Cell Development Kit (CDK) Documentation

Creating a PR for CDK Technical Documentation

PR: Ginkgo Bioworks Introduces Cell Development Kits (CDKs) for Standardizing Technical Work

Ginkgo Bioworks has announced the launch of Cell Development Kits (CDKs). CDKs are technical documents that help to standardize and templatize technical work at Ginkgo. This documentation initiative has provided consistency within teams, efficiency across teams, and customer satisfaction.

The Cell Development Kits have been a game changer for our developers, enabling them to work more efficiently and with greater confidence. With the improved documentation and templates we provided, developers now have a clear source of truth for using and maintaining the modules, reducing confusion and saving time. This has given our Organism Engineers greater confidence in understanding modules, and we're seeing more successful widespread adoption as a result. Our team's efforts to deliver documentation and templates for our 6 CDKs have been hugely beneficial for our developers and customers alike. “We're thrilled to have played a role in making the development process smoother and more accessible for our team and our customers." - CDK Owner

The CDKs currently provided are Module User Guides. These User Guides are just one component of a larger set of documents that help orient Codebase on how to use TDP modules. By delivering these clear, comprehensive user guides for CDKs, we've contributed to this larger effort to streamline and simplify the development process.

<u>CDK Documentation Provided</u>

1. *User Guides (Spearheaded by DTKM)*: Provide a low-level overview of module background and technical details. Used by program leads, Organism Engineers, and Project Planning Leads. This includes information on:
    - Rationale
    - Permissions
    - The How-To (Use & Execute)
    - ★ *Module Playbook - Subsection of User Guides (Spearheaded by DTKM):* Provide operational and process guidance to Organism Engineers and Program Leads who are running a module. This includes information on:
        - How to request work within the module
        - Where to find specific information

In July 2022, Ginkgo established a central Transformation Office to lead the execution of high-priority, cross-organizational initiatives. The goal of Big Rock 1 was to lead the development of 6+ CDKs while also establishing a process for continued CDK development into the future. The 6 first 6 CDKs developed were:

- Pichia pastoris protein / enzyme
- Aspergillus niger protein / enzyme
- Escherichia coli protein / enzyme
- Saccharomyces cerevisiae small molecule
- Yarrowia lipolytica small molecule
- Escherichia coli small molecule

Having now met that goal, the standardizing of such work has enabled the accelerated execution of technical work here at Ginkgo. Technical work that is meeting target cost & timelines while providing high quality, scientifically valid results that are being codified in a manner that can inform future module execution.

Frequently Asked Questions

Q: Why is documentation important?
Good documentation helps to reduce the learning curve for new users during the onboarding process, as well as serves as a single source of truth for developers and stakeholders, enabling them to keep track of project progress, scope, and goals. Well-documented software products can be more easily integrated into larger systems and workflows, reducing costs and increasing efficiency.

Q: What are Cell Development Kits (CDKs)?
CDKs are a set of standardized modules, that include varying types of documentation, which provide a reliable framework for engineering cells, simplifying the design and construction of organisms with specific functionalities.

Q: Reducing costs, what does that look like?
CDKs drive chassis strain reuse, which has been dwindling a project's cost from $9-12M to $3-4M, increasing potential downstream value share from one product to three to four from the same level of platform capacity.

Q: Where can I find a timeline/status for the implementation of CDK technical documentation?
TDP Modules Tracker will keep you updated on the status of CDK technical documentation modules

Q: What is a TDP Module?

TDP Modules are the basic building blocks of CDK-enabled programs. Each module corresponds to a Task in a TDP, comprising at least one complete DBTL loop. They will return a deliverable that meaningfully advances a cell program.

Q: What is a module?
A set of work, with a specific goal/function, involving more than one Foundry Offerings and/or Codebase full-time equivalent (FTE) tasks that advance the progress against a customer deliverable

Q: What is BR1?
BR1, Big Rock 1, is an effort across Ginkgo to standardize how we advance cell programs, for which Cell Development Kits (CDKs) have been identified as a “toolkit” solution

Q: This is a lot of effort focused on Software documentation. Shouldn’t we instead focus on building software that doesn’t need documentation?
The scientists at Ginkgo are doing hard and complex work, and the Ginkgo software provides scientists with the functionality and flexibility to do that work at scale. Software that is flexible enough to accommodate many complex workflows has a learning curve, and while the DT team puts in considerable effort to make the software as user-friendly as possible, the software isn’t always intuitive. In addition, we have a large set of legacy tools that we know are not intuitive to use and cannot be brought up to the usability expectations that we have for new software any time soon. That’s where clear, concise documentation resources are invaluable