Operational Briefing
Presentation to Investors and Analysts
6 February 2018
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Unless otherwise specified all information is as at 31 December 2017.
Technology
Please visit the following link to view:
macq.co/technology
Macquarie’s Technology capability

### Corporate and Asset Finance
- **MiRA**: automating data collection and analytics from portfolio companies to streamline reporting and improve portfolio company oversight.
- **MIM**: investing in real-time, global portfolio management and risk management platform.

### Banking and Financial Services
- **Asset Finance**: investing in market-leading platforms to create an engaging and seamless customer journey.
- **Principal Finance**: provides flexible primary financing solutions and engages in secondary market investing, across the capital structure.

### Banking Offering
- **Best Digital Banking Offering**: invested in a real-time core banking platform for loans and retail deposits.
- **Most Innovative Card Product**: built Australia’s first open banking platform to give customers control over their own data and the power to manage how they want to share it.

### Commodities and Global Markets
- **Global institutional securities house**: including deep quantitative expertise in machine learning and AI, gaining insights from complex data sets.
- **Investment in electronic execution/DMA systems**: support innovative digital banking solutions for our customers with the launch of ApplePay and AndroidPay.

### Macquarie Capital
- **Dedicated global team**: providing advisory and capital raising services.
- **Work with entrepreneurs**: to provide capital and advice to grow their business, including the creation of platforms through subsequent acquisitions.

### Summary
- **Relying on technology for better investing, operational processes and investor engagement**.
- **Secured debt software financing by CAF Principal Finance**.
- **Investment in people and culture**: creating opportunities to continue to grow and develop.
- **Business-focused strategy**: benefits from close alignment with technology specialists.
- **Deep expertise in technology**: allows the adoption of new and disruptive technologies.
- **Open API architecture**: connecting our platforms.
- **Cloud-first strategy**: supports agility, scalability and efficiency.
- **Partner with entrepreneurs**: with a focus on long-term relationships.

### Technology capability

<table>
<thead>
<tr>
<th>MACQUARIE ASSET MANAGEMENT</th>
<th>CORPORATE AND ASSET FINANCE</th>
<th>BANKING AND FINANCIAL SERVICES</th>
<th>COMMODITIES AND GLOBAL MARKETS</th>
<th>MACQUARIE CAPITAL</th>
</tr>
</thead>
<tbody>
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**Relying on technology for better investing, operational processes and investor engagement.**

**$465m** Secured debt software financing by CAF Principal Finance.

**Best Digital Banking Offering**: invested in a real-time core banking platform for loans and retail deposits.

**Most Innovative Card Product**: built Australia’s first open banking platform to give customers control over their own data and the power to manage how they want to share it.

**420+ stocks under coverage globally in Telecoms, Media and Technology; by 45+ analysts**.

**$1b+ invested in technology companies since 2000**.

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Investing in our people and platforms, and partnering with entrepreneurs

**Investing in workplace**
- Award winning workplace experience at 50 Martin Place
- Enterprise social networking
- Office 365
- Workplace by Facebook
- Web-based video conferencing

**Investment in people and capability**
- New leadership program
- New BFS Chief Digital Officer
- Enhanced cyber security capabilities
- New CIO
- Appointed Chief Data Officer
- First Macquarie Technology Conference
- New Head of Networks
- Emerging Technology Advisory Service (ETAS)
- Agile and DevOps
- New Head of CMM Technology and CIO EMEA

**Investment in core infrastructure**
- Cloud-first strategy
- Private Cloud (Asia)
- Public Cloud (Global)
- Hong Kong Data Centre exit
- Network Transformation Program
- Private Cloud (Australia)
- Private Cloud (Americas and EMEA)

**Investing in platforms**
- BFS Wrap since ’99
- BFS Core Banking platform
- CGM Global oil platform
- BFS & CAF API enabled technology
- CGM Front office strategic technology program
- CAF MotoMe
- CAF UK origination portal
- CAF Smart meters (UK) and car trackers (Australia)
- BFS Macquarie Vision platform
- BFS Transaction and Savings accounts
- BFS New digital banking experience
- CAF Introducer Assistant
- BFS Natural language recognition
- BFS Apple Pay and Android Pay
- MAM
- Technology simplification via global platform strategy

**Partnering with entrepreneurs (since ’95)**
- Formation of Corporate Operations Group
- New BFS Chief Digital Officer
- New CIO
- First Macquarie Technology Conference
- New Head of Networks
- Emerging Technology Advisory Service (ETAS)
- Agile and DevOps
- New Head of CMM Technology and CIO EMEA
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- MAM
- Technology simplification via global platform strategy
Case study: Operating Groups are supported and enabled by the Corporate Operations Group

Corporate Operations Group manages Macquarie’s core infrastructure, designs, develops and supports applications and services and provides strategic leadership on disruptive technology opportunities.

**CORE INFRASTRUCTURE AND WORKPLACE**

- **36%** servers running in the Cloud
- Workplace by Facebook for enterprise social networking
- **13.5k** users migrated to Office 365
- Network transformation and next generation firewalls

**APPLICATIONS AND SERVICES**

- **99.9%** platform availability
- DevOps and Agile
- Open API architecture

**PEOPLE AND LEADERSHIP**

- Cyber Awareness educating staff about security threats
- Inspiring staff through the Macquarie Technology Conference
- ETAS - Specialist knowledge in emerging technologies
- Investing in professional and technical skills

Digital transformation

- MuniMo
- Introducer Assistant
- I bank with Macquarie
- DEFT
Case study

Core strengths in Technology

- **Business-focused strategy** benefits from close alignment with technology specialists
- **Open API architecture** connecting our platforms
- **Deep expertise in technology** allows the adoption of new and disruptive technologies
- **Cloud-first strategy** supports agility, scalability and efficiency

Creating an engaging and seamless customer journey

**MotoMe platform**
- A car buying and financing ecosystem, connecting digital, social and physical environments

**Origination portals in Australia and EMEA**
- Market leading technology platforms, enabling operational efficiency and continued growth through increased market access and service differentiation

**Automated credit decisions**
- Increasing productivity and efficiency, and optimising the customer experience
### Case study

#### Core strengths in Technology

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#### Digital Banking

**Leading digital banking** experience with features that are firsts in Australian banking including client push notifications and natural language search

**Datastax**
The same technology as Netflix and Facebook

**First Australian bank** to have implemented leading API-enabled systems architecture using OpenShift technology from Redhat

**Rebuilt our technology stack** and are the first to offer lending and retail deposits on one core banking system

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#### BFS: Digital Banking

**More than 1.1 million** Australian clients

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#### Open Banking

Australia’s first open banking platform giving customers control over their own data

#### Intermediaries / partnerships

Facilitating customisable experiences that incorporate banking capability for our partners (Woolworths Money, mortgages)

#### Platform

Significant investment in platforms as a key part of our business and growth moving forward (Wrap, DEFT)

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#### Financials

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funds on platform</td>
<td>$A85.3b</td>
</tr>
<tr>
<td>Australian mortgage portfolio</td>
<td>$A31.2b</td>
</tr>
<tr>
<td>Total BFS deposits</td>
<td>$A46.3b</td>
</tr>
<tr>
<td>Business banking loan portfolio</td>
<td>$A7.2b</td>
</tr>
</tbody>
</table>

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1. Funds on platform includes Macquarie Wrap and Vision.
2. BFS deposits exclude corporate/wholesale deposits.
Case study

Core strengths in Technology

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**Electronic execution platform** provides a seamless client experience with 24/6 trading coverage

Partnering with clients located around the world to help them achieve their global trading objectives through a comprehensive suite of algorithms, tools and investment analytics utilising big data and cloud computing.

The platform enables clients to access over 100 liquidity venues in 50 countries through an intuitive global interface.

Algorithms are designed with a deep understanding of global market microstructures and includes regional and market specific optimisation.

This technology is complemented with local market insight from our regional trading desks located in 23 countries.

**The cost to provide innovative services to clients is declining as volumes increase**

+22% increase in transactions year on year¹

-23% decline in total technology costs per transaction²

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1. FY18 YTD and annualised compared to FY17 transaction volumes for CGM. 2. Total technology and market operations costs for CGM, with FY18 data annualised compared to FY17. Total technology costs include costs attributable to pre-trade activity and exclude project-related technology expenses and support services.
Case study

Core strengths in Technology

Business-focused strategy benefits from close alignment with technology specialists

Partner with entrepreneurs with a focus on long-term relationships

Deep expertise in technology allows the adoption of new and disruptive technologies

Supported PEXA since 2012 including providing significant investment funds in its initial funding round

- Supported company formation and initial business planning process in 2011
- Provided the first external venture capital in 2012 and continued to follow on in subsequent funding rounds
- Investment was underpinned by a deep, long term relationship with the PEXA founding CEO, together with many years of experience investing in property data and consumer credit data businesses
- Macquarie’s retail and business bank were early adopters of the PEXA platform
- Operating in 5 Australian States which together represent over 90% of all Land Registry transactions in Australia by volume¹
- 112 financial institutions are engaged representing in excess of 90% of all Land Registry transactions by volume²

MacCap: PEXA

MacCap has supported Nuix, an Australian software company that allows organisations to pinpoint critical information to act on cybersecurity, risk and compliance threats

- First invested in Nuix in 2011 and has also provided financing in subsequent investment rounds
- Nuix, founded in 2000, is now recognised as a global leader in delivering solutions to address the key challenges, risks and opportunities associated with the growth and complexity of data
- Leveraged its extensive experience as an investor in adjacent data-focused software businesses to provide support to the Nuix team
- Nuix today has over 1,800 customers in 70 countries
- Customers include major financial regulators, law enforcement agencies, global corporations, intelligence agencies, the United Nations, and all leading advisory firms and litigation support vendors

¹ Land Registries; PEXA analysis. ² Based on lending commitment volumes (APRA).
What’s next?

MACQUARIE ASSET MANAGEMENT

Further leveraging data and analytics in portfolio management to identify new sources of alpha generation

Leveraging technology within operating assets to drive performance and unlock trends across portfolio of 138 portfolio businesses, ~300 properties and ~4.5m hectares of farmland

Enhancing client experience through technology-enabled interactions

Automating middle and back office processes

COMMODITIES AND GLOBAL MARKETS

Global trade digitalisation: as supply chains become more efficient, 5% increase in world wide GDP and 15% increase in total trade volume; well positioned to find growth in commodity markets

Digital relationships: increased sophistication of electronic execution and research platforms for clients

Internet of things: optimised commodity trading in CGM will be based on IoT data streams

Deep market insight and intellectual property: continue to be at the forefront of investment thematics for next generation technology including machine learning, AI and IoT

CORPORATE AND ASSET FINANCE

Use of technology to enhance customer purchase, including online choice (virtual reality)

Development of vehicle fleet products (including pay per ride) to facilitate driverless and shared vehicles

• Electric vehicles will account for ~50% of vehicle sales by 2030

Big data opportunity to gain insights into customer behaviour and understanding the asset and asset lifecycle

• Volume of business data worldwide doubles every 1.2 years

MACQUARIE CAPITAL

Continue to work with entrepreneurs in the technology sector to support long term growth through advisory services

Investing in opportunities in the infra-tech space to take advantage of crossover with strong infrastructure business

Recently acquired a 50% stake in environmental monitoring business EMS B&K, a global leader in real time, continuous environmental monitoring for infrastructure, resources, smart cities and industrial customers

CORPORATE OPERATIONS GROUP

Drive automation of core infrastructure and processes, increasing opportunities for creativity and innovation

• $A2.2tr boost to Australia’s national income between 2015 and 2030 from productivity gains; $A1tr from accelerating the rate of automation and $A1.2tr from transitioning the workforce

• By 2030, the average Australian worker will spend 2 hours per week less on manual and routine tasks; 71% of the total expected reduction in work time will come from people doing the same job

Opportunity to gain customer and operational insight, leveraging big data and analytics to provide strategic advice to our businesses and clients

BANKING AND FINANCIAL SERVICES

Continue with digitisation transformation, including mortgages and wrap

Continue platform enhancements and automation to:

• Improve the customer experience through self-service and a more personalised experience

• Allow intermediaries to be more efficient and offer more tailored experiences to their clients

• Platform enhancements in Wealth Management will provide advanced smart searching capabilities, data analytics, practice management reporting, and integration with digital advice solutions for advisors


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