

GBS Core Banking on HPNS

[WholesaleBanking at ING, Past, Present & Future - A user story]

eBITUG – London – May 2017

London

ING and WholesaleBanking, an intro...

ING - one of the largest banks in The Netherlands.



ING WholesaleBanking has a local presence in 40 countries. Our global branches serve a wide range of organisations, including corporates, multinational corporations, financial institutions, governments and supranational bodies.



...Looking back when we started with Atlas/GBS in ING...

Atlas/GBS 20th anniversary in London



We celebrated the Atlas/ GBS 20th anniversary in London in 2008, as our ING London branch was the first branch in which the Atlas application was implemented.

ING's GBS Global Banking System Service...

GBS Global Banking System is a package solution from ION Trade / WallStreetSystems and is the core back-office banking system supporting the following products:

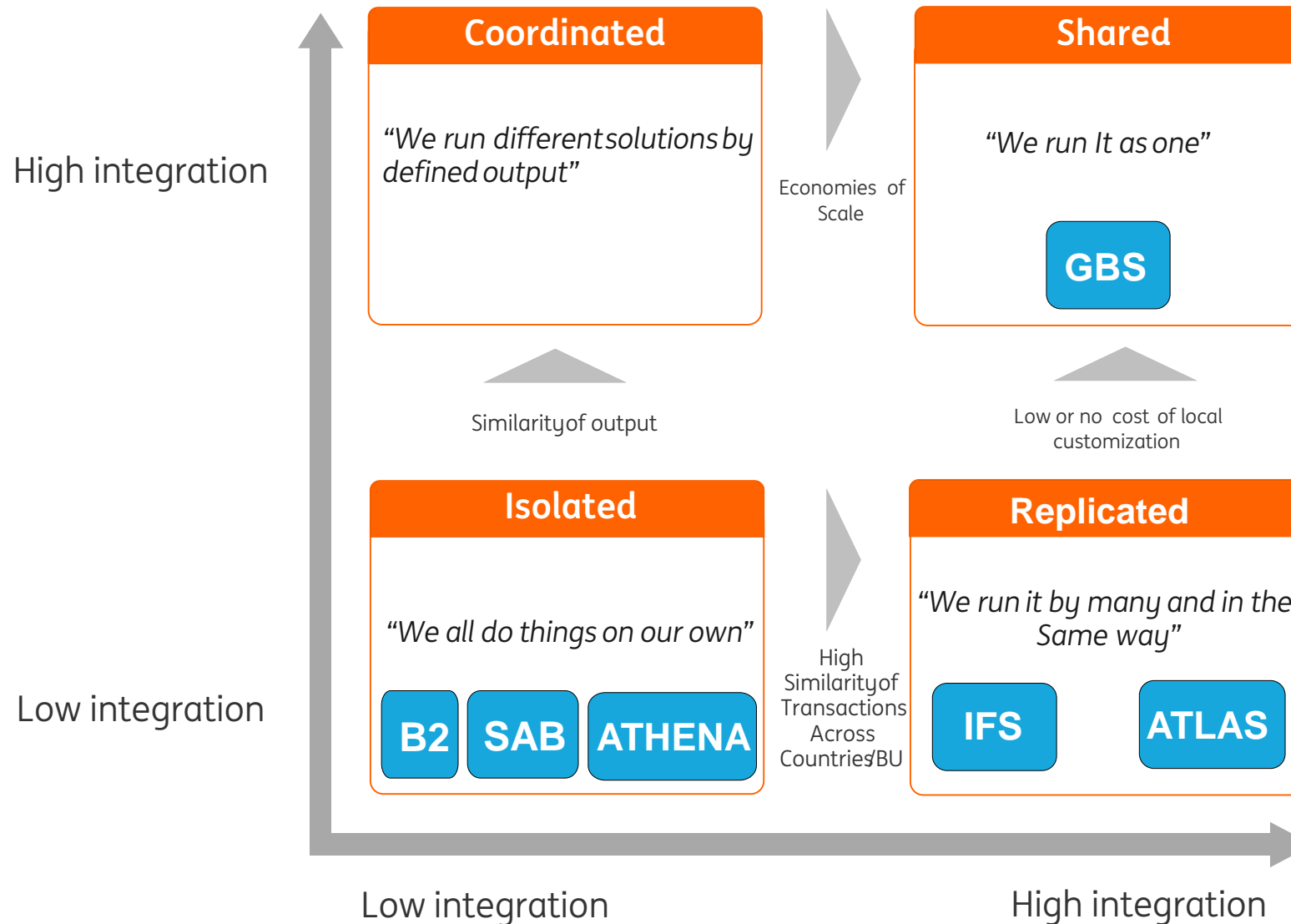
- Payments, Receipts, Overdrafts, Account management
- FX, Money Market, Capital Markets
- Lending and Structured Finance
- Shared Facilities/Limits
- Ledger, accounting and reporting

Strong features of GBS are:

- Flexible by means of parameters
- Options to build own interfaces and connections

GBS Core Banking is a multi-branch, multi-currency application and the successor of the single-branch, base-currency Atlas Core Banking application.

Besides GBS, ING has more Core Banking Solutions...



...ING's Accelerating Think Forward Strategy...

1. As part of ING's strategy the GBS Core Banking application was to be replaced by a set of applications. The GBS Core Banking system was planned to be decommissioned by 31 December 2016.
2. Not only GBS, but also the other applications running on the HPNS were to be replaced, to be able to phase-out the HPNS platform.



3. Re-platforming of GBS to different hardware is not an option.

...includes Data Centers Consolidation...

- Mid 2015 a project was started to host GBS Asia instances in the strategic Data Centers.



As part of life cycle management actions were taken...

To be able to support the business growth and meet regulatory requirements. Not only the hardware set-up had to be changed, but also the performance had to be improved significantly, on both application level as well as hardware level.

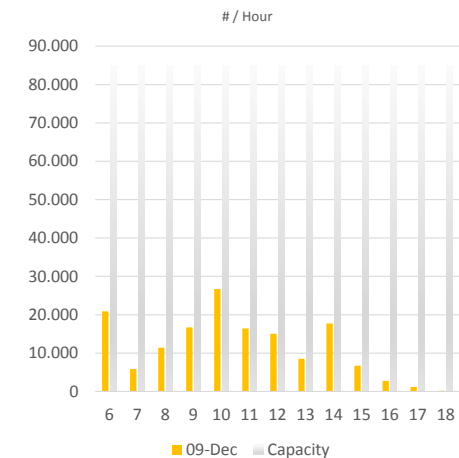
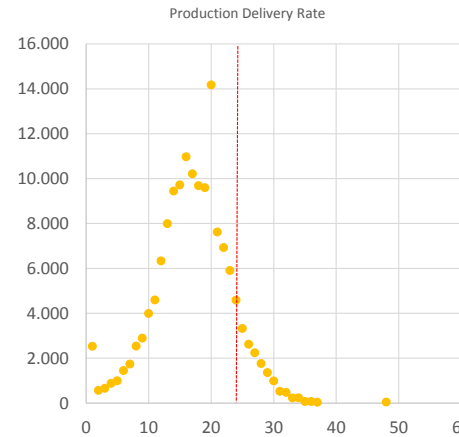
- A separate Disaster Recovery (DR) platform was required to support a full system fail-over and close an audit finding. The DR could no longer reside on the Dev/Test/Acc (DTA) platform.
- Moving to NSK 2400 series with Static Solid Disks (SSD's) for all Wholesale Banking systems in Q4, 2015 – Q1, 2016 as part of Life Cycle Management and to improve the performance.
- A Proof-Of-Concept was executed in May 2016 in Böblingen (Germany) supported by HPE, and application vendor WSS to streamline the application.
- Moving GBS Romania instance to a dedicated platform to meet their business growth and improve their performance.

In addition, moving Asia's GBS instances to the shared NSK platform in NL to meet the Data Centers consolidation requirements.

Performance Tuning GBS RO – Lab Test results 16TPS vs 24TPS

Transactions from 9 Dec 2016 from 6:00 – 11:30

Latency Interval	Shared Platform		Dedicated Platform	
< 10s	42,692	45%	84,825	92%
10s-20s	9,792	10%	4,166	4%
20s-40s	8,043	9%	1,630	2%
40s-1m	3,202	3%	1,537	2%
1-2m	4,854	5%	331	0%
2-3m	4,095	4%	128	0%
3-4m	2,825	3%	0	0%
4-5m	1,733	2%	0	0%
> 5m	16,726	18%	29	0%
	93,962		92,646	



Lab Test: No repairs, sufficient funds
Max 8 partitions per physical SSD.

1. Shared Platform → 16TPS

Set-up max 10 dedicated logical SSD's

- GBS RO becomes disc bound

2. Dedicated Platform → 24TPS

Set-up max 40 dedicated logical SSD's

▪ **Tuning 24TPS Production Delivery**

- > 24TPS → queuing transaction
- Peak @20 Sec: Batch deliveries are 'truncated'
- In principle, processing 24TPS over a long period of time, will ensure **92% of transactions processed < 10 sec** (real-life is a bit more complex).

Performance Tuning GBS RO – Lab Test 24 TPS: CPU Bound

00=infra;
01=appl

Disk	GB	IQUE	IQU2	IQU3	IQU4	IDAT	SETT	AENT	ACBL	FAC*	ACID	CONF	FDEC	FDEF	TEXT	MPOP
\$BAGR00	20															
\$BAGR01	50															
\$BAGR02	50	P0	P0	P0	P	P0	P0	P0	P0	P0	P0		P0	P0	P0	P0
\$BAGR03	50										[0]		P0	P0	P0	P0
\$BAGR04	50				A											
\$BAGR05	50								1							
\$BAGR06	50								2							
\$BAGR07	80								3							
\$BAGR08	20						A			A						
\$BAGR09	20							A								
\$BAGR10	65															
\$BAGR11	65								ASNQ							
\$BAGR12	20						FX	[0]	10							
\$BAGR13	20						LD	FX	5							
\$BAGR14	20						[0]	LD	13							
\$BAGR15	20						RE0	PA0	7							
\$BAGR16	20						RE2	PA2	8							
\$BAGR17	20						RE4	PA4	9							
\$BAGR18	20						RE6	PA6	4							
\$BAGR19	20						RE8	PA8	11							
\$BAGR20	20						PA0	RE0	12							
\$BAGR21	20						PA2	RE2	6							
\$BAGR22	20						PA4	RE4	14							
\$BAGR23	20						PA6	RE6	15							
\$BAGR24	20						PA8	RE8	16							
\$BAGR25	20									[0]						
\$BAGR26	20															
\$BAGR27	20	[0]														
\$BAGR28	20	A														
\$BAGR29	20	A														
\$BAGR30	20	A														
\$BAGR31	20	A														
\$BAGR32	20		[0]													
\$BAGR33	20		A													
\$BAGR34	20		A													
\$BAGR35	20		A													
\$BAGR36	20		A													
\$BAGR37	20			[0]												
\$BAGR38	20			A												
\$BAGR39	20			A												
\$BAGR40	20			A												

Payment
Accounting and
Account Balances

Message
Generation

Static Data and
Configuration

Account Overdraft

GBS Internal
Queuing (IFER)

IFER

- GBS Staging and internal queuing (all steps performed by the system to process a payment, i.e. position updates, limit check, accounting, messaging). Spread reduces wait time on disks.
- Payments enter the system from MQ here, data stored in IDAT, after capture payment info is stored in SETT.

Accounting

- Balances are maintained by posting accounting entries to them. The entries are generated and posted real time.
- Payment accounting is based on SETT, create AENT which in turn results in updates on ACBL. Partition of ACBL is done based on #postings, there are 2 partitions with just 1 account in them:
 - Disk 12: is the internal account with the RO Retail system.
 - Disk 14: is the account with local RON clearing.

Message Generation

- Once the processing was tuned, the bottleneck shifted to the Message generation (SWIFT, clearing, towards E-portal). Moving the data away from the main DB on disk 02 to disk 03 fixed this.

CONFFILE

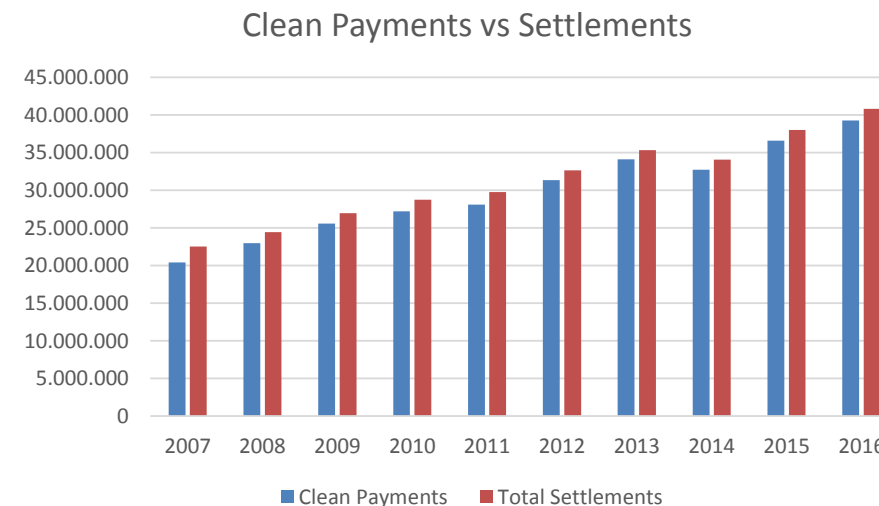
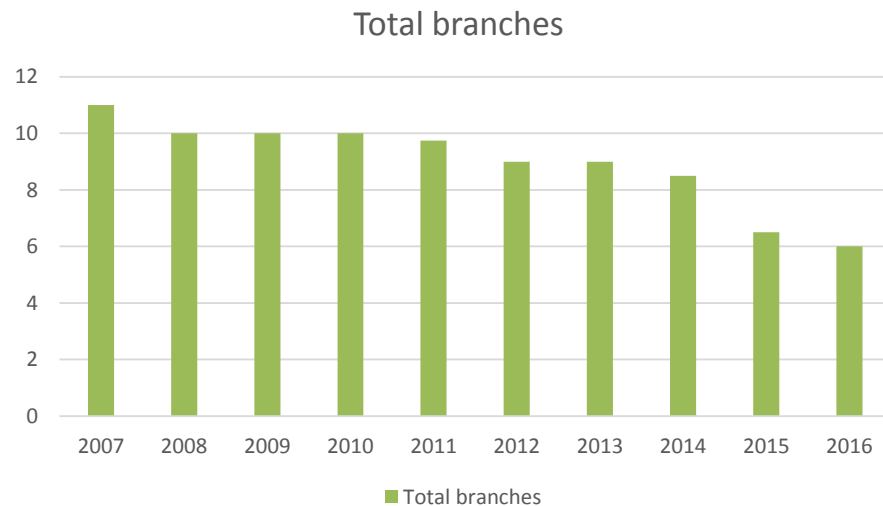
- Interesting case where all data in 1 file is faster than spread out over multiple disks. This file holds both technical configuration as well as static data used in payment processing (charges). This could be related to the File opening (tbi).

Providing the following results for GBS RO performance

- The move to the dedicated NSK 2400 series platform with SSD's improved the performance of GBS RO significantly: 16 TPS → 24 TPS.
 - Based on
 - 40 logical SSD's instead of 10 logical SSD's
 - Multiple IQUE's implemented to improve the Internal Queuing (spread the disc IO's of IFER)
 - Consolidate CONFFILE on a dedicated disk improved the performance
 - Performance of accounting entry generation was improved by Implementing Deferred Posting with better file distribution
- The GBS application already supports enhanced routing mechanism, multi-threading processing and by adding partitioning for certain flows, performance further increased.
- Removing GBS RO from the shared platform provided sufficient space for GBS Asia.
- Decommissioning of the NSK platform in the Data Center in SG as per June 2017.

...so now, almost 10 years later...

- 5 branches have moved away from GBS, and transaction volumes have doubled:



International Core Banking Platform NL is GBS service provider...

ICBP is part of the ING Ops & IT Banking organisation - Manager ICBP Inez van Holtz

- ICBP is the Service provider of the GBS Core Back-Office Banking Services to ING Wholesale Banking branches in CEE: BG, CZ, HU, RO, SK and UA.
- The GBS Core Banking status has changed in 2016 from “Legacy” to “Retained”.

Our Way of Working is a combination of

- Agile/Scrum DevOps teams using GSSM as “Global Service and Solution Model”.
- The model covers the regions Asia and CEE
 - Singapore covers the majority of the Operational Services, and
 - Amsterdam the Functional Solutions for as far it is linked to GBS.
 - TCS provide operational services and some development capability out of both Singapore and Mumbai.

...to ING's Wholesale Banking branches abroad...

Europe: 3 GBS instances

- Romania
- Czech Republic
- Hungary, Slovakia, Ukraine and Bulgaria

Asia: 3 GBS instances moved towards 2 GBS instances in May 2017

- SPV, so-called Special Purposes Vehicles e.g. an ING Rep Office
- China, Japan, South Korea, Taiwan, Philippines, Malaysia, Indonesia, Singapore
- South Korea's Seoul Securities → integrated in Asia branches instance as per May 2017

- For most of these branches GBS is the license-to-operate.

...ICBP NL is located in Amsterdam...

The department has remote teams in Singapore, Mumbai and London. The ICBP NL team itself is very international and has 6 different nationalities.



... key factors for results...



- Close cooperation between HPNS Infra Team and GBS Application Service Provider teams.
 - High business involvement by RO Branch in straightening out the Business case & requirements.
 - High Performing GBS NL team supporting the GBS Asia team to host GBS Asia in the strategic Data Centers (NL).
-
- ➔ GBS RO on dedicated platform.
 - ➔ GBS Asia upgraded to the same maintenance and support level as GBS Europe.
 - ➔ SG NKS platform decommissioned.

New plans are needed to prepare for the future...



- Business volumes in GBS Core Banking application keep on growing: Doubled in 10 years.
- Regulator demand has become stricter over the years e.g. Disaster Recovery (DR) → Data Center Down.

Still more to come...



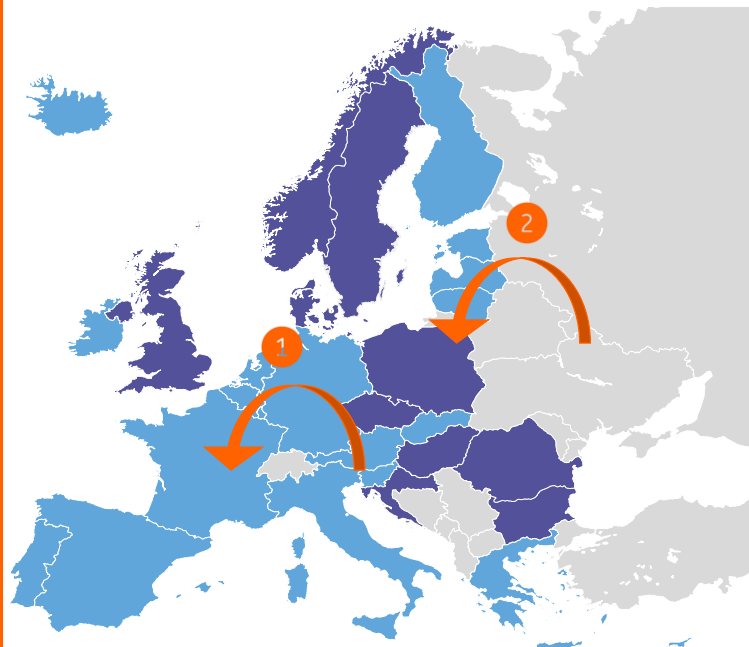
A Data Center Down exercise is planned for November 2017.

- GBS failover to be flawless and fully transparent, enabling to move away from a business decision.

Continuous business growth and new Regulations require an adaptive Way of Working:

- Prepare GBS for Payment Services Directive 2 (PSD2) and Immediate (Instant) Payments Regulations

...these preparations just started...



Legend

- Euro EEA country
- Non-Euro EEA country
- Non-EEA country

- 1 Transactions within the EEA in **any** currency
- 2 Incoming transactions into the EEA in **any** currency

PSD2 – Jan, 2018 part of National Law

- ING Client to grant a Third Party Provider (TPP) to access their account information (AIS) or initiate a payment (PIS)

Immediate (instant) Payments – 1 July 2019

- On March 27th, 2017 the National Bank of Hungary issued a statement:
 - all single credit HUF transactions under the threshold of HUF 10 million (appr. EUR 32 thd) are mandatory to be settled as immediate (instant) payments i.e. from the initiator to the beneficiary's account within 5 seconds.

Requires GBS to move away from application/infra downtime:

- solution for back-up/restore...
- date roll-over...
- API-access by 3rd parties...

Challenges: some next steps are known, some are unknown...



Challenges, and some of the steps to be taken:

- Multifactor authentication, adapt to latest security standards
- Replace proprietary interfaces with tooling based on Java, use of API's, moving towards the Cloud
- Zero Loss of Transactions
- Further performance improvements
- Automated regression testing

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