

INVESTOR  
DAY | 2023

# GLOBAL TECHNOLOGY

Firm Overview

► Global Technology

Consumer & Community Banking

Corporate & Investment Bank

Commercial Banking

Asset & Wealth Management

JPMORGAN CHASE & CO.

# We continue to execute against our technology strategy

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



Customer and client experiences

Product and platform development

- Continued to release new products and experiences that delight our customers:
  - **Account validation:** custom-built engine that validates bank accounts to protect customers
  - **Cash optimization:** enable utilization of residual cash to generate alpha
  - **Connected Commerce:** ecosystem of products connected via reusable APIs
  - **Fusion:** cloud-native data management and reporting platform
  - **Versana:** reduce settlement times and improve liquidity management for syndicated loan market

## 2 Strengthen our development capabilities and infrastructure



Modernize technology

Drive software development excellence

- Improved **speed-to-market of product features** by 20% (in days)
- Continued **application modernization** through refactoring, SaaS replacement, and legacy decommissioning
- Enabled **multi-vendor public cloud** as target state infrastructure
- Completed ~60% of our **application migrations** to strategic data centers
- Optimized **data center footprint** to facilitate public cloud journey

## 3 Unlock the power of data



Embed data and insights into everything

- Ahead of our plan to deliver **\$1B business value**
- **+34%** YoY growth in AI/ML use cases in production
- Accelerated **large-language-model (LLM) enablement**

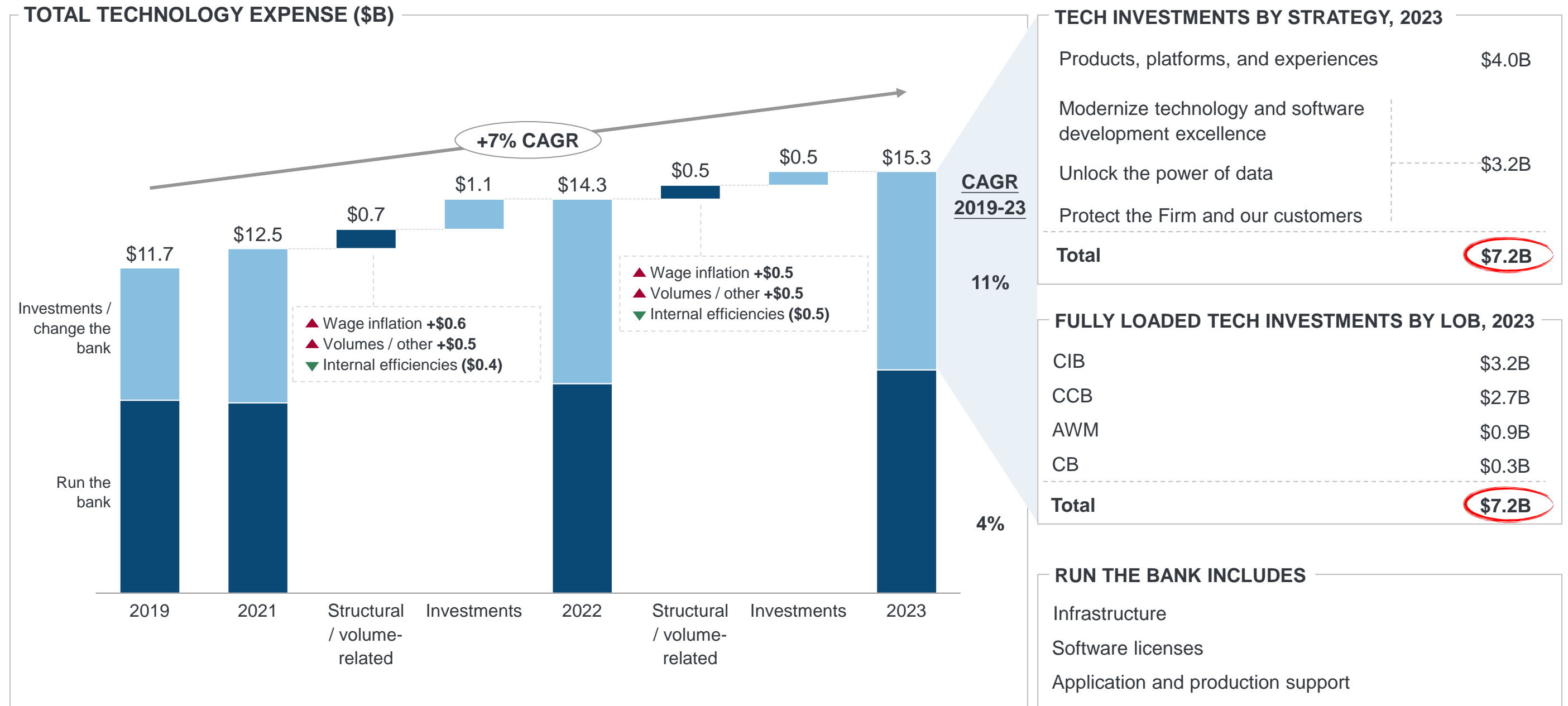
## 4 Protect the Firm and our customers



Proactively defend against cyber threats

- **Matured ability** to respond to new threats, including quantum safe encryption
- Delivered business value through **cyber as a differentiator**
- Maintained **flat expense** relative to volume increases

# Our expense growth is driven by investments, volumes, and structural factors



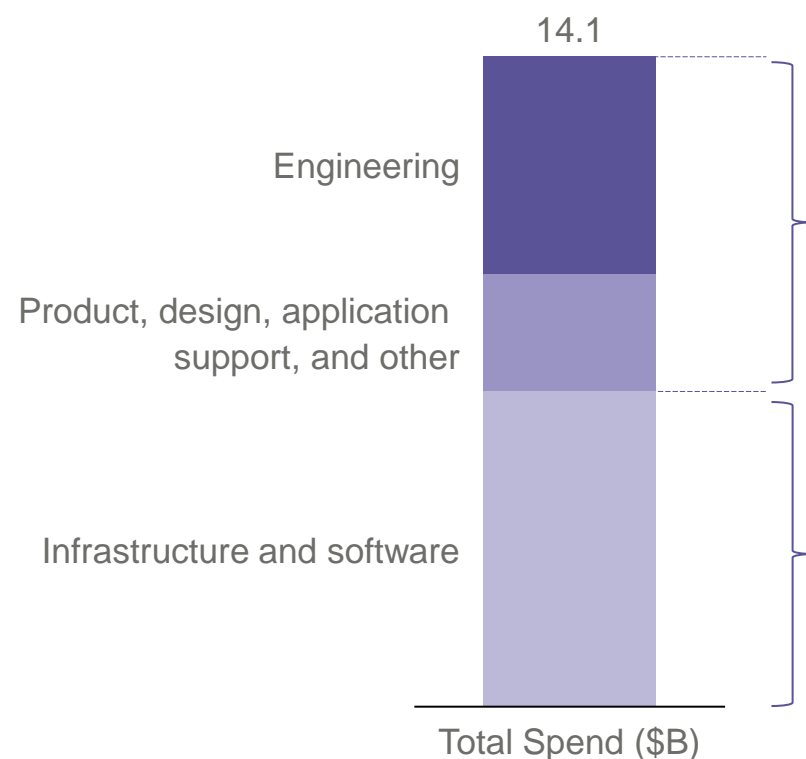
Note that totals may not sum due to rounding

We have delivered \$0.5B against our \$1.5B productivity target

**OUR 3-YEAR COMMITMENT FROM INVESTOR DAY 2022**

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

**PROGRESS WE'VE MADE**

**~\$300mm**

through engineering efficiencies and labor productivity



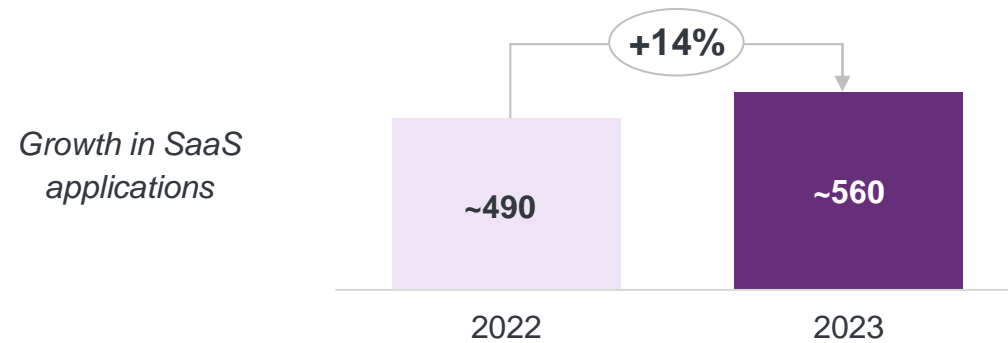
**~\$200mm**

in infrastructure productivity

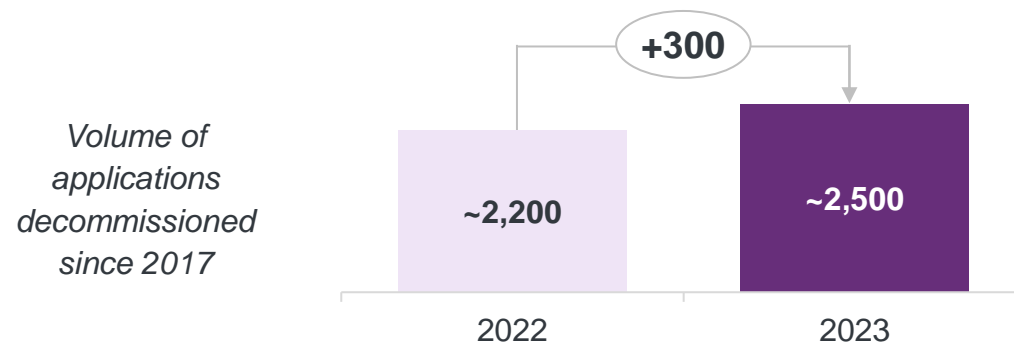
We continue to modernize our technology estate while keeping infrastructure RTB expense relatively flat

WE'VE MADE SIGNIFICANT PROGRESS IN MODERNIZING APPLICATIONS...

- We have **increased SaaS adoption** to replace non-differentiating applications with industry-leading SaaS solutions



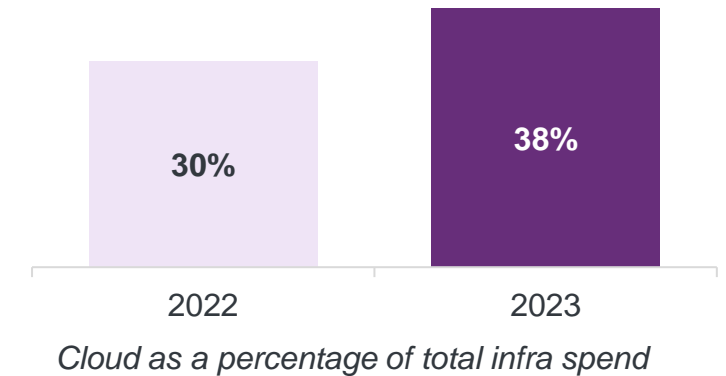
- And we have continued our **legacy application decommissioning journey**



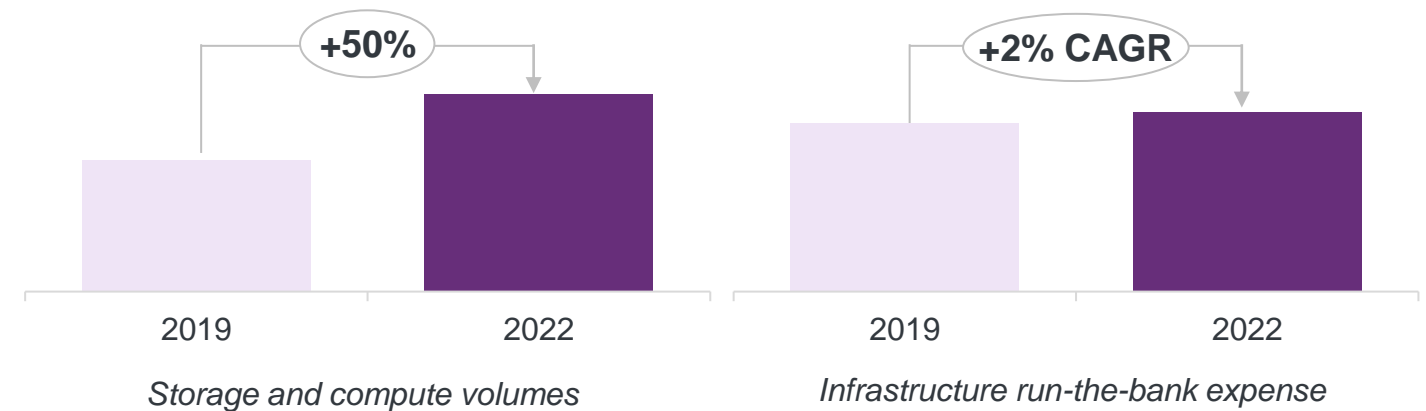
...WHILE MODERNIZING OUR INFRASTRUCTURE & SUPPORTING GROWING VOLUMES

- In the last year, we have been **modernizing our on-premise infrastructure and growing cloud use**

**~60%**  
of in-scope applications  
have fully migrated to our  
modern data centers

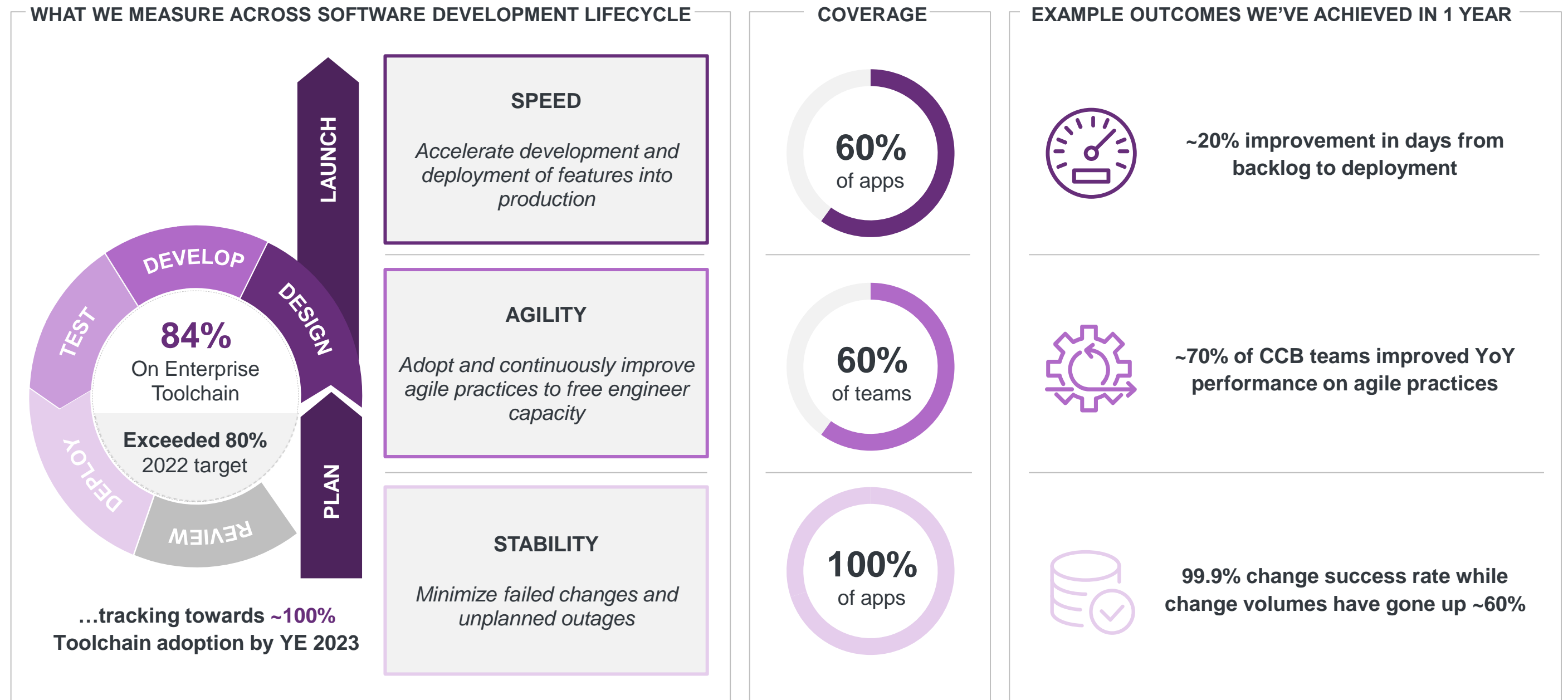


- Over time, this has resulted in our **infrastructure run-the-bank expense remaining relatively flat while our volumes have increased**




## 2 Strengthen our software development capabilities and infrastructure

We've made progress on technology modernization and engineering excellence to drive efficiencies in feature delivery and slow our expense growth




# Our modernization strategy is enabling us to deliver significant value across the business




### Chase.com

Completed **migration** of internet-facing Chase.com to the **public cloud** in 4Q22, serving all customers through **Amazon Web Services**


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 **15 Chase.com** releases weekly, **2 mobile app** releases monthly

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 **22% increase** in change volume

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 **100%** customers onboarded (including 63mm+ active digital customers)




### Connected Commerce

Moving up-funnel to meet customers earlier in their journeys, **protecting our core franchise, and disrupting incumbents** in Commerce


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 **Innovative API-driven platform** to automate partner onboarding and simplify integration with Chase ecosystem

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 **35% increase** in speed to deliver product features YoY

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 Offers and recommendations delivered **\$350mm impact over two months** in 2023




### JPM Payments Transaction Engine

Graphite is a scalable, modern strategic platform for **processing payments globally**, including real-time payments


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 Each payment capability built with its **own independent component architecture**

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 Reduced time to launch a new real-time payment market from **~18 months to ~3-6 months**

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 **Third largest** payments platform by volume




### Markets Regulatory Reporting Platform

Regulatory data warehouse responsible for global regulatory reporting for **Cash Equities, Futures, and Options in 15+ countries**


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 Running on **public cloud**, enabling **real-time** audit trail calculation and report generation

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 Increased ability to scale to **2.5B trades per day on public cloud** from 500mm trades per day on-premise

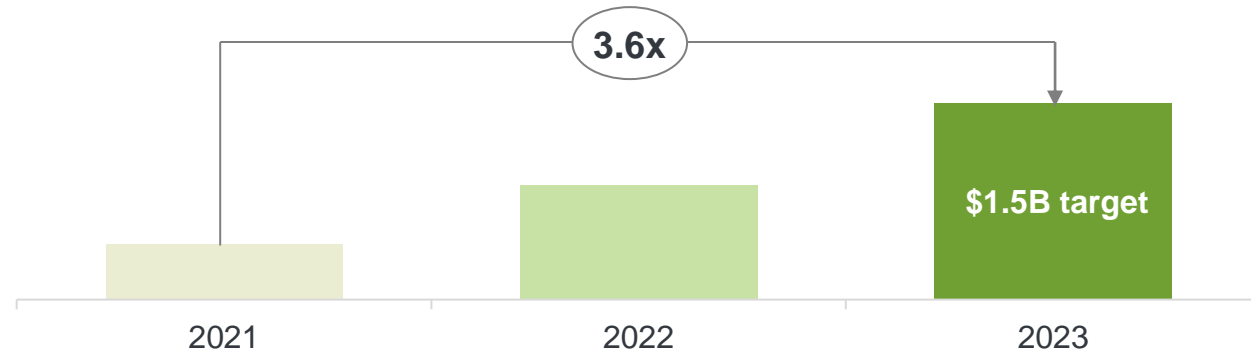
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 Reduced monthly running cost by **>50%**

# We continue to prioritize our investment in Data and AI/ML, and see increasing value in our businesses

## WE EXPECT TO BEAT OUR AI/ML IMPACT TARGETS

### AI/ML driven business impact



### Select thematic examples across our 300+ use cases in production



**Personalization of products and experiences for retail customers**

~25 use cases  
~\$220mm impact in 2022



**Deepening client relationships through improved analytics and insights**

~60 use cases  
~\$100mm impact in 2022

## CONTINUING TO ACCELERATE THE POWER OF OUR DATA AND AI/ML

### Building an industry-leading team

**900+**  
data scientists

**600+**  
ML engineers

**200+**  
AI researchers

**Ranked #1**  
Evident AI Index<sup>1</sup>

### Expanding our technology platforms

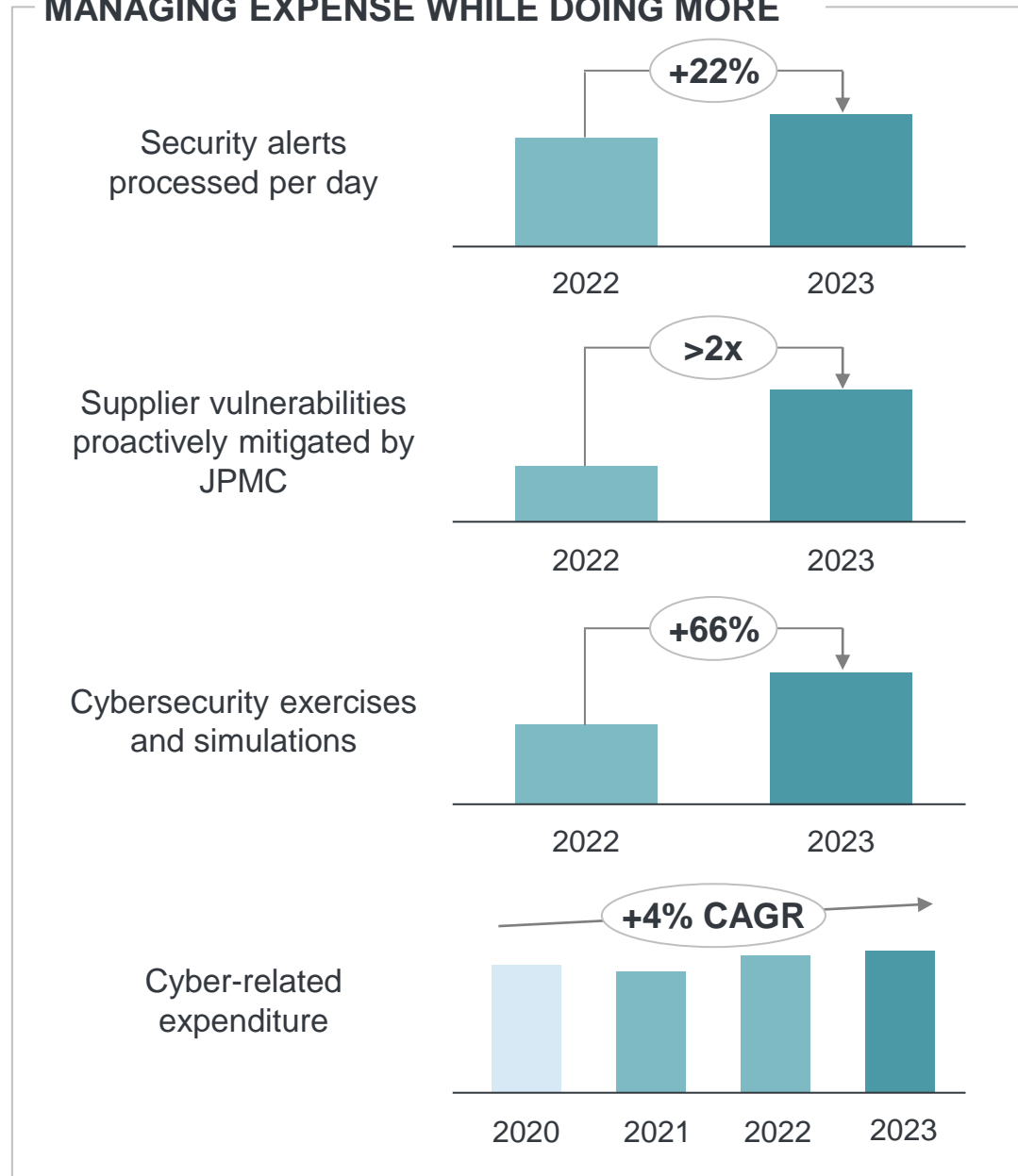
- Improving capabilities, with embedded governance and Responsible AI
- Integrating ML Ops capability to support teams to develop models faster and measure performance
- Increased use cases leveraging firmwide model development and training platform by 2.2x YoY

<sup>1</sup> JPMC ranked number one in the Evident AI Index (January 2023), the first public benchmark of major banks on their AI maturity



# We continue to evolve our best-in-class Cyber capabilities through a dynamic threat environment

## MANAGING EXPENSE WHILE DOING MORE



## CREATING VALUE WHILE PROTECTING THE FIRM AND FINANCIAL SERVICES INDUSTRY CRITICAL INFRASTRUCTURE



**Further strengthening access and authentication**, improving user experience while lowering the burden of managing passwords



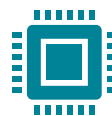
**Automating security controls** by default in development, data, and infrastructure platforms, **reducing the number of required developer actions by over 60%**



**Reduced required actions and introduced straight-through-processing** for cloud regulatory compliance resulting in **automated approval for over 60% of deployments**



**Advising U.S. Government and policy makers** to improve public-private partnership and enhance cybersecurity for critical infrastructure



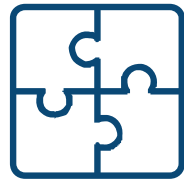
**Engaging with NIST<sup>1</sup>** as a financial services member of the National Cybersecurity Center of Excellence and collaborating on post-quantum cryptography migration guidelines

<sup>1</sup> National Institute of Standards and Technology

We are well positioned to lead across our businesses, backed by resilient, innovative technology, for years to come

1

**Deliver best-in-class products and experiences to customers**



Continued to release new products and experiences that **delight our customers**

2

**Strengthen our software development capabilities and infrastructure**



Improved **speed-to-market of product features** by 20%

**\$0.5B** productivity impact delivered against **\$1.5B target**

**~100%** Enterprise Toolchain adoption by year-end

3

**Unlock the power of data**



Ahead of our plan to deliver **\$1B business value**

**300+** use cases in production

**\$1.5B** value target to be delivered by year-end 2023

4

**Protect the Firm and our customers**



Creating value while **protecting our Firm and customers**

**Optimizing our expense** while volumes increase