Element Biosciences

Specification Sheet

ElemBio™ Cloud

Simple, flexible management of sequencing data in the cloud

Highlights

- Real-time run monitoring from a mobile device or desktop
- Transparency and collaboration in a centralized platform
- Full-service or self-managed analysis solutions
- Automated FASTQ file generation

Introduction

Next-generation sequencing (NGS) has revolutionized bioinformatics and the management of large, complex datasets. As NGS adoption accelerates, many cloud services have emerged to provide storage and analysis solutions for genomic data. Getting results from sequencing, however, remains a challenge. Services often lock labs into a closed data ecosystem, or require a level of infrastructure and expertise that is best suited for mature organizations with dedicated bioinformaticians and IT professionals.

ElemBio Cloud, a direct extension of Element Biosciences instruments, functions as an online platform that enables remote monitoring and facilitates data storage and analysis (Figure 1). Innovative and user-friendly, ElemBio Cloud matches any lab to their ideal solution and can scale from out-of-the-box simplicity to fully customized and self-managed options. ElemBio Cloud also includes an ever-evolving feature set that brings flexibility and ease to all aspects of NGS data management. Labs with an established solution have the freedom to manage data in their environment.

Cloud connected

Historically, NGS data management involves ecosystem complexities that can lead to a multi-software approach and delay results. To deliver a uniform experience that encourages collaboration and streamlines operations, ElemBio Cloud centralizes the management of all users, instruments, and data. Designed for bioinformaticians and scientists alike, ElemBio Cloud empowers any user to interpret raw data and get results. Integration with onboard operating software also grants the flexibility to remotely manage one instrument or an entire fleet.

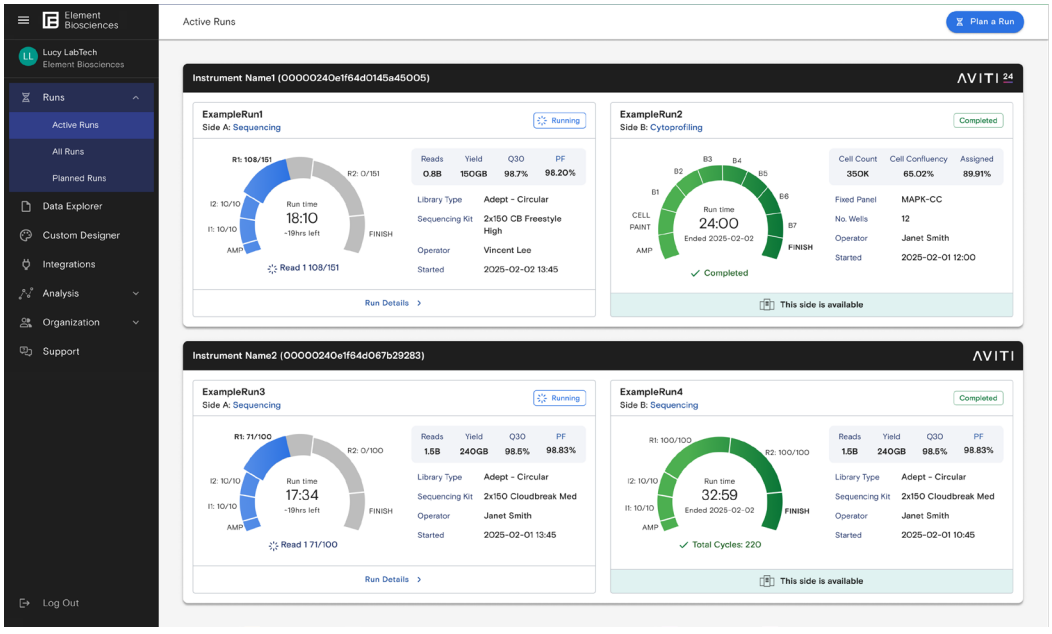

Figure 1. Online instruments automatically connect to ElemBio Cloud and are granted access to a clear, modern dashboard that displays active runs for all connected systems. Also, intuitive navigation quickly takes you to other features.

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Run planning and management

Planned runs, an ElemBio Cloud feature, facilitate run setup and validation. Planned runs allow one team member to create a run in ElemBio Cloud while another member can select the run on the instrument during run setup. To enter run parameters and import a verified run manifest, a user completes a simple form in ElemBio Cloud (Figure 2). When the run is ready to start, the user simply selects the planned run and loads consumables, with no additional setup required.

Runs that are performed on a connected instrument are listed in ElemBio Cloud as an active or historical run. Each run is also displayed with general information for at-a-glance status updates. Furthermore, a single click opens complete details for the selected run.

Remote run monitoring in real time

Operating software integration enables real-time run monitoring from a mobile device or desktop. The Active Runs page displays run status and performance metrics for active runs on connected instruments. As a run progresses, data is generated on-instrument and streamed to ElemBio Cloud. When a run is selected, a rich set of metrics are displayed in a series of dynamic, interactive charts (Figure 3). A thumbnail image shows polonies on the flow cell and provides a quick visual check for density. Runs that use a local storage connection can post data to ElemBio Cloud for offline run monitoring.

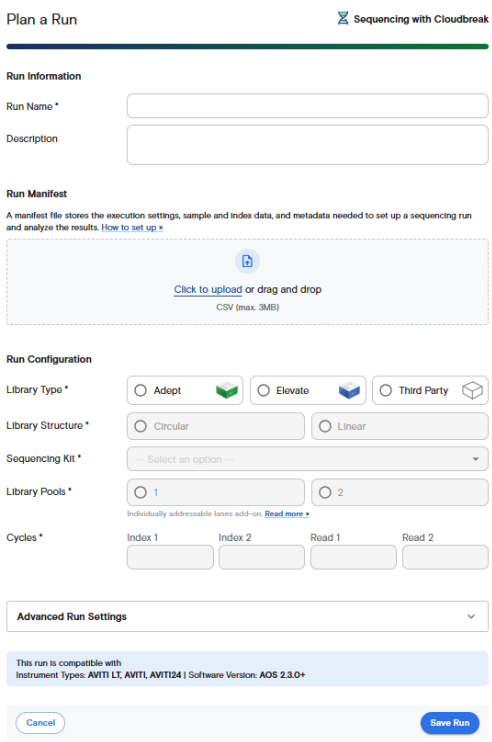

Figure 2. The planned runs feature creates and saves runs in ElemBio Cloud for later execution on an instrument.

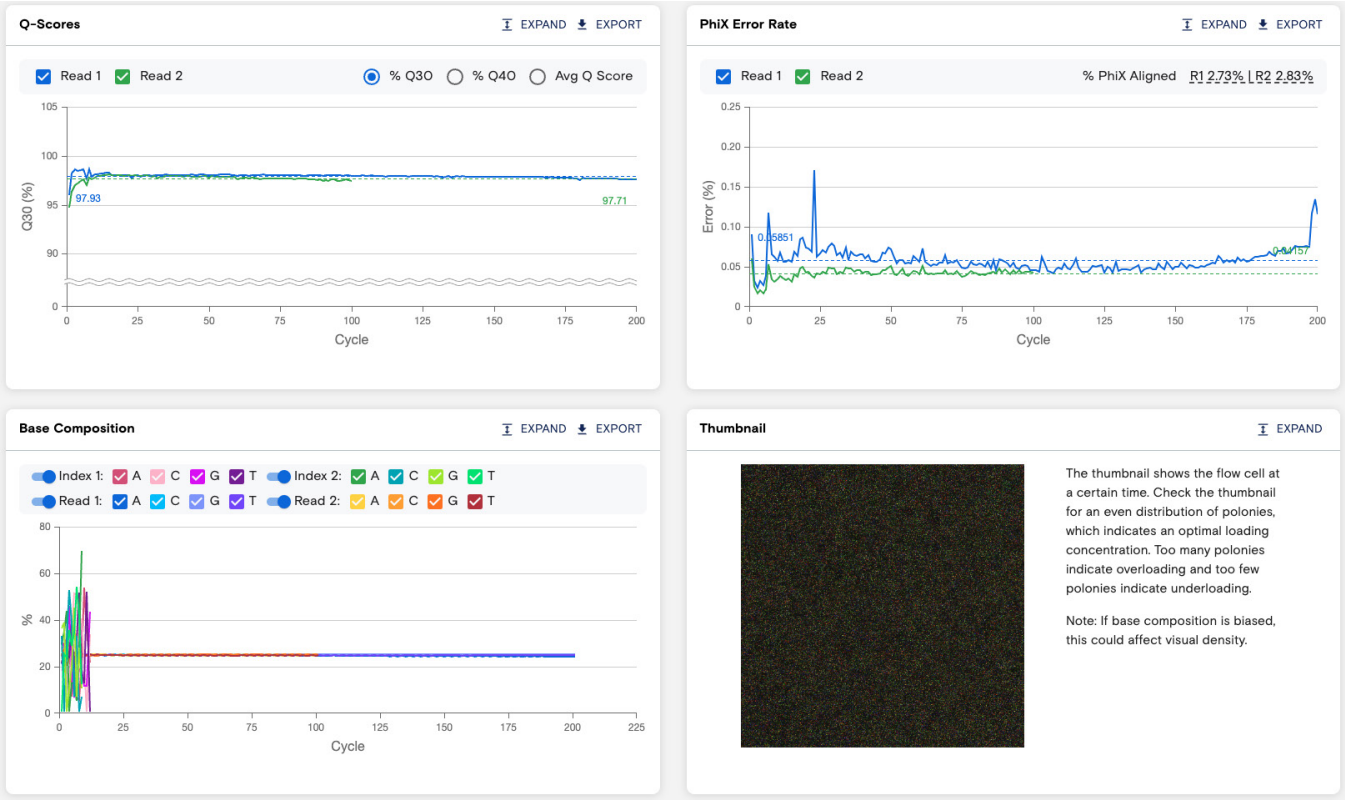

Figure 3. ElemBio Cloud visualizes run metrics in real time to help gauge run performance. The software preserves this data as a historical run.

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Full menu of analysis solutions

Every lab has unique analysis needs. Labs that have an established cloud infrastructure might not require a plug-and-play solution, but other labs might face challenges in setting up a secure cloud-based data ecosystem. Also, some labs might prefer to keep their data offline.

No matter what your requirements are, Element provides the following flexible analysis solutions:

- ElemBio Catalyst™ – Host your data and analysis seamlessly with Element.
- Self-Managed Cloud – Use third-party providers such as AWS, DNAnexus, Google Cloud, or Seqera to manage your own storage and analysis.
- Local Analysis – Keep your data offline with on-premise analysis solutions.

ElemBio Catalyst

Element offers ElemBio Catalyst, which is a subscription-based cloud analysis solution that is integrated within ElemBio Cloud and is designed to store and analyze AVITI data. With an ElemBio Catalyst subscription, Element handles the setup, management, and hosting of cloud storage and compute resources on your behalf. Your data is securely stored in dedicated Amazon S3 storage buckets within your preferred AWS region. Also, the platform supports essential analysis workflows and includes sequencing and cytoprofiling along with additional subscription-based secondary analysis packages available. To get started, either purchase an ElemBio Catalyst subscription or take advantage of the 45-day free trial.

Automated FASTQ file generation

To transition from sequencing to secondary analysis, all NGS workflows require base calls to be converted into FASTQ files. ElemBio Catalyst automates FASTQ file generation to minimize the touchpoints that can cause results to delay or increase the error potential. When a run is completed, Bases2Fastq Software automatically converts the bases files into FASTQ files and stores them in the cloud. Through ElemBio Cloud, ElemBio Catalyst makes raw sequencing data and FASTQ files readily accessible for browsing and download (Figure 4).

Open secondary analysis

After FASTQ files are generated, your NGS data is ready for secondary analysis, which is based on the application and is supported by a diverse range of open-community services. Instead of locking labs into a specific pipeline, Element provides data in the industry standard FASTQ format and ensures compatibility with virtually any secondary analysis software (Figure 5). To perform secondary analysis, either subscribe to ElemBio Catalyst or use a third-party service that supports your application. For a complete list of secondary analysis workflows and available providers, see the *Workflow Library* at https://docs.elembio.io/docs/elembio-cloud/analysis/workflow-library/.

Data protection and security

To reduce privacy risk and the misuse of genetic information, safe NGS data management is paramount. ElemBio Cloud implements data security and privacy protections and complies with applicable global data privacy regulations.[1] For maximum protection, data is encrypted in transit and at rest.

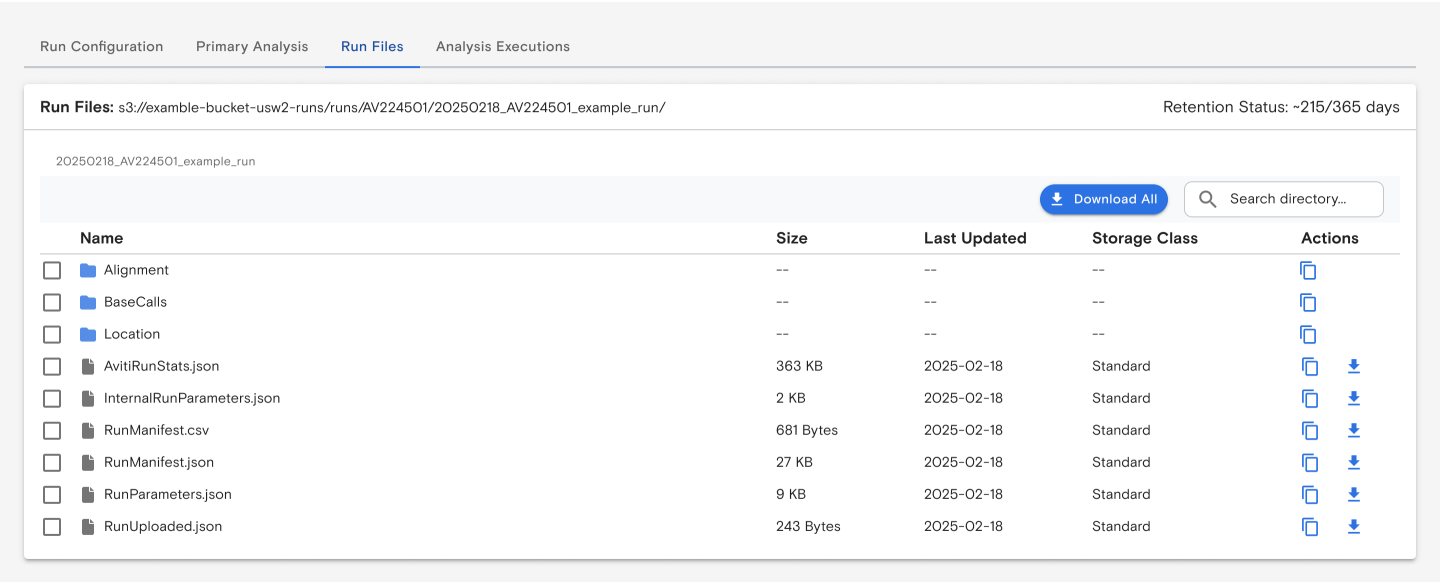

Figure 4. Data Explorer in ElemBio Cloud grants full access to all run data such as raw sequencing or cytoprofiling files, FASTQ, and secondary analysis files.

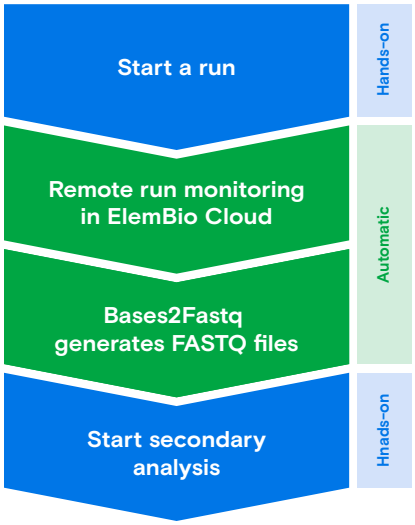

Figure 5. ElemBio Cloud automates the steps between sequencing and secondary analysis. After FASTQ file generation, use the software of your choice to start secondary analysis.

Each ElemBio Cloud account has a unique domain with the option to use an authentication provider through single sign-on (SSO). Role-based access separates administrators from team members and allows only administrators to manage integrations and team members. User control is instant.

If you choose to subscribe to ElemBio Catalyst and allow Element to host your data, then strict data access and security roles are applied to the hosted data. Data storage and compute resources are operated on AWS and supported by robust data security processes. Access to data is restricted to approved Element staff. Data mining, which assesses data to identify patterns and create models, is never performed. To review the full measure of data protection and security, see *ElemBio Cloud Data Protection (LT-00012)* at elementbiosciences.com/resources.

Add-ons for extended capabilities

Scaling an NGS operation is complex. Throughput and project needs change over time and expansion into new applications requires ample flexibility. Add-ons enable additional capabilities in ElemBio Cloud and the operating software, which allows labs to effortlessly accommodate increased throughput, project separation, and other changes. A dedicated page in ElemBio Cloud lists add-ons for the organization and provides visibility into the status and history of each add-on. For offline instruments, the add-ons page provides the ability to download a key for local installation of add-ons.

Straightforward pricing

All ElemBio Cloud accounts include run monitoring, user management, and fleet management, along with unlimited numbers of runs, users, and storage connections.

ElemBio Catalyst offers a subscription model with annual renewals. The annual subscription includes usage credit for the year. After the usage credit is exceeded, per-use rates apply. Usage is calculated based on storage-based costs, data transfer (egress), API usage, and compute costs.

Conclusion

ElemBio Cloud offers a simple yet powerful solution for NGS data management at any scale. For more experienced labs, adaptability and control is maximized. ElemBio Cloud operates in an open ecosystem that is designed for ease of use without complex costs and empowers analysis for any lab on the first day of sequencing. As Element continues along a trajectory of continuous innovation, regular software updates ensure peak performance that keeps pace with developments across the field of genomics.

Ordering information

Product	Catalog #
ElemBio Catalyst	100-00007
Premium Workflows: Sequencing	100-00008
ElemBio Catalyst Usage	100-00009

To learn more, visit elementbiosciences.com/products/elembio-cloud

References

1. "Privacy Policy," Element Biosciences, accessed January 11, 2024, https://www.elementbiosciences.com/legal/privacy.
2. "AWS Cloud Security," AWS, accessed January 11, 2024, https://aws.amazon.com/security/.

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