

Detail Comparison table of Streamlit, Dash, NiceGUI and Bokeh

FEATURES	STREAMLIT	DASH	NICEGUI	BOKEH
EASE OF USE	Very Easy (Minimal Code)	Moderate (More setup required)	Very Easy (Pythonic and minimal code)	Moderate (More code needed for interactivity)
UI CUSTOMIZATION	Limited (Basic theming, no full CSS)	Highly Customizable (CSS, Bootstrap, External templates)	Simple UI with material components	Not much customizable, good for visualization
INSTALLATION	pip install streamlit	pip install dash	pip install nicegui	pip install bokeh
RUN THE APP	<code>streamlit run app.py</code>	<code>python app.py</code>	<code>python main.py</code>	<code>python main.py</code>
BEST FOR	Quick dashboards & data apps	Interactive data driven apps	Robotics, IoT, UI-heavy apps	Data visualization-heavy applications
BACKEND REQUIRES?	No (works standalone)	Yes (Usually flask/fast API)	Yes (can use flask/ FastAPI)	No (Standalone, but can integrate with Flask)
PERFORMANCE	Moderate (Can be slow for large dataset)	Optimized (Good with large data)	Lightweight	Optimized for high performance visualizations
INTEGRATION	Pandas, Matplotlib, Plotly	Plotly, Pandas, Matplotlib	FastAPI, OpenCV, AI/ML	Pandas, NumPy, SciPy
STATE MANAGEMENT	Limited	Built-in	Simple reactivity	Limited (State management is not native)
SUPPORTS REAL TIME UPDATE?	Via Session state	Via callbacks	Auto updates	Yes (Server-side updates with Tornado)
SUPPORT MULTIPAGES?	No	Yes (dash.pages)	Yes (With routes)	Yes (Through layouts)
MOBILE RESPONSIVENESS	Basic	Good	Good	Basic

DEPLOYMENT	Streamlit Cloud, Docker, Heroku	Dash Enterprise, Docker	Any cloud provider, FastAPI	Bokeh Server, Flask, Cloud
LEARNING CURVE	Very Easy	Moderate (Requires Flask knowledge)	Very Easy	Moderate (Requires understanding of Bokeh concepts)
GITHUB STARS	37k + 🌟	21.9k 🌟	10.7k 🌟	19.6k 🌟
USED BY	680k +	75.5k +	1.4k +	96k +
USE CASES	ML Models, Dashboards, Analytics	Data dashboard, enterprise apps	Finance, real-time visualization	Complex interactive plots and analytics
SCALABILITY	Limited for large app	Good for large apps	Good for production	Good for large data sets
COMMUNITY SUPPORTS?	Strong, fast growing (Active updates)	Large (Used in industry)	Smaller (but growing)	Large, established in scientific computing
SECURITY FEATURES?	Basic (limited authentication)	Advanced auth, role management	(Basic, integrates with FastAPI)	Supports authentication and authorization via Flask
MEMORY USAGE	Moderate (Can be high for large dataset)	Optimized for large data sets	Lightweight	Optimized for handling big data
NATIVE DARK MODE SUPPORT?	Yes (Built in)	No (Requires CSS Styling)	Yes (built-in) support	No
DATABASE CONNECTIVITY	Yes (Supports SQL, Snowflake, Pandas)	Yes (PostgreSQL, MySQL, MongoDB via flask)	Yes (Works with FastAPI/ SQLLite)	Yes (SQLite, PostgreSQL, MongoDB)
NATIVE MOBILE APP SUPPORT?	No (Web based only)	No (Requires React native for mobile)	Yes (Responsive UI, PWA support)	No
PRICING	Free (Open source) + Streamlit Cloud (Paid for deployment)	Free (Open source) + Dash Enterprise (Paid)	Free (Fully open-source)	Free (Fully open-source)

Final Thoughts: Which One Should You Choose?

- ✓ For quick ML & data dashboards: **Streamlit**
- ✓ For enterprise-grade dashboard apps: **Dash**
- ✓ For IoT, robotics, and UI-heavy applications: **NiceGUI**
- ✓ For rich, interactive visualizations and data analytics: **Bokeh**