



INVESTOR
DAY | 2022

GLOBAL TECHNOLOGY

FIRM OVERVIEW

▶ GLOBAL TECHNOLOGY

CONSUMER & COMMUNITY BANKING

INTERNATIONAL CONSUMER GROWTH INITIATIVES

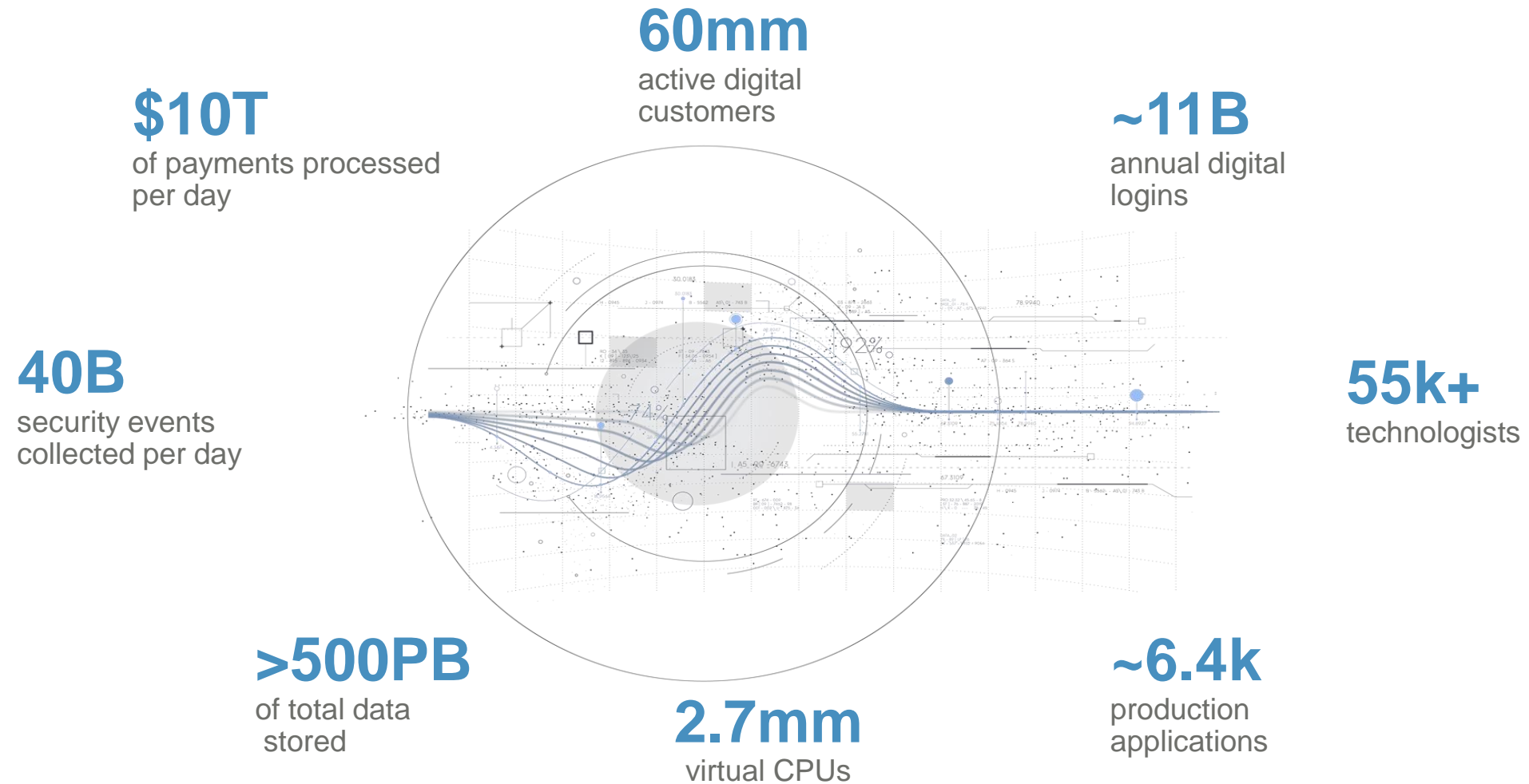
CORPORATE & INVESTMENT BANK

COMMERCIAL BANKING

ASSET & WEALTH MANAGEMENT

JPMORGAN CHASE & Co.

We deliver technology at a global scale



Our technology strategy is aligned to business priorities

1 Deliver best-in-class products, platforms and experiences



Customer and client experiences

- Deliver **differentiated experiences** to all that we serve
- Accelerate **digital transformation** of all business processes



Product and platform development

- Rapidly **release high quality products** to enable new business growth
- Maximize **economies of scope and scale** from strategic platforms

2 Strengthen our software development capabilities and infrastructure



Modernize technology

- Break **monoliths into modular and API-driven** architecture
- Accelerate adoption of **elastic compute** in public and private cloud



Drive software development excellence

- Enable engineers with **best-in-class tools** to maximize productivity
- Bring **engineering closer to the customer** to maximize effectiveness

3 Unlock the power of data



Embed data and insights into everything

- Experiment at scale by making **data rapidly available**
- **Accelerate AI/ML delivery** through model reuse and automated controls

4 Protect the firm and our customers

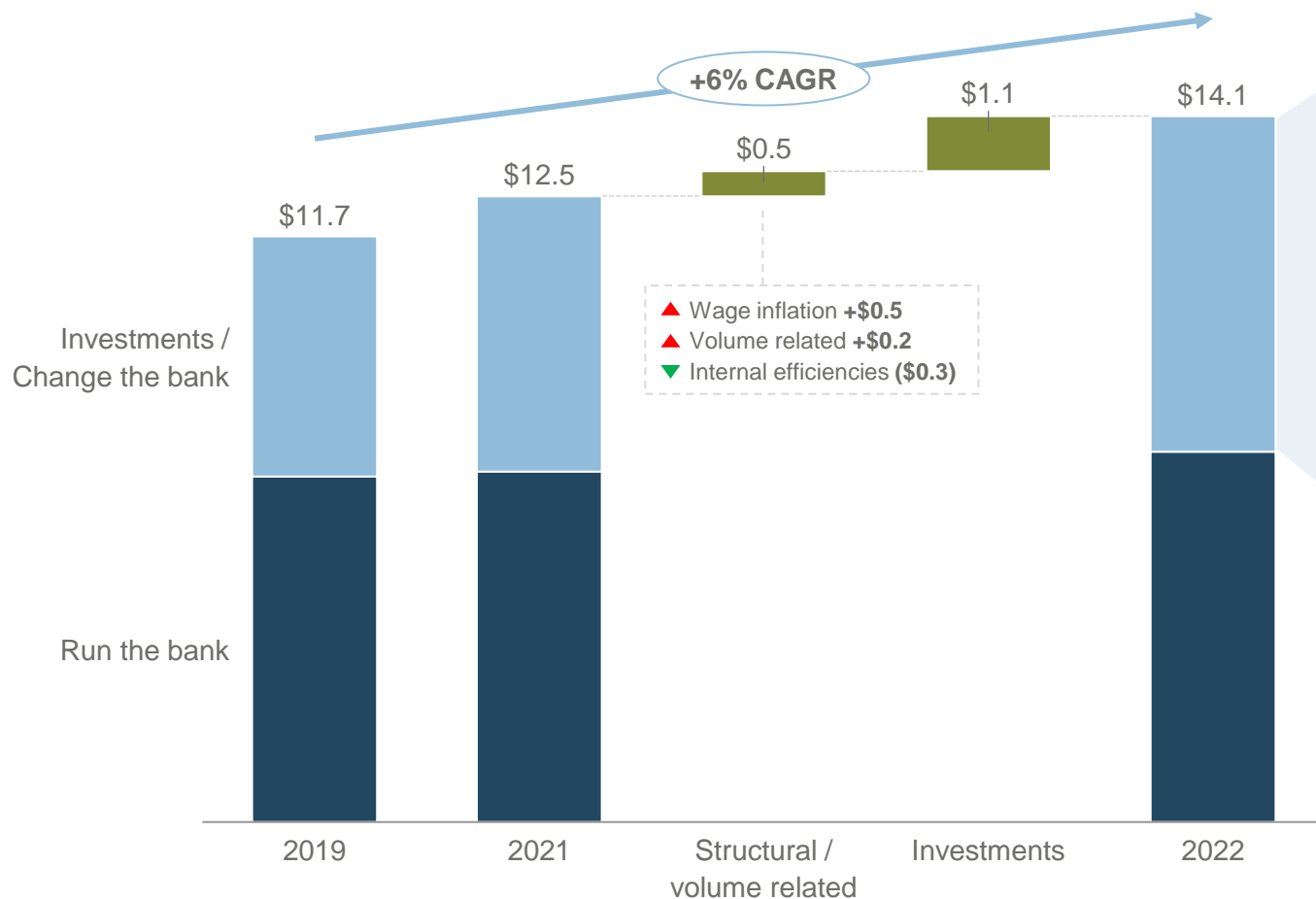


Proactively defend against cyber threats

- **Embed security and privacy** into all our products and platforms
- Develop **seamless controls to reduce friction** around new tech adoption

Our expense growth is driven by investments

Total technology expense (\$B)



Investments by strategy, 2022

Products, platforms and experiences (largely in the business)	\$4.1B
Modernize technology and software development excellence	\$2.6B
Unlock the power of data	
Protect the firm and our customers	

Total

\$6.7B

Fully loaded investments by LOB, 2022

CIB	\$3.1B
CCB	\$2.4B
AWM	\$0.9B
CB	\$0.2B

Total

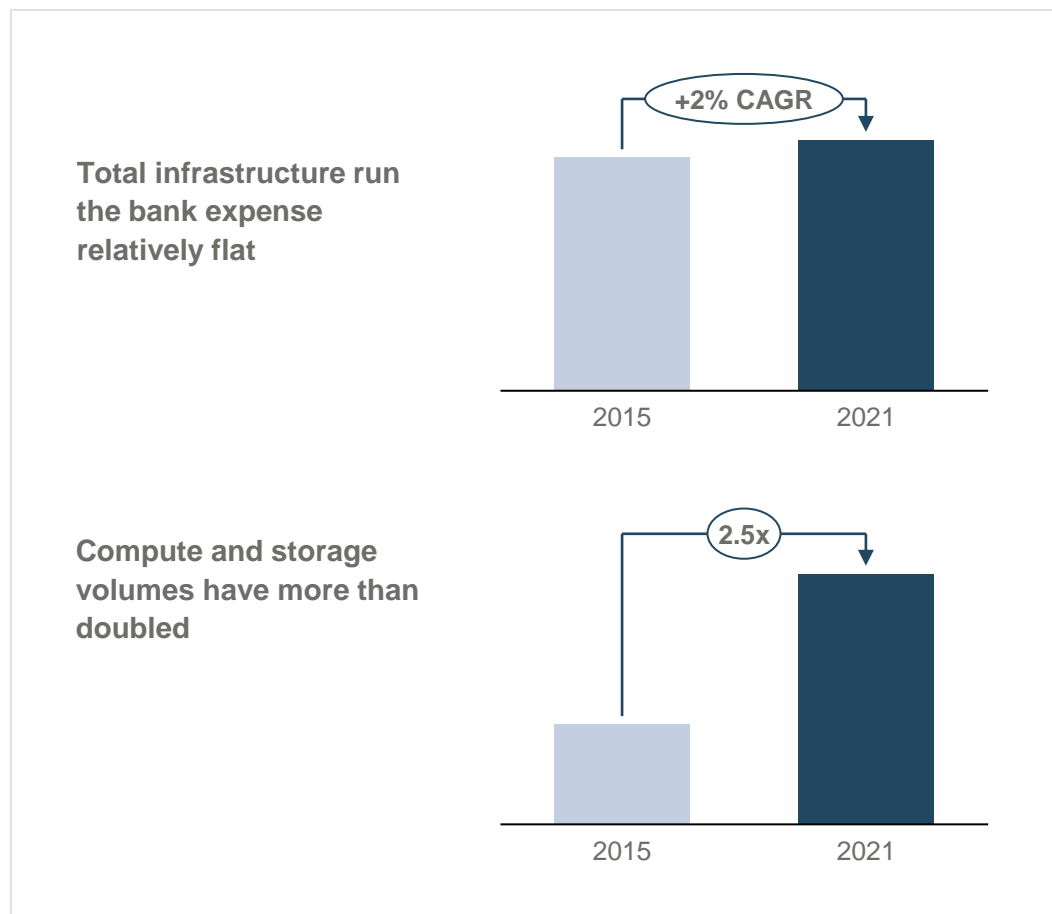
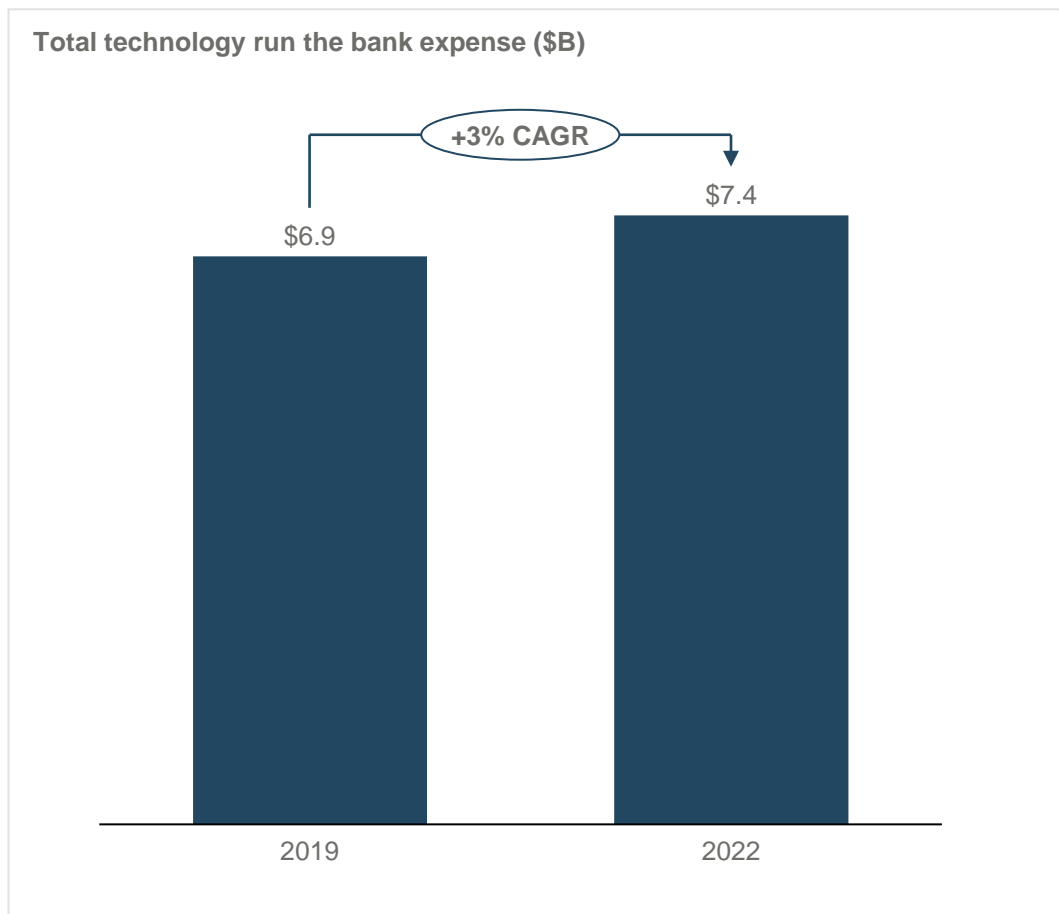
\$6.7B

Run the bank includes

- Infrastructure
- Software licenses
- Application and production support

Note: Totals may not sum due to rounding

We have held run the bank expense relatively flat, while volumes have doubled



Our \$4.1B investment across the businesses will directly drive returns



Customer and client experiences

Product and platform development

Select examples

Consumer & Community Bank

- **Chase.com and mobile app** that engage our 60mm digitally active customers
- **Leads, customer insights and scripting** for our bankers, advisors and relationship managers

- **Consumer and Small Business Payments platform** supporting \$5T of annual payments volume
- **Personalization engine** that powers one-to-one personalized experiences across our channels

Corporate & Investment Bank

- **eTrading platform** to support clients with the ongoing growth of electronic execution
- **E-commerce capabilities** (Wallet, Express Checkout, Embedded Banking) to focus on Marketplaces and SMB

- **Real-time and faster payment** capabilities deployed to clients globally by Graphite
- **Glass platform** to provide liquidity and account services such as wallet, virtual accounts, sweeps and pooling

Asset & Wealth Management

- **AM Morgan Suite** enabling \$1T+ in digital / self-service transactions

- New **PB advisor tools** for client prospecting and solutions recommendations

Commercial Bank

- **Best-in-class sales enablement** tools and data analytics for bankers
- **Middle Office workflow automation**, cycle time improvements and lower cost to serve

- Comprehensive **payments solutions** for our real estate clients
- Cloud based, client-focused **data platform**

2 Strengthen our software development capabilities and infrastructure

We are modernizing our infrastructure and applications to increase speed, resiliency and drive cost efficiency

Strengthening our technology foundation...

Application Modernization

- **Refactor** applications to optimize **cloud adoption** (public & private)
- **Replace** applications with industry-leading SaaS solutions
- **Build** cloud-native core banking systems
- **Decommission** redundant applications, **2,200** complete

Infrastructure Modernization

- Enable **multi-cloud strategy** to access best capabilities and mitigate lock-in risk
 - Built **highly secure** private cloud platform
 - Enabled one **public cloud** provider, two more in progress
 - **30%+** of total infrastructure spend is in cloud (~50% incl. virtual servers)
- Optimize current footprint, consolidating from **33 to 17** global data centers by 2025



While delivering value...

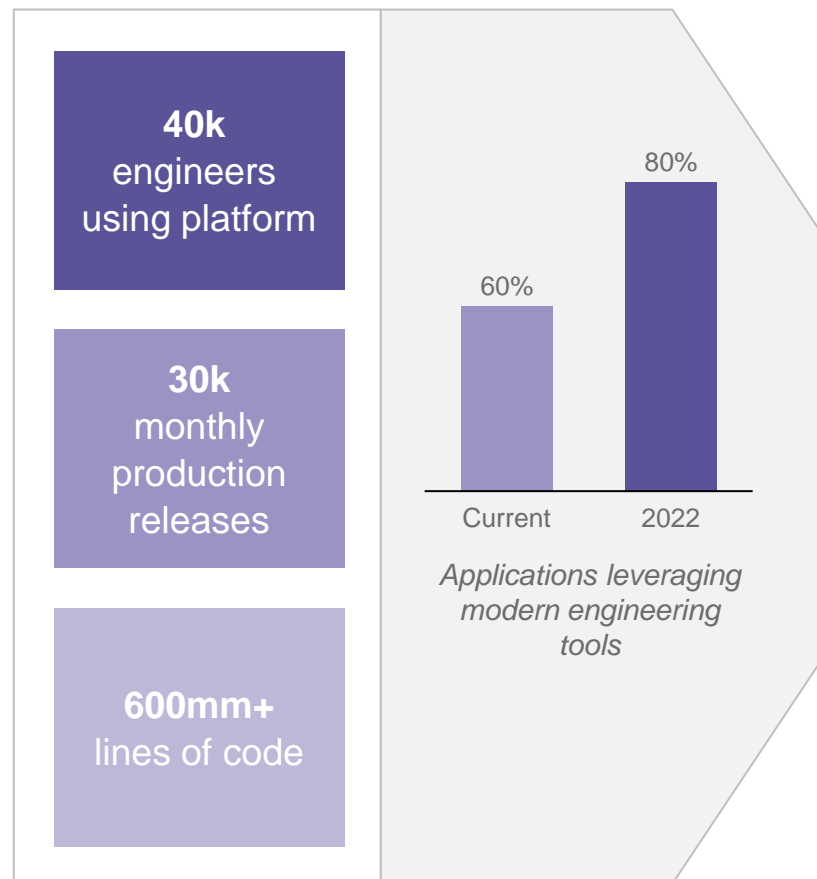
On-demand infrastructure capacity

>95% Reduction in hardware provisioning time





15-20% Infrastructure cost efficiency

Our software delivery tools drive productivity and speed to market


Automate and streamline software delivery



Platform capabilities...

	Engineer Enablement	Best-in-class capabilities (e.g., ML for improved code quality)
	Speed of Controls	Automation of security and quality controls to reduce risk
	Operational Excellence	Predictive analytics for build success rates and testing sufficiency
	Ease of Integration	Flexibility to integrate new tools as ecosystem evolves

... to achieve business outcomes



20%
Faster delivery of product features
~10%
Improved engineer productivity

Three examples that demonstrate the value we have realized



Price, Trade & Risk Platform

Foundation of our Markets business completing billions of risk calculations daily

Refactored monolithic application to **modern cloud-native platform** to provide capacity on-demand

30% reduction in risk calculation times

~80% reduction in calculation cost per hour

Autonomously expand compute footprint from 0 to 14k then back to 0 to adapt to market demand



Chase.com Migration

Serving all digital customers with continuous feature enhancements, security and 24x7 availability

Refactored to **multi-cloud architecture** to enable performance, speed of feature delivery and automation

>99.99% availability with automatic failover

>50% reduction in runtime costs

100% customers supported by 2022YE



ServiceNow Adoption

Firmwide platform delivering digital workflows and unlocking enterprise efficiencies

Rationalized 24 applications with **industry leading SaaS platform** to replace non-modern systems and increase productivity

Nearly **\$50mm in savings** since 2019

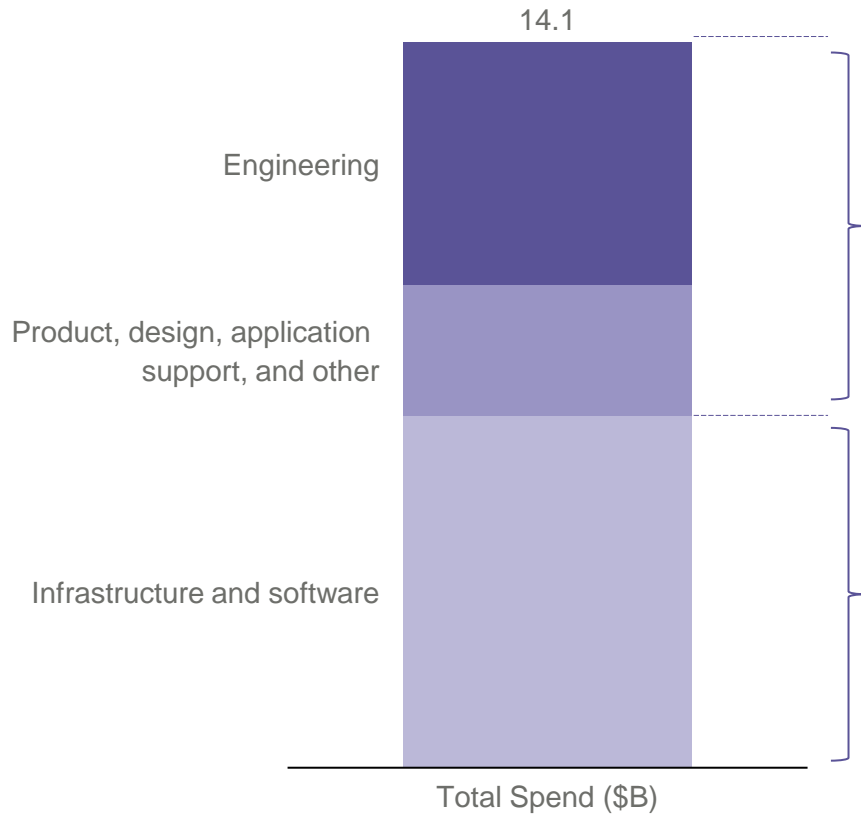
Single **largest collection of integrated reference data** for the firm

80% increase in employee experience when ordering workplace technology services

2 Strengthen our software development capabilities and infrastructure

Modernizing technology and software development excellence will drive cost efficiency across the total spend and slow our expense growth

Total spend breakdown



Opportunity levers

Software development excellence

- Improve engineer capacity through agile adoption and elimination of non-value adding activities
- High levels of automation (testing, release, production support) and streamlined software delivery through our platforms

Modernize technology

- Increase utilization of cloud and reduce data center footprint
- Break monolithic applications into modular and API-driven architecture to improve cost elasticity

Opportunity size

~10%

in productivity and cost efficiency

15-20%

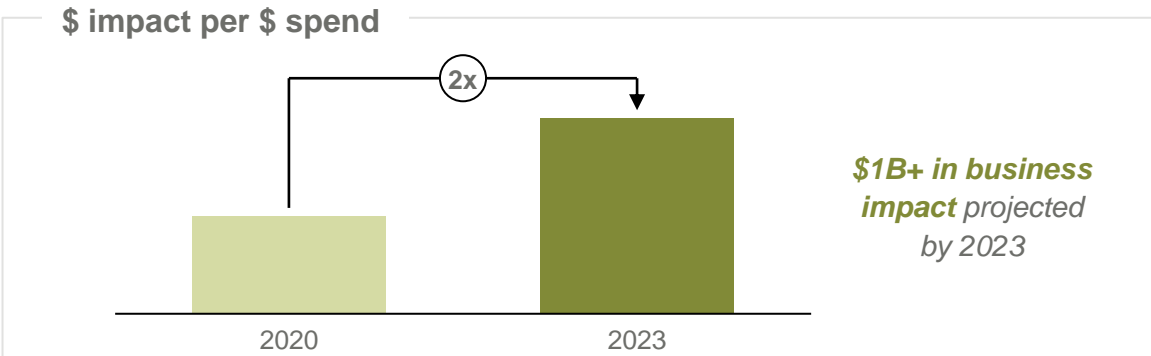
in infrastructure cost efficiency

~\$1.5B

in productivity and cost efficiencies over the next 3 years

Our AI platforms will drive speed-to-market and enable adoption at scale

We are seeing high impact from our AI investments



Select examples

Equities Trading (Flow Trader)

Utilizing AI to deliver faster quotes to clients



Quote Time

Up to **80%** time improvement

Fraud Risk Modelling

Identifying fraudulent transactions with AI to reduce losses



Fraud Losses

\$100mm reduction since 2017¹

¹Volumes up 50% in the same time period

Build strategic platforms and empower our 1,000+ data scientists

We are addressing the two biggest challenges in delivering AI at scale...

Data Management Lifecycle

Make data available at speed and at scale

- Manage data-as-a-product to make it easier to consume and combine with other data
- Move data to public cloud for greater scale and elasticity

Majority of firmwide analytical data available in **real time**

AI Model Lifecycle

Improve data scientist productivity and speed

- Dedicated training data management platform
- Reduce friction in model development process
- Fit-for-purpose policies and controls

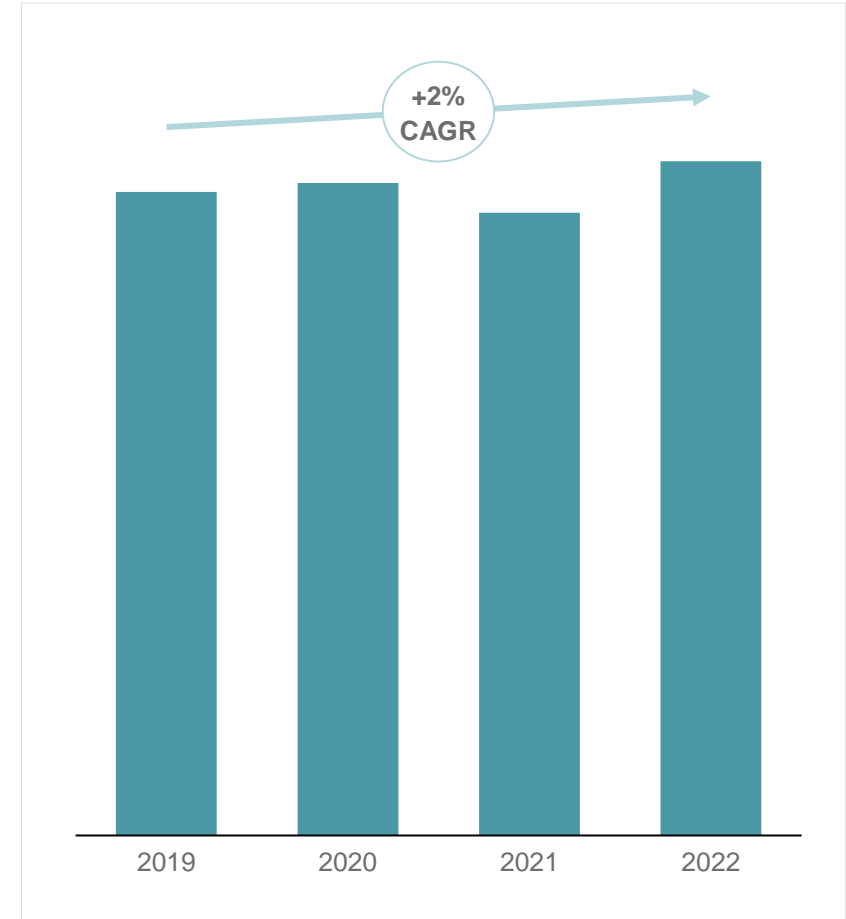
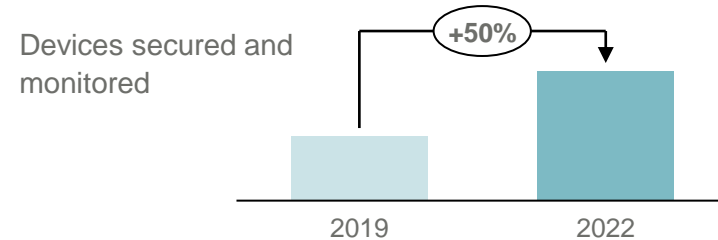
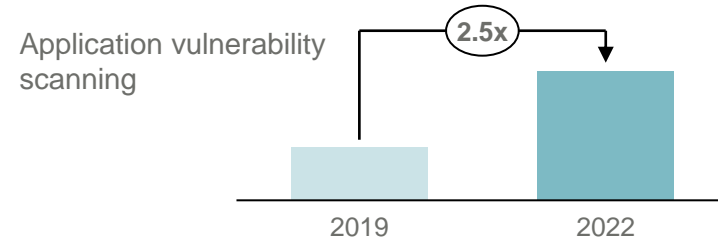
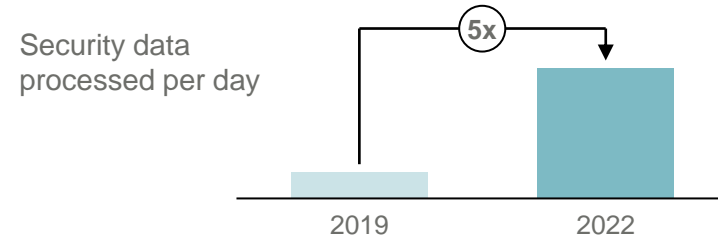
70% faster model speed-to-market

4 Protect the firm and our customers

We have maintained consistent cybersecurity investment through a dynamic threat and regulatory environment

Investments in controls and automation... enabled us to support increased volume / growth ... while maintaining steady cybersecurity spend (\$mm)

- **Dynamic global cybersecurity defense** to anticipate and prevent threats and prioritize incremental investment
- **Maintain cybersecurity posture and trust** against evolving technology and business demand
- **Deliver security-as-a-feature** by enhancing security, privacy and fraud capabilities within our products
- **Remove friction** through sustainable control patterns and automation
- **Proactively adapt** with evolving public policy, regulation and ecosystem changes



We are well positioned to differentiate ourselves with technology

1

Deliver best-in-class products and experiences to customers



Positive \$ return in business value

Share gain and revenue growth through innovative solutions

2

Strengthen our software development capabilities and infrastructure



~\$1.5B in productivity and cost efficiencies over 3 years

20% faster delivery of product features

3

Unlock the power of data



>\$1B in business impact

70% faster delivery of production AI models

4

Protect the firm and our customers



Faster response to new threats

Secure and private by design