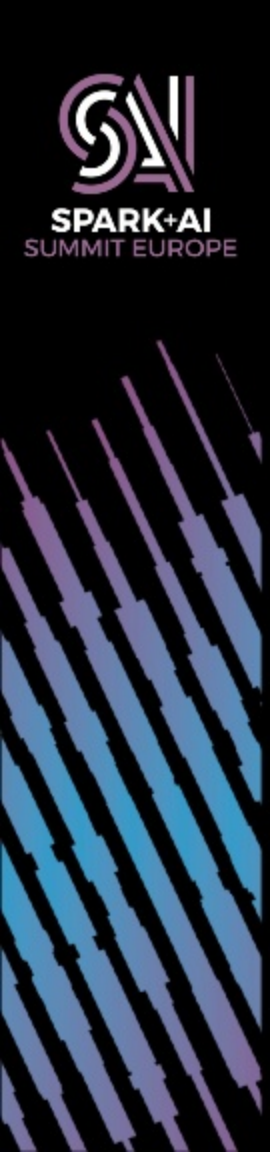


Lambda Architecture in the Cloud with Azure Databricks

Andrei Varanovich, InSpark

#SAISDev6

Selfie

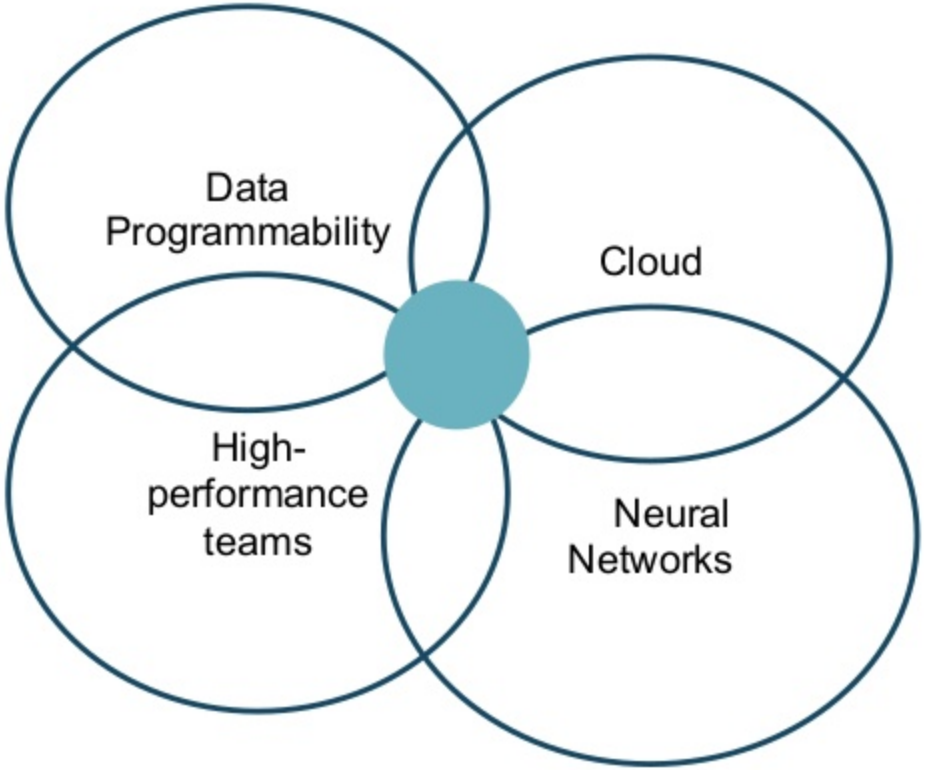
INSPARK

Data & AI Lead

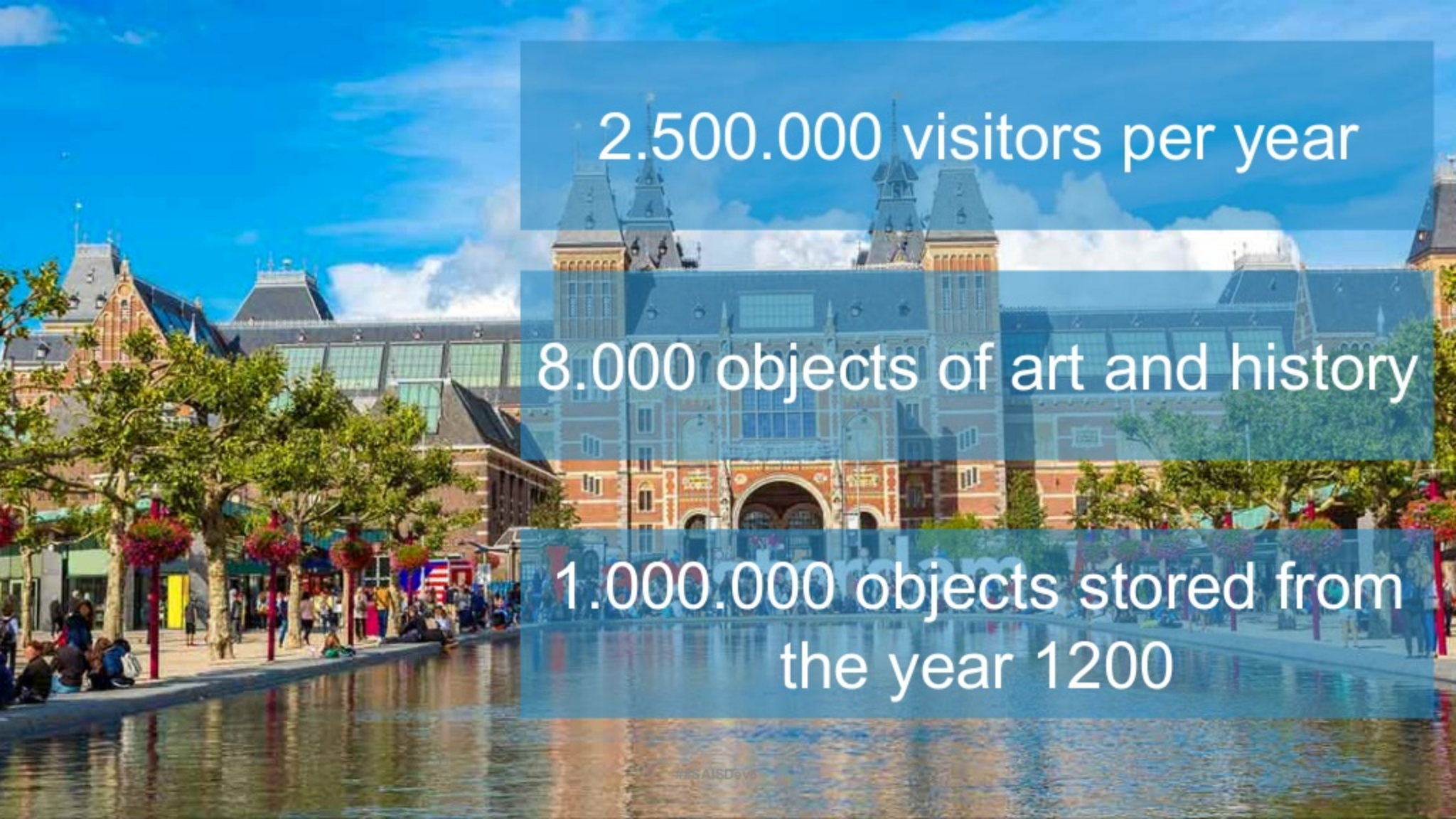
@DrGigabit

andrei.varanovich

andrei.varanovich@inspark.nl



Big Data problem is many ~~small~~ data problems


2.500.000 visitors per year
8.000 objects of art and history
1.000.000 objects stored from the year 1200

Under the hood

Capacity Planning

Ticket Sales

Warehouse Management

Financial Performance

Marketing Performance

Sponsorship engagement

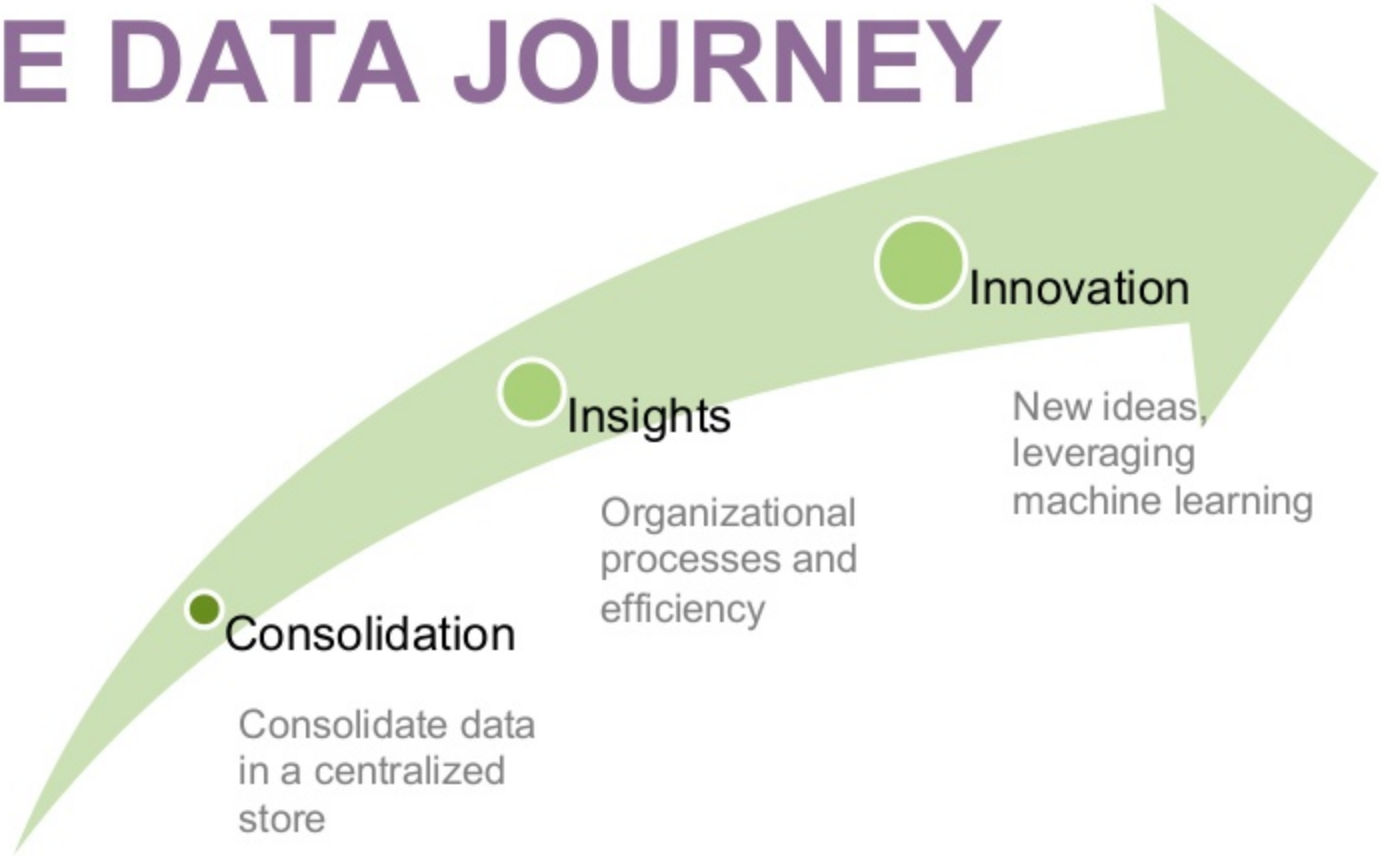
Service Management

Occupancy rate

Retail

Incident Management

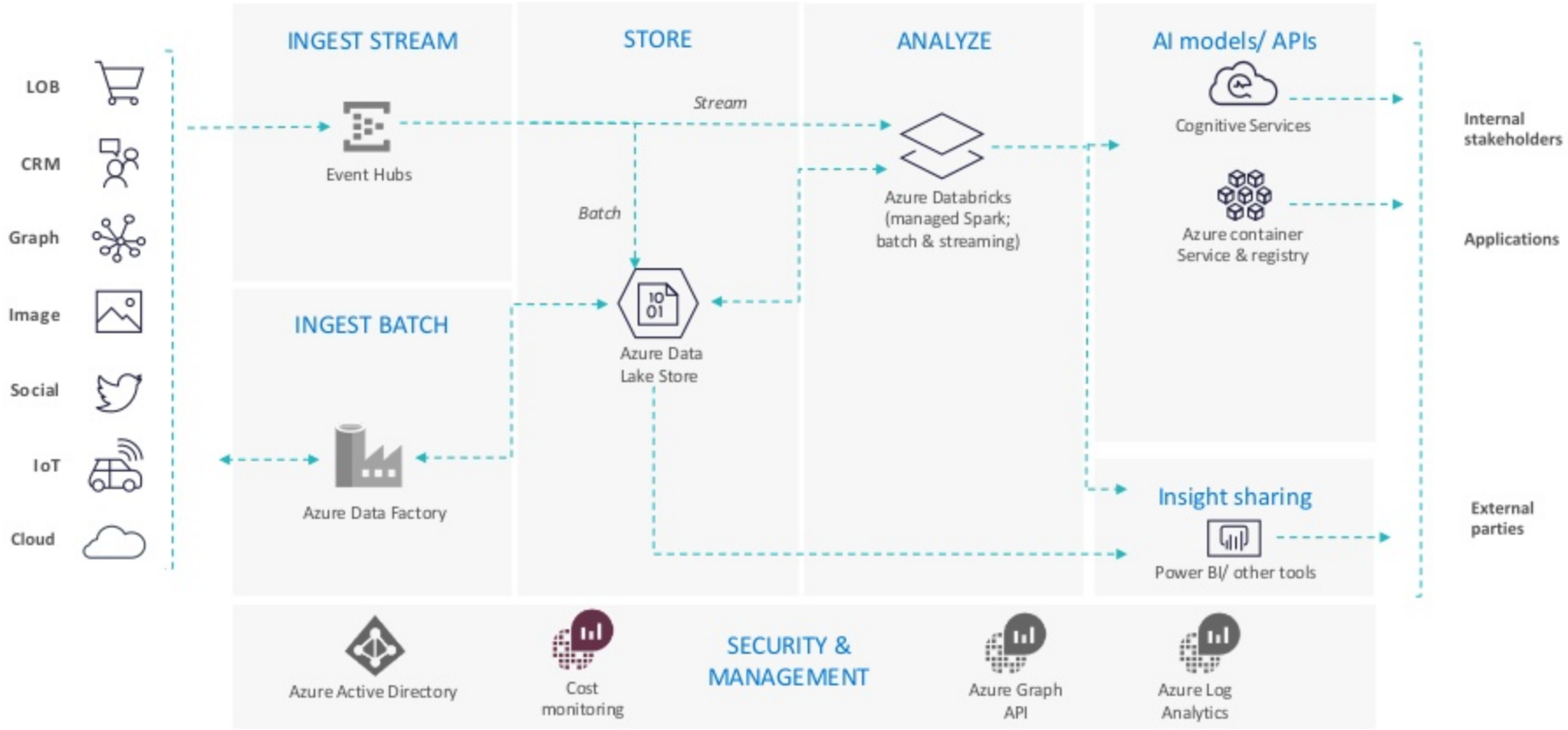
THE DATA JOURNEY

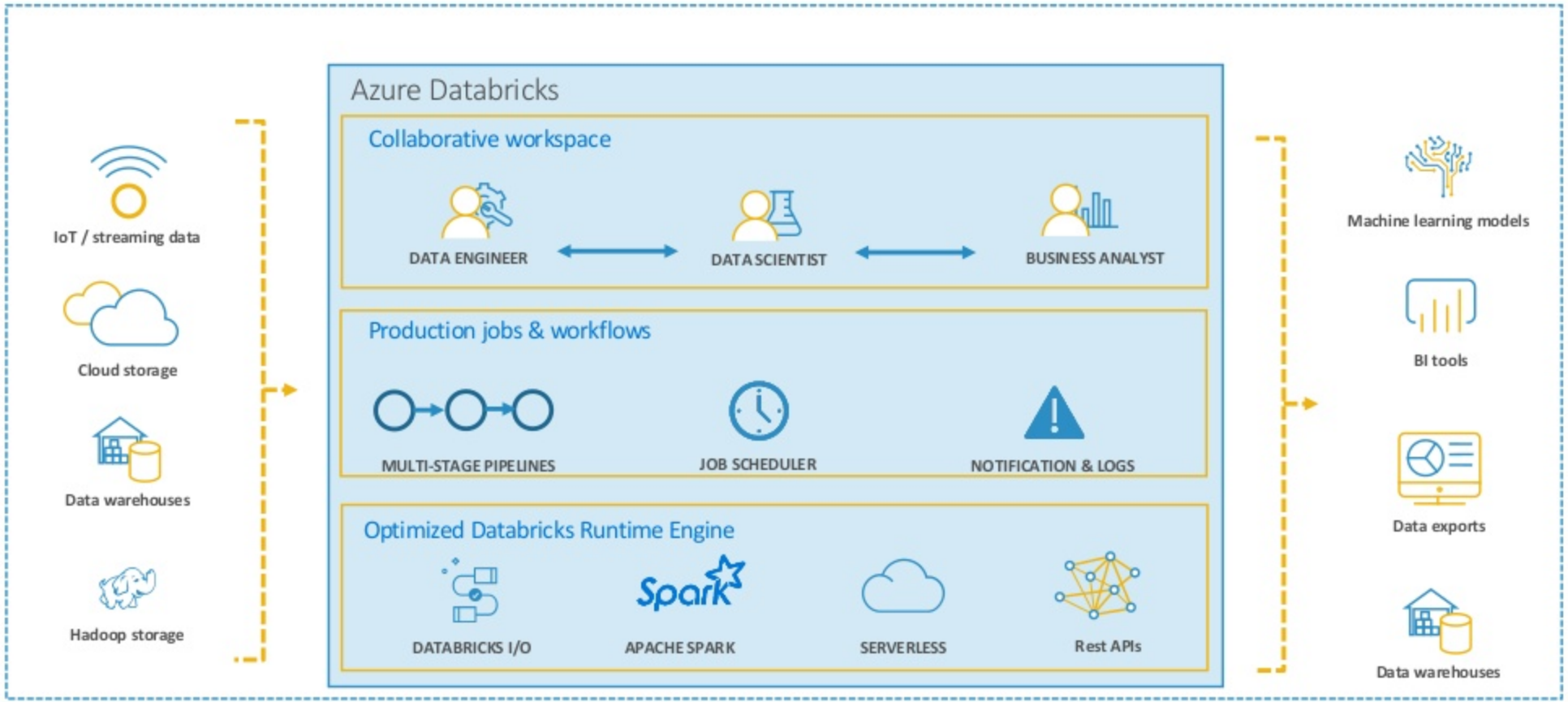


IN THE NEED FOR THE PLATFORM

We are in the need of the truly elastic data platform, to avoid any upfront planning, deployment and operations expenses, and put business value discovery first. The platform should support the [big]data projects in any stage, without the need to reengineer the whole solution.

Lambda Architecture on Azure




IoT / streaming data
Cloud storage
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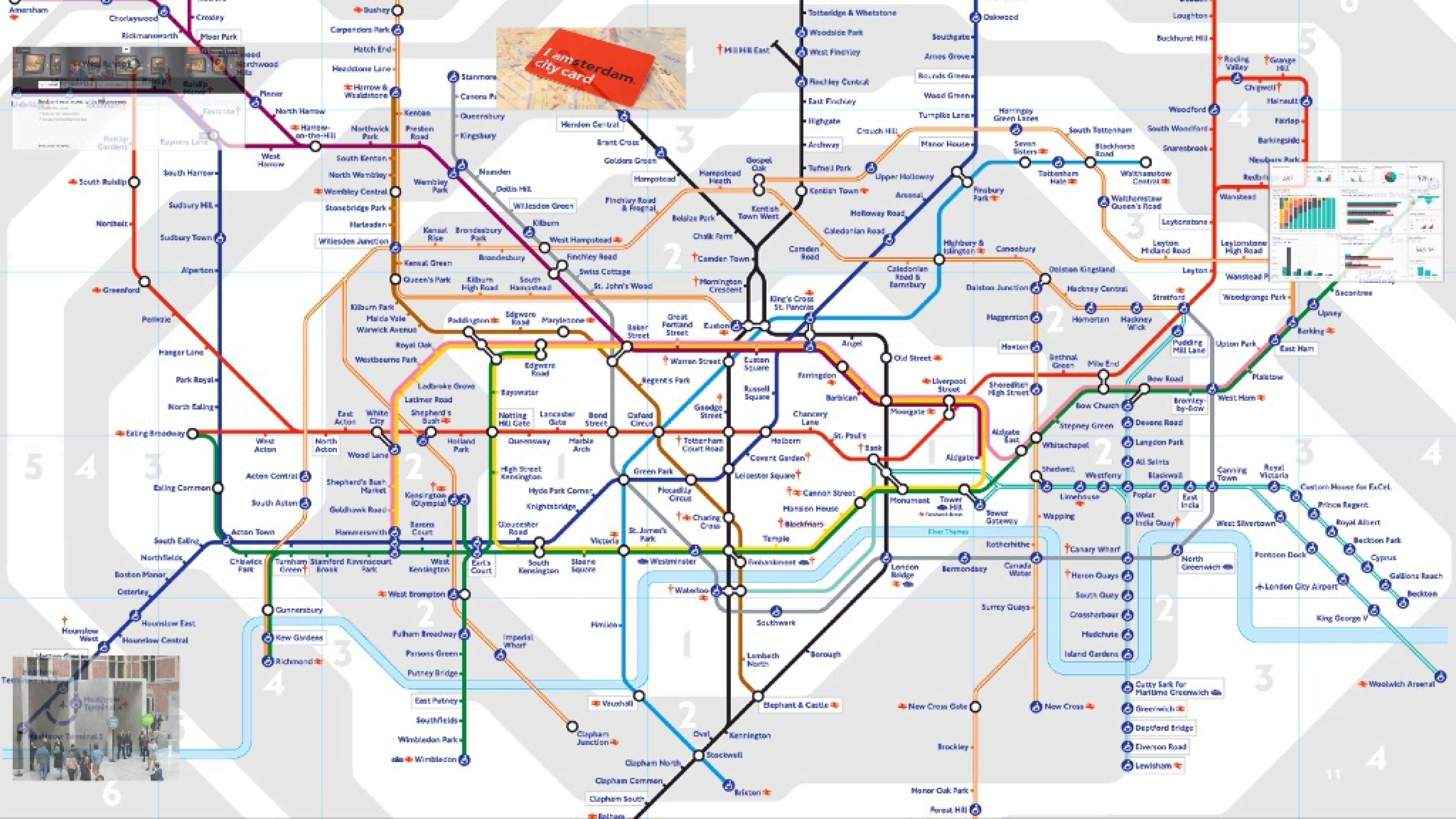
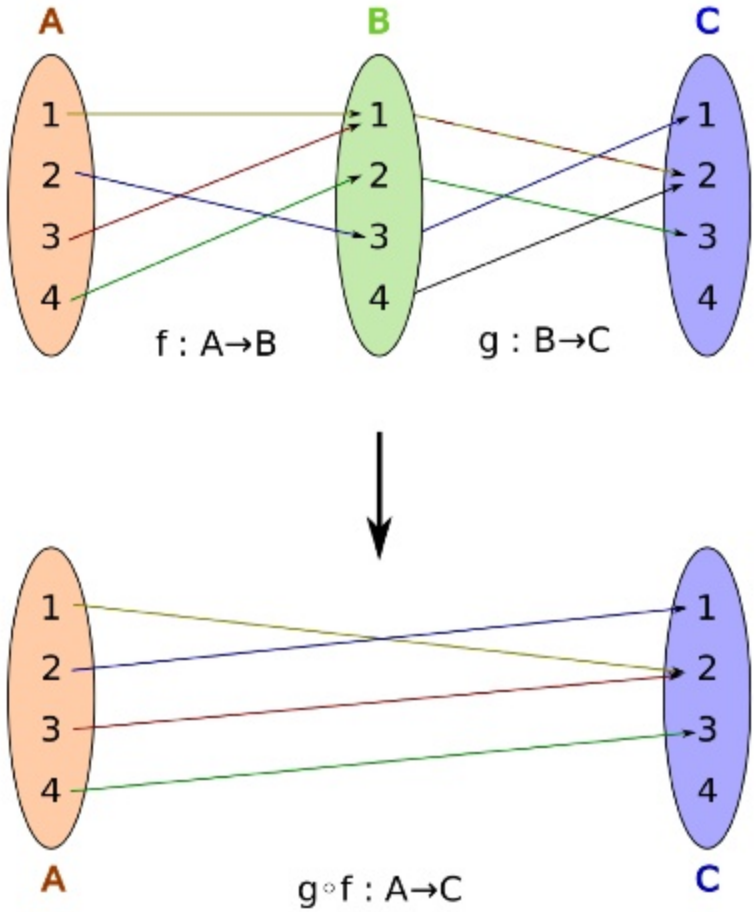
Simplicity is the ultimate sophistication

Leonardo da Vinci



Amersham
Chorleywood
Croxley
Rickmansworth
Moor Park
Northwood
Northwood Hills
Pinner
North Harrow
Harrow-on-the-Hill
West Harrow
Eastcote
Ruislip Manor
Ruislip
Uxbridge
Ruislip Gardens
Rayners Lane
South Harrow
South Ruislip
Northolt
Sudbury Hill
Sudbury Town
Alperton
Greenford
Perivale
Hanger Lane
Park Royal
North Ealing
Ealing Broadway
West Acton
North Acton
East Acton
White City
Ealing Common
Acton Central
South Acton
Acton Town
South Ealing
Northfields
Boston Manor
Osterley
Hounslow East
Hounslow Central
Hounslow West
Heathrow Terminal 5
Chiswick Park
Turnham Green
Stamford Brook
Ravenscourt Park
Gunnersbury
Kew Gardens
Richmond
Bushey
Carpenders Park
Hatch End
Headstone Lane
Harrow & Wealdstone
Kenton
Northwick Park
Preston Road
South Kenton
North Wembley
Wembley Central
Wembley Park
Stonebridge Park
Harlesden
Willesden Junction
Kensal Green
Queen's Park
Kensal Rise
Brondesbury Park
Brondesbury
Kilburn High Road
South Hampstead
Kilburn Park
Maida Vale
Warwick Avenue
Royal Oak
Westbourne Park
Ladbroke Grove
Latimer Road
Shepherd's Bush
Wood Lane
Shepherd's Bush Market
Goldhawk Road
Hammersmith
Barons Court
West Kensington
Kensington (Olympia)
Earl's Court
West Brompton
Fulham Broadway
Parsons Green
Putney Bridge
East Putney
Southfields
Wimbledon Park
Wimbledon
Imperial Wharf
Clapham Junction
Stanmore
Canons Park
Queensbury
Kingsbury
Neasden
Dollis Hill
Willesden Green
Kilburn
West Hampstead
Finchley Road
Swiss Cottage
St. John's Wood
Hendon Central
Brent Cross
Golders Green
Hampstead
Finchley Road & Frognal
Hampstead Heath
Belsize Park
Chalk Farm
Camden Town
Mornington Crescent
Gospel Oak
Kentish Town West
Kentish Town
Tufnell Park
Archway
Highgate
East Finchley
Finchley Central
West Finchley
Woodside Park
Totteridge & Whetstone
Mill Hill East
Camden Road
Caledonian Road
Caledonian Road & Barnsbury
Holloway Road
Arsenal
Upper Holloway
Crouch Hill
Oakwood
Southgate
Arnos Grove
Bounds Green
Wood Green
Turnpike Lane
Manor House
Harringay Green Lanes
Seven Sisters
South Tottenham
Tottenham Hale
Blackhorse Road
Walthamstow Central
Walthamstow Queen's Road
Finsbury Park
Highbury & Islington
Canonbury
Dalston Kingsland
Dalston Junction
Hackney Central
Homerton
Hackney Wick
Haggerston
Hoxton
Leyton Midland Road
Leytonstone High Road
Leytonstone
Leyton
Stratford
Wanstead Park
Woodgrange Park
Paddington
Edgware Road
Marylebone
Baker Street
Great Portland Street
Euston
King's Cross St. Pancras
Angel
Old Street
Warren Street
Euston Square
Regent's Park
Russell Square
Farringdon
Barbican
Goodge Street
Chancery Lane
Moorgate
Liverpool Street
Shoreditch High Street
Bayswater
Notting Hill Gate
Lancaster Gate
Bond Street
Oxford Circus
Tottenham Court Road
Holborn
St. Paul's
Bank
Queensway
Marble Arch
Holland Park
High Street Kensington
Hyde Park Corner
Knightsbridge
Green Park
Piccadilly Circus
Leicester Square
Covent Garden
Charing Cross
Cannon Street
Mansion House
Blackfriars
Monument
Tower Hill
Tower Gateway
Aldgate
Aldgate East
Gloucester Road
South Kensington
Sloane Square
Victoria
St. James's Park
Westminster
Embankment
Temple
Waterloo
Southwark
London Bridge
Borough
Lambeth North
Elephant & Castle
Pimlico
Vauxhall
Kennington
Oval
Stockwell
Brixton
Clapham North
Clapham Common
Clapham South
Balham
Bermondsey
Rotherhithe
Canada Water
Surrey Quays
Wapping
Shadwell
Whitechapel
Stepney Green
Bethnal Green
Mile End
Bow Church
Bow Road
Bromley-by-Bow
Devons Road
Langdon Park
All Saints
Pudding Mill Lane
West Ham
Plaistow
Upton Park
East Ham
Barking
Upney
Becontree
Limehouse
Westferry
Poplar
Blackwall
East India
West India Quay
Canning Town
Royal Victoria
Custom House for ExCeL
Prince Regent
Royal Albert
Beckton Park
Cyprus
Gallions Reach
Beckton
West Silvertown
Pontoon Dock
London City Airport
King George V
Woolwich Arsenal
North Greenwich
Canary Wharf
Heron Quays
South Quay
Crossharbour
Mudchute
Island Gardens
Cutty Sark for Maritime Greenwich
Greenwich
Deptford Bridge
Elverson Road
Lewisham
New Cross Gate
New Cross
Brockley
Honor Oak Park
Forest Hill
River Thames
Loughton
Buckhurst Hill
Roding Valley
Grange Hill
Chigwell
Hainault
Woodford
Fairlop
South Woodford
Barkingside
Snaresbrook
Newbury Park
Redbridge
Wanstead
I amsterdam city card

LAMBDA TO THE RESCUE

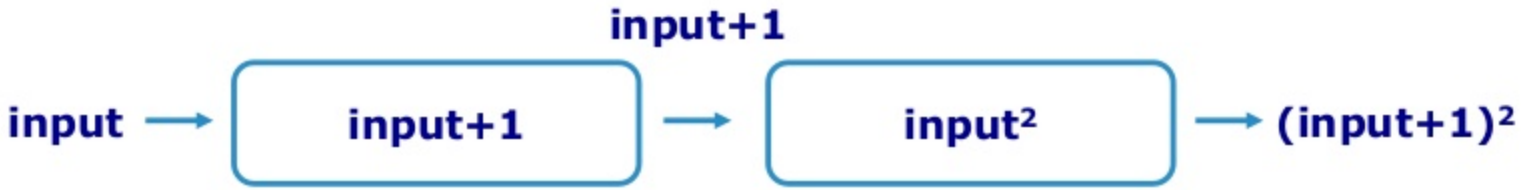


Composition of functions is applying one function to the result of another

$$f(x) = x+1$$

$$g(x) = x^2$$

$$(g \circ f)(x) = g(f(x))$$



$$(g \circ f)(x) = (x+1)^2$$

Transformation pipeline as a series of transitions

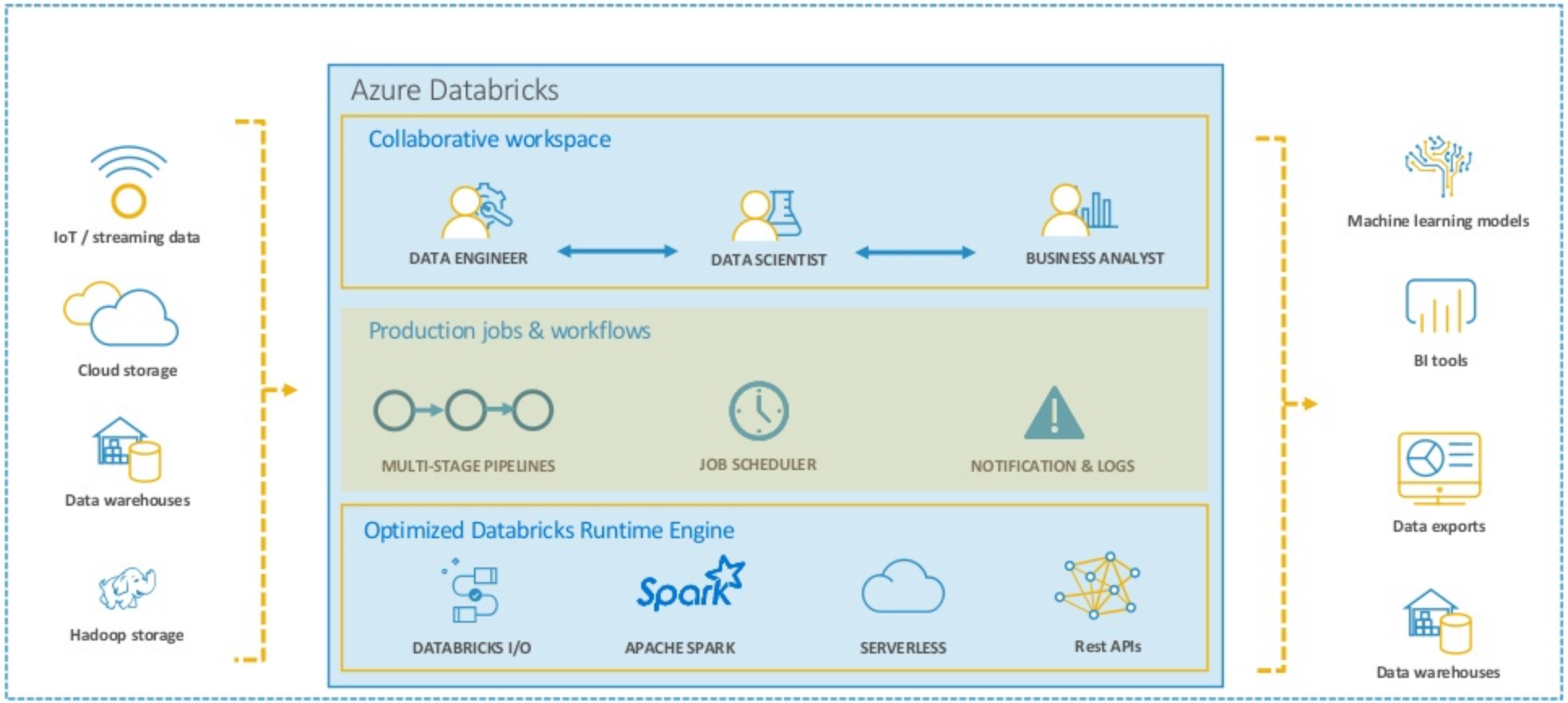
f1

f2

f3

s1

sum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Conclusions

> … with proper design, the features come cheaply. This approach is arduous, but continues to succeed.
>
> —Dennis Ritchie

- Standardization on Apache Spark allows us to move forward without introducing extra complexity.
- 100% PaaS offering is important – no need to maintain the infrastructure. All components we use offered as PaaS on Azure.
- Data pipelines as function composition allows us to ensure end-to-end consistency and spot the errors quickly.
- Saving intermediate states allows to quickly inspect the data sets.

Thank you!

Questions?