Overview
ANALYSIS OPTIONS FOR HIFI DATA

PacBio HiFi sequencing unlocks new insights for applications, ranging from whole-genome variant calling to RNA sequencing and metagenomics. To help you choose the right approach for your application, PacBio provides several supported analysis options, and you can also use third party tools when needed.

PacBio-developed tools offer an excellent analysis experience as they are designed specifically for HiFi data. There are multiple ways to access PacBio analyses.

SMRT® Link A graphical and command line environment that runs on a local server and provides end-to-end workflows for many standard applications.

PacBio workflows Prebuilt workflows hosted on GitHub. These are intended for high performance computing environments and are useful when you want scalable, customizable workflows.

PacBio standalone tools Individual command line tools distributed as precompiled binaries or via Bioconda or Github. These give you the flexibility to build custom pipelines.

Third party tools When there is not a PacBio tool or workflow for your application, there are many third party options compatible with HiFi data.

The table below summarizes recommended options for each application area and shows how SMRT Link workflows, PacBio workflows, PacBio tools, and third-party tools align. It is intended to give new PacBio users, including SMRT Link Cloud users, a quick way to understand what analysis paths are available and where to start.

	SMRT Link* GUI & CLI** workflows	**PacBio workflows** GUI* & CLI workflows	**PacBio tools** CLI tools	**Third party** CLI tools
Installation	SMRT Link is intended for installation on a local server with a Job Management System.	PacBio workflows available on GitHub are intended for HPC installations or SMRT Link Cloud users.	PacBio standalone tools intended for Linux systems and distributed as precompiled binaries or via Bioconda.	Third-party tools* compatible with HiFi data.

Whole genome sequencing

	SMRT Link	PacBio workflows	PacBio tools	Third party
Human genome	Variant Calling, HiFi Mapping (mapping only)	PacBio Human WGS Variant Pipeline[1]	pbmm2, hiphase, trgt, sawfish, pbstarphase, paraphase, pb-cpg-tools, vclust, svtopo, svpack, mitorsaw, paraviewer	minimap2, deepvariant, pharmcat, sniffles2
Human 5mCpG methylation profiling	HiFi Mapping		pbmm2, pb-cpg-tools, methbat	
Chromatin accessibility profiling (Fiber-seq)	HiFi Mapping			fibertools-rs, fiberseq-qc, fire
***De novo* assembly**		PacBio Human Assembly Pipeline		hifiasm
Cancer genomes	HiFi Mapping	HiFi-somatic-WDL	pbmm2, owl, hiphase	deepsomatic, severus, wakhan, chord
Microbial *de novo* assembly	Microbial Genome Analysis			hifiasm, flye
AAV		Long-read AAV Analysis (laava)[2]		

Targeted panels

	SMRT Link	PacBio workflows	PacBio tools	Third party
Amplicon sequencing	Target Enrichment, HiFi Mapping	HiFi-amplicon-workflow	paraphase, pbmm2, pbstarphase	
Hybrid capture	Target Enrichment, HiFi Mapping		paraphase, pbstarphase	
PureTarget™ panels	PureTarget Repeat Expansion, Target Enrichment	PureTarget Carrier Pipeline (PTCP)[1]	trgt, vclust, kivvi	

RNA sequencing*

	SMRT Link	PacBio workflows	PacBio tools	Third party
Kinnex™ full-length RNA sequencing	Read Segmentation and Iso-Seq® Analysis		skera, isoseq, pigeon, pbfusion	sqanti3, isoannot, tappas, bambu, talon, deseq2, isoquant, liqa, stringtie
Kinnex single-cell RNA sequencing	Single-Cell Iso-Seq Analysis, Read Segmentation and Single-Cell Iso-Seq Analysis		skera, isoseq, pigeon	seurat, talon, deseq2, flamesv2, isosceles

Microbial

	SMRT Link	PacBio workflows	PacBio tools	Third party
Shotgun metagenomic profiling		pb-metagenomics-tools		diamond, megan
Shotgun metagenomic assembly + curation		pb-metagenomics-tools		hifiasm-meta, metamdbg, metaflye
Kinnex 16S rRNA	Read Segmentation	HiFi-16S-workflow	skera	dada2, qiime2

* See resource for third party bioinformatics tools for RNA sequencing

* See SMRT Link user guide for more details
** All SMRT Link workflows are executable in the command-line using pbcromwell or cromwell

* Some workflows have GUI implementations in Compatible Partner ecosystems.
1. Available on DNAnexus (GUI & CLI)
2. Available on FormBio (GUI & CLI)

* Commonly used third-party tools. Not a comprehensive list of all third-party tools.

PacBio