible and can support a variety of custom setups beyond these configurations.
- ☐ Additional workstations purchased separately can also be added to the network to serve as additional nodes. The corresponding number of NIS-Elements software licenses must be purchased to match the number of simultaneous processing tasks.
- ☐ For tailored solutions based on your specific application needs, available resources, and network infrastructure, **please contact your sales representative** to explore how NIS-Elements Cluster Computing can support your workflows.



Explore how NIS-Elements' Cluster Computing solution will streamline your workflows and accelerate your analysis workloads.

Contact your local Nikon representative to learn more.

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