



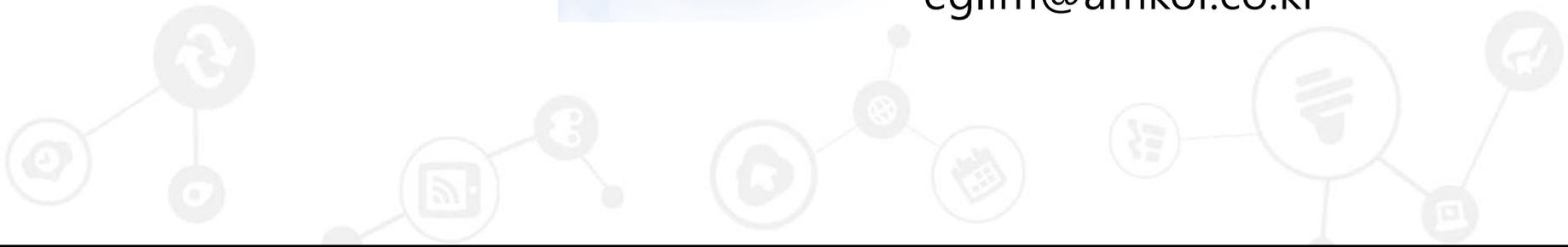
*PLM NPI Process 을 통해 본 System Integration



Amkor 코리아

임응기 과장

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Contents

1. Amkor 소개

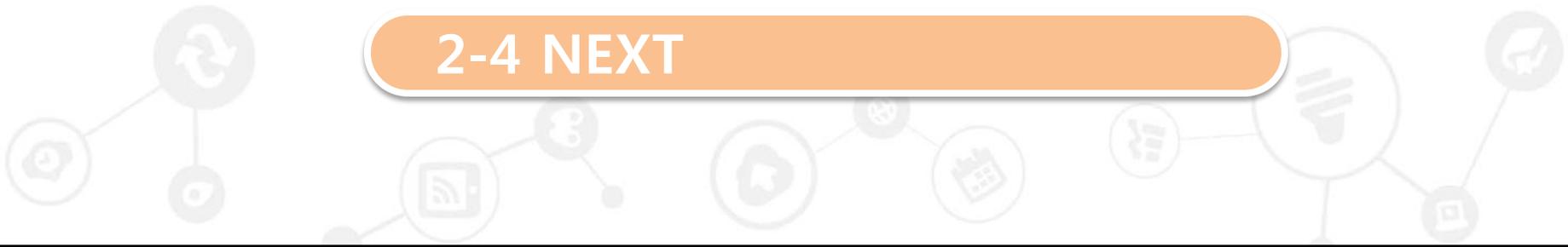
2. PLM 도입 과정

2-1 1단계

2-2 2단계

2-3 안정화

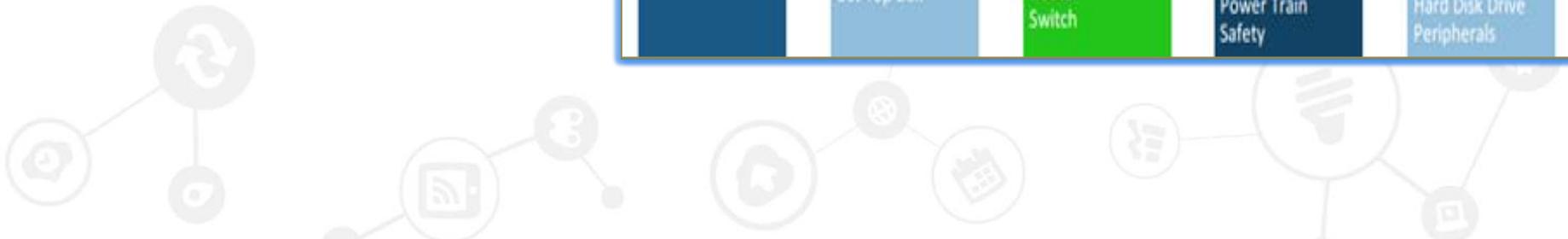
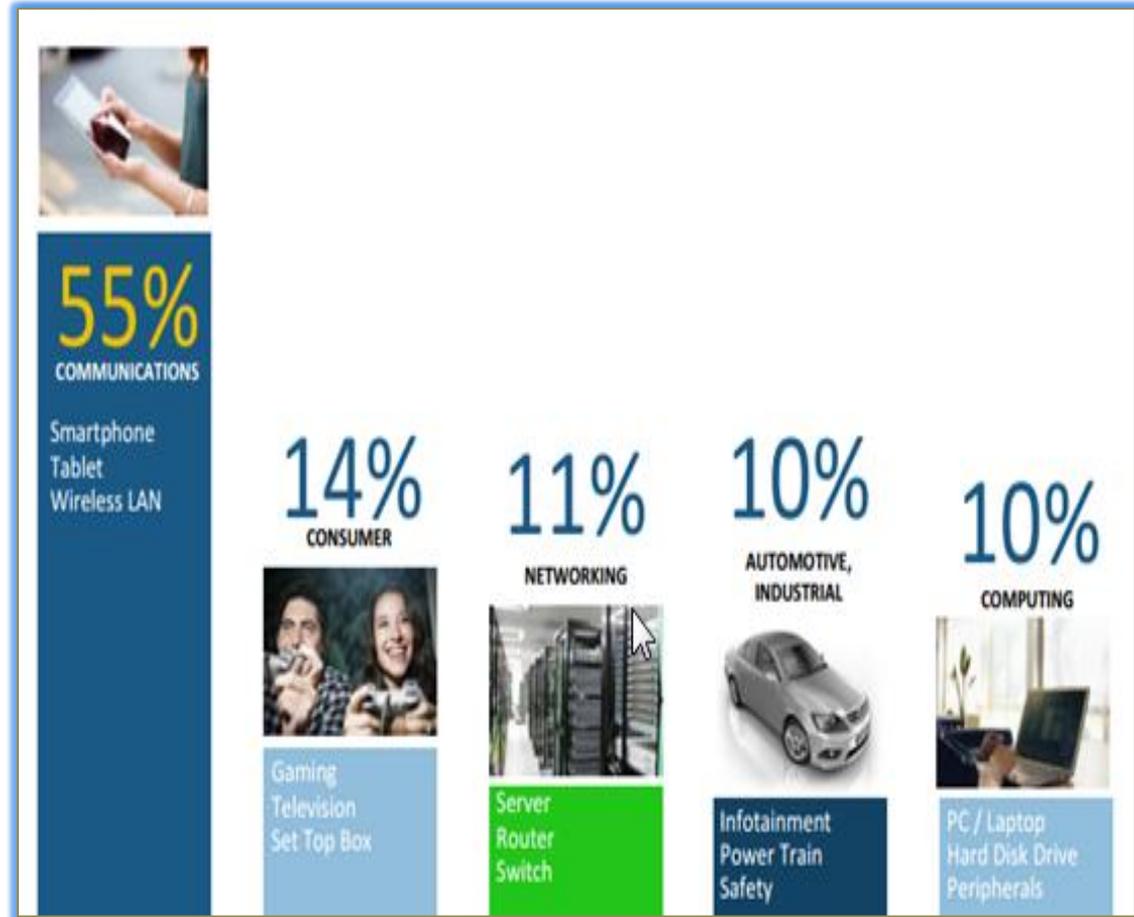
2-4 NEXT



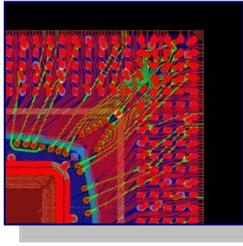


1 Amkor 소개 - 회사 소개

- 반도체 패키징 & 테스트 업체
OSAT (Outsourced Semiconductor Assembly and Test)
- 아시아 6개국에 12개 생산공장
- 38억 달러 매출액 (2013년 기준)
- Application



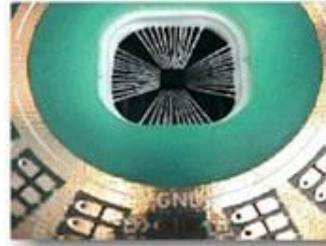
1 Amkor 소개 - 패키징 & 테스트



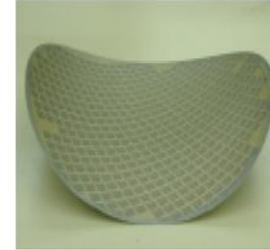
1. Package Design



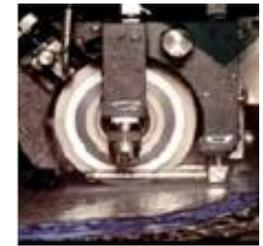
2. Wafer 제작



3. Wafer Probe Test



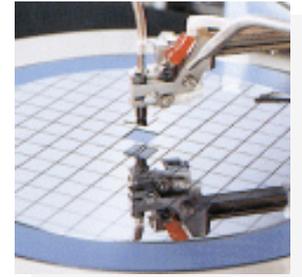
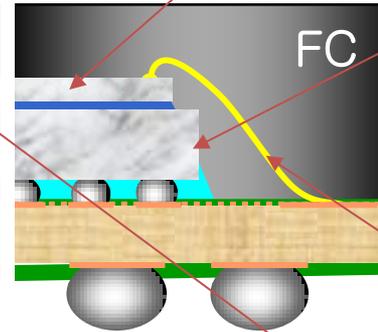
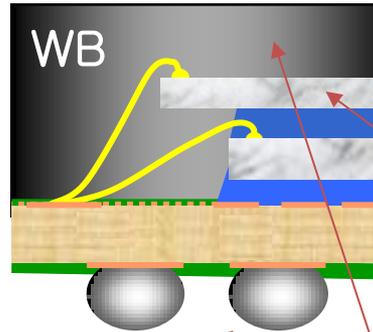
4. Wafer Thinning



5. Sawing

Multi Chip CSP

FC CSP

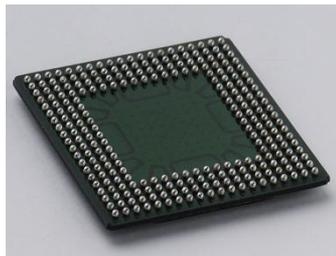


6. Die Attach

11. 테스트



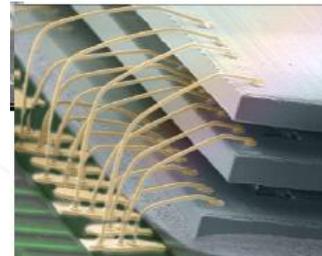
10. Solder Ball Attach



9. Molding



8. Die Stacking



7. Wire Bonding





1 Amkor 소개 – Product 소개

Leadframe



Laminate Wirebonding



Flip Chip & Wafer Bumping

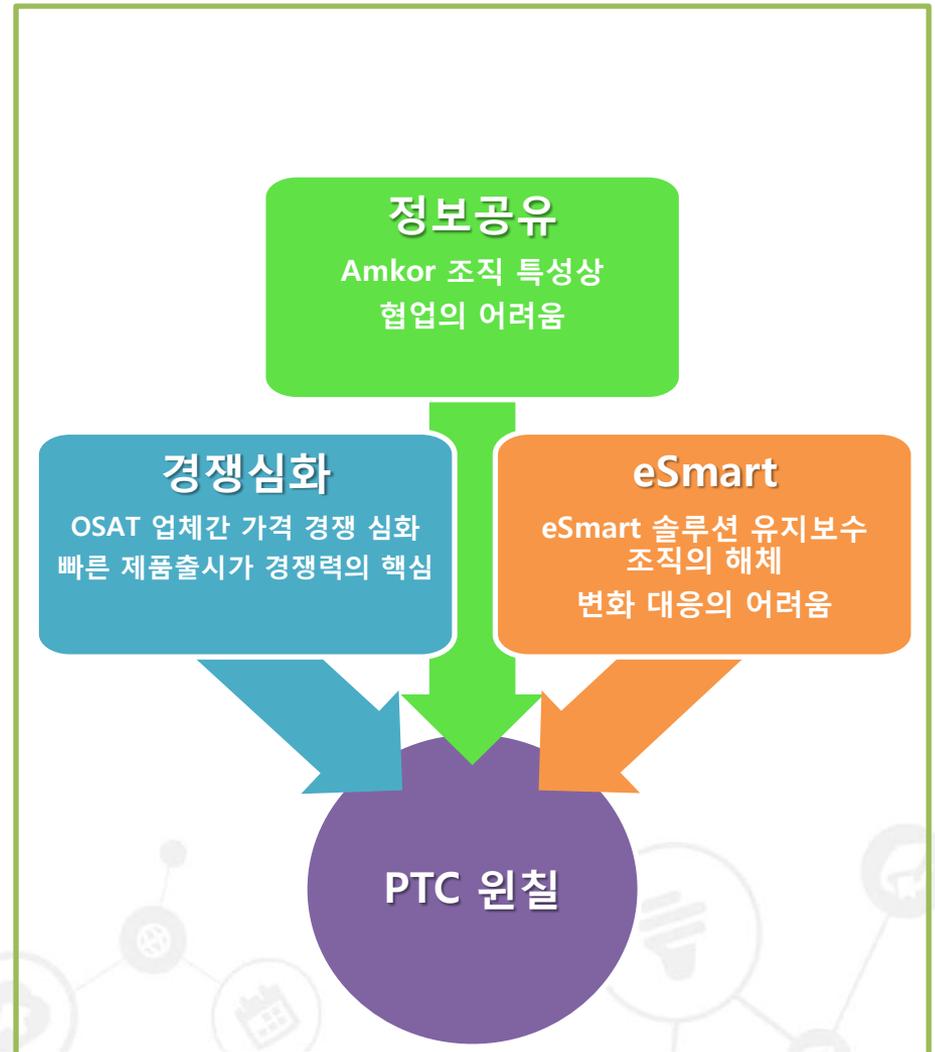




2 PLM 도입과정 (1단계->2단계->안정화->Next)

1단계 (2008.1~2009.1)

- **PLM 도입배경**
- 글로벌 표준업무절차
- PLM 과 생산 System 과의 정보 연계





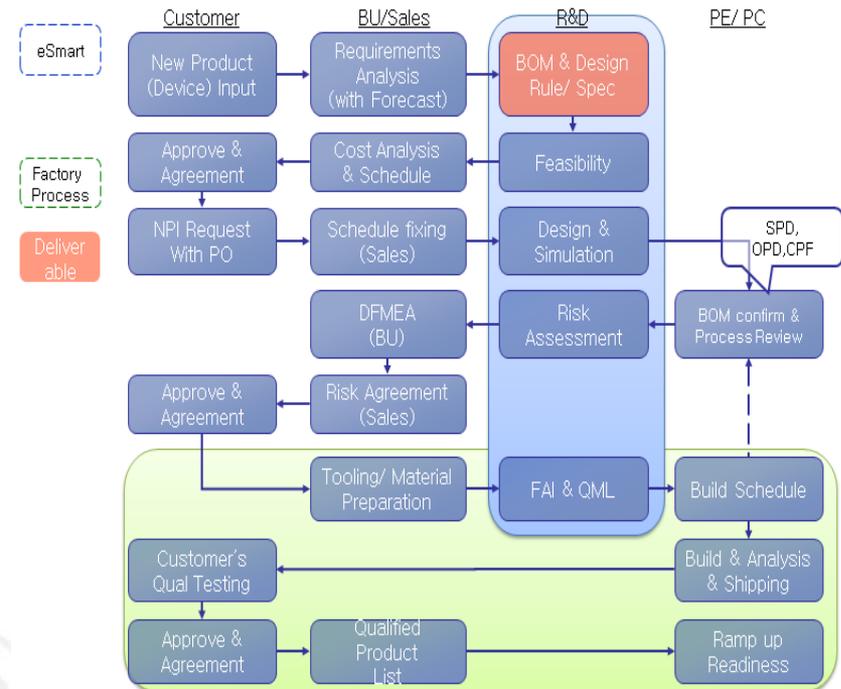
2 PLM 도입과정 (1단계->2단계->안정화->Next)

1단계 (2008.1~2009.1)

- PLM도입배경
- **글로벌 표준업무절차**
- PLM 과 생산 System 간의 정보 연계

PLM Initial NPI Process

- RnD의 eSmart와 각 공장 DB 통합
- PLM의 추가 Process 설계

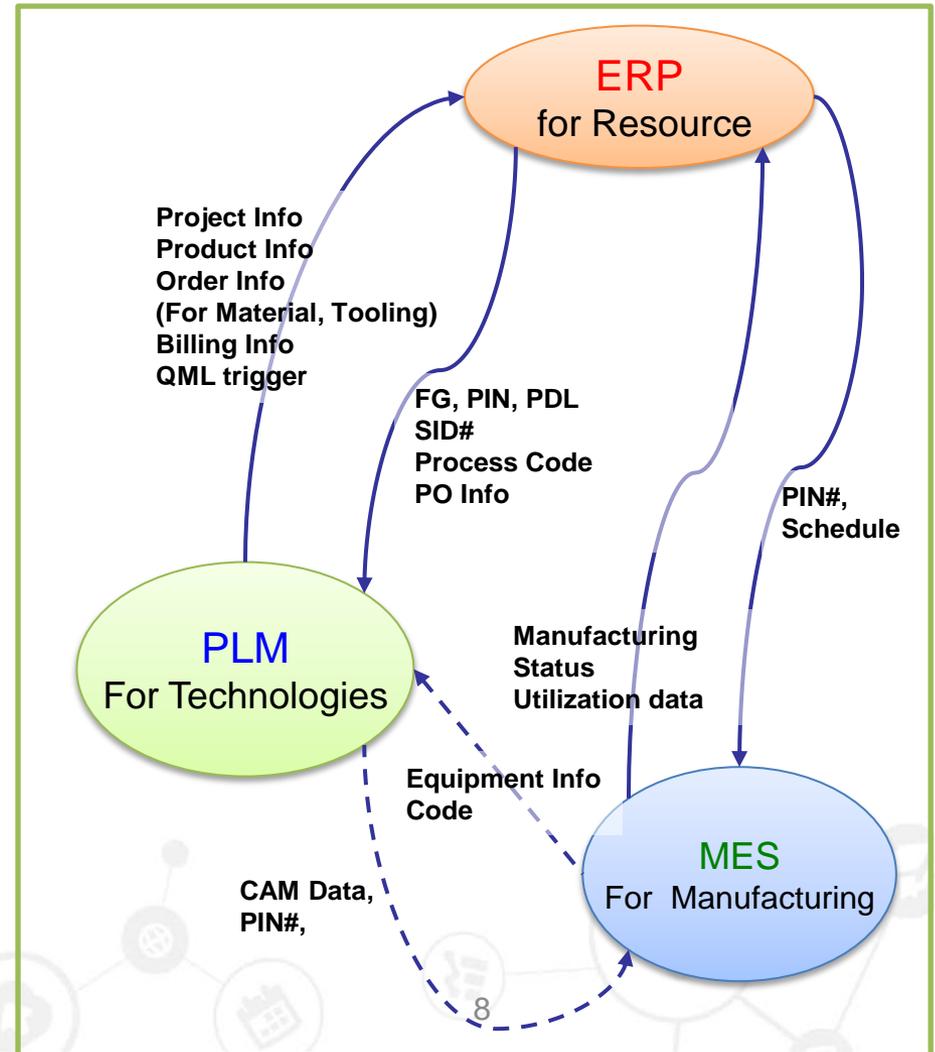




2 PLM 도입과정 (1단계->2단계->안정화->Next)

1단계 (2008.1~2009.1)

- PLM 도입배경
- 글로벌 표준업무절차
- **PLM 과 생산 System 간의 정보 연계**





2 PLM 도입과정 (1단계->2단계->안정화->Next)

2단계 (2009.2~2010.8)

- **사용자인터페이스(UI)개선**
- Test Business Module 개발
- Design BOM & Manufacturing BOM 개발
- Spec Migration
- NPI Process 확립

Phase 1 – OOTB View

Name	Number	Actions	Version	State	Last Modified	Context
DE136821, 232, Eagle, FCCSP, mic, ALCHIP 2	DE136821	Actions	A.6	Design	2014-06-20 09:19 KST	Products Design
DE136782, 360, PTSPR22 / PT5616S32A, SOIC, mic, PRI	DE136782	Actions	A.11	Design	2014-06-19 17:18 KST	Products Design
OR115412 (Package) Tooling Item, 101384738, K4, K4's ct	OR115412	Actions	A.8	Completed	2014-06-19 09:35 KST	Supplier Chain Manage
PHOTO MASK 14' LAY.RDL 57653MDI0F	108895389	Actions	A.14	Released	2014-06-19 08:23 KST	Material
359159WB	359159WB	Actions	01.2	Released	2014-06-18 14:48 KST	Quad-LF
DE136809, 232, Maple, DRMLF, mic, ALCHIP 2	DE136809	Actions	A.5	Under Review	2014-06-18 14:22 KST	Products Design
DE136811, 1, FLAT, chypark, AMKOR INTERNAL_BUILDS	DE136811	Actions	A.2	In Work	2014-06-18 13:23 KST	Products Design
OR119311, Leadframe, 101388540, P1, OPL, ANALOG DEV	OR119311	Actions	A.2	Rejected	2014-06-18 10:02 KST	Supplier Chain Manage
133_AMS AG_OFN_bchpark	003370CD	Actions	A.2	Released to SAP	2014-06-16 14:39 KST	Customer Drawing
470_ATMEL TRADING COMPANY, LTD_Test_Test_chypark	BR241602	Actions	A.2 (AMKOR)	Obsolescence	2014-06-16 13:49 KST	Build Request
470_ATMEL TRADING COMPANY, LTD_Test_Test_chypark	MS000546730	Actions	A.1 (AMKOR)	In Work	2014-06-16 13:49 KST	Build Request
470_ATMEL TRADING COMPANY, LTD_Test_Test_chypark	PS000546729	Actions	A.1 (AMKOR)	In Work	2014-06-16 13:49 KST	Build Request

Phase 2 – Portal View

Title	Number	Version	State	Last Modified	Context
DE136821, 232, Eagle, FC...	DE136821	A.6	Design	2014-06-20 00:18:17.0	Products Design
DE136782, 360, PTSPR22 /...	DE136782	A.11	Design	2014-06-19 08:18:57.0	Products Design
OR115412 (Package) Tool...	OR115412	A.8	Completed	2014-06-19 00:35:24.0	Supplier Chain Ma...
PHOTO MASK 14' LAY.RD...	108895389	A.14	Released	2014-06-18 23:23:49.0	Material
359159WB	359159WB	01.2	Released	2014-06-18 05:48:49.0	Quad-LF
DE136809, 232, Maple, DR...	DE136809	A.5	Under Review	2014-06-18 05:22:56.0	Products Design
DE136811, 1, FLAT, chyp...	DE136811	A.2	In Work	2014-06-18 04:23:16.0	Products Design
OR119311, Leadframe, 10...	OR119311	A.2	Rejected	2014-06-18 01:02:30.0	Supplier Chain Ma...
133_AMS AG_OFN_bchpark	003370CD	A.2	Released to SAP	2014-06-16 05:39:16.0	Customer Drawing
470_ATMEL TRADING CO...	BR241602	A.2 (AMKOR)	Obsolescence	2014-06-16 04:49:19.0	Build Request
470_ATMEL TRADING CO...	MS000546730	A.1 (AMKOR)	In Work	2014-06-16 04:49:17.0	Build Request
470_ATMEL TRADING CO...	PS000546729	A.1 (AMKOR)	In Work	2014-06-16 04:49:17.0	Build Request



2 PLM 도입과정 (1단계->2단계->안정화->Next)

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- 사용자인터페이스(UI)개선
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- Design BOM & Manufacturing BOM 개발
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Test Business Module 개발

The screenshot displays three overlapping windows from the PLM system's Test Business Module:

- Test NPI:** Shows a request form for 'Test NPI' with fields for Request No (TM117024), Name (XLRX AP-XC9528KLA), Customer ID (753), and Customer Name (XLRX AP).
- Test Develop:** Shows a request form for 'Test Develop' with fields for Request No (TD100208), Name (jyokm), Customer ID (1000202), and Customer Name (ATK). It also includes a table for 'Operation' with columns for Operation, Test program/Rev, and a quantity of 200.
- Test FA:** Shows a request form for 'Test FA' with fields for Requester (YoungMean Kim), Request Date (2014-06-23), and Due Date (2014-06-24). It includes a table for 'Requester Information' and a 'Plan' section with columns for Doc No, Requester, Request Date, Due Date, Start Date, Complete Date, and Exp.



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Design BOM 개발

- 최종 Product 의 연관 Drawing 과 Part 그리고 Part 의 연관 Drawing 을 리포트 형태로 구현

D000537513	A.3	Released
103045172	A.1	Released
101388412	A.2	SidAssigned
624694UA	0A.1	Released
629753AP	0A.1	Released
510594GB	0D.6	Released
629753GB	0A.1	Released
510594AP	0D.7	Released
510594ST	0D.7	Released
610079MS	0B.2	Released
629753UD	0A.1	Released
629773AY	0A.3	Released
629993PO	0A.1	Released
DE136413	A.6	Completed



2 PLM 도입과정 (1단계->2단계->안정화->Next)

2단계 (2009.2~2010.8)

- 사용자인터페이스(UI)개선
- Test Business Module 개발
- **Design BOM & Manufacturing BOM 개발**
- Spec Migration
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Manufacturing BOM 개발

- Process 와 Part 를 Tree 구조로 구현
- 최신 M-BOM 을 ERP 로 전송하여 FG(Finish Goods) 생성에 활용

PACKAGE	Saw MLF2 process flow for ENTROPIC	
P 0090	D/A CURE	Cure : 175+/-5°C, 30 Min
C 0090010	100+/-5/2H,150+/-5/1H	
C 0090001	175+/-5°C/1HR	
P 0120	WIRE BOND	H/B Temp : 200 +/-10 °C
C 0120012	150+5-0°C AU	
C 0120002	210+/-10°C AU	
P 0130	0 3/OPT INSP-100%	Insp: 100% (), Failed (Y)
C 0130003	LOW POWER	
P 0135	3RD OPT QA GATE	Sampling Plan : LTPD 5/0
C 0135001	LTPD 5/0	
P 0175	MOLD	
C 0175001	MATTE	
M MG336	EMC	G700
M 101361973	EMC, G700(14*7.0)	
P 0352	TAPE DETACH	
C 0352003	MANUAL	
C 0352006	TAPE DETACH_60+/-10°C	



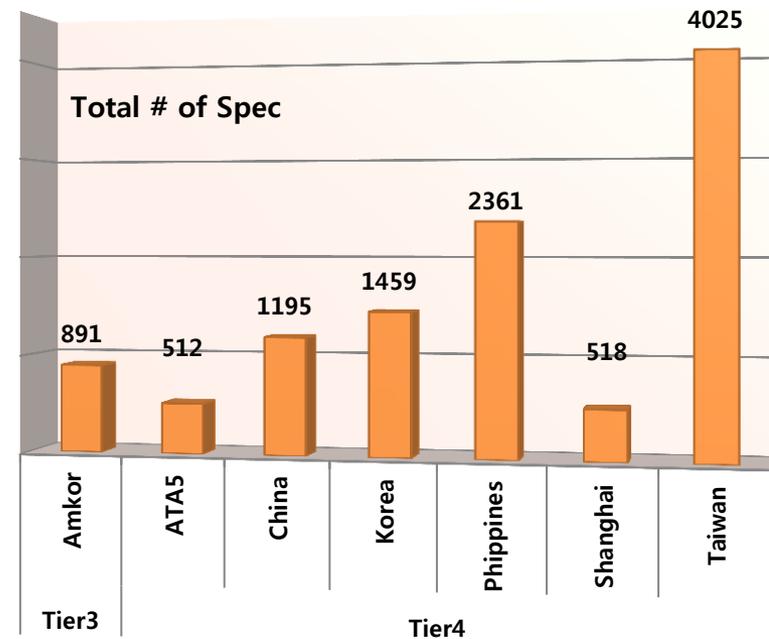
2 PLM 도입과정 (1단계->2단계->안정화->Next)

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- Design BOM & Manufacturing BOM 개발
- **Spec Migration**
- NPI Process 확립

Spec Migration

- 여러 공장 DB 에서 분리 관리되던 고객/Amkor Spec 을 PLM 으로 Migration
- Spec numbering rule 재정비





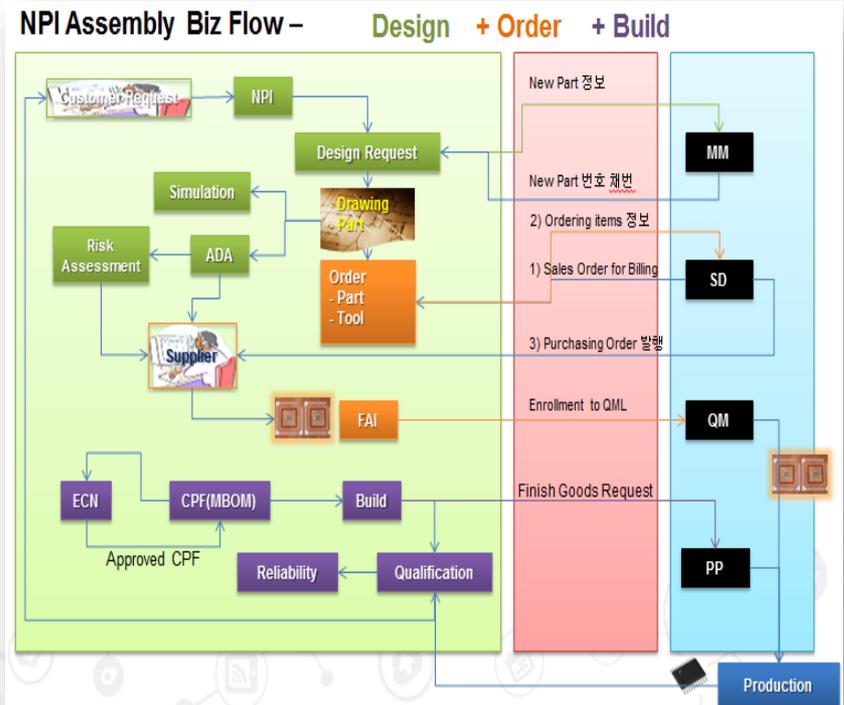
2 PLM 도입과정 (1단계->2단계->안정화->Next)

2단계 (2009.2~2010.8)

- 사용자인터페이스(UI)개선
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- Spec Migration
- **NPI Process 확립**

NPI Process 확립

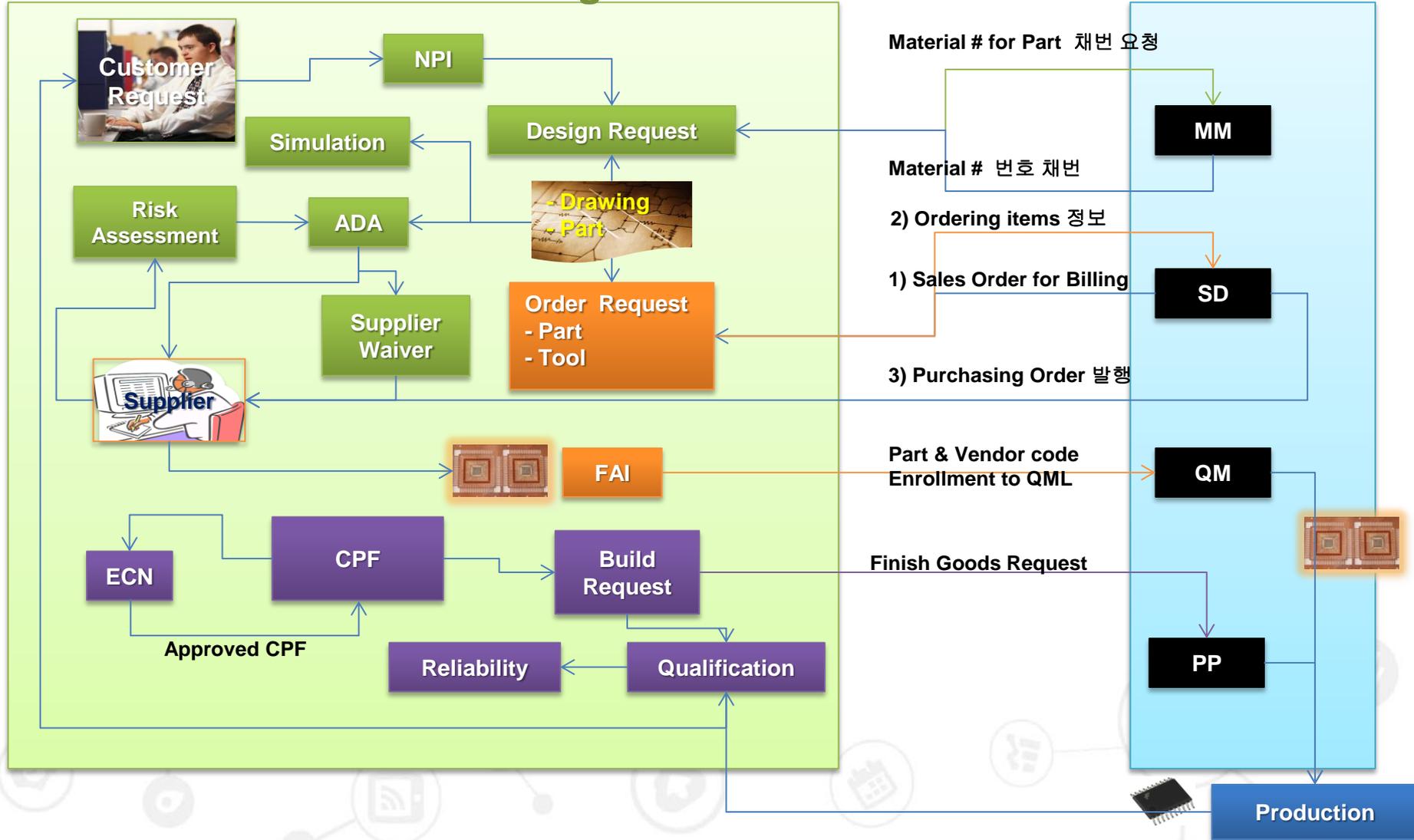
- 월 평균 500여 개의 New Product 생성
- 18개월의 짧은 라이프사이클 (PBGA 기준)



2 PLM 도입과정 (1단계->2단계->안정화->Next)

NPI Flow –

Design + Order + Build





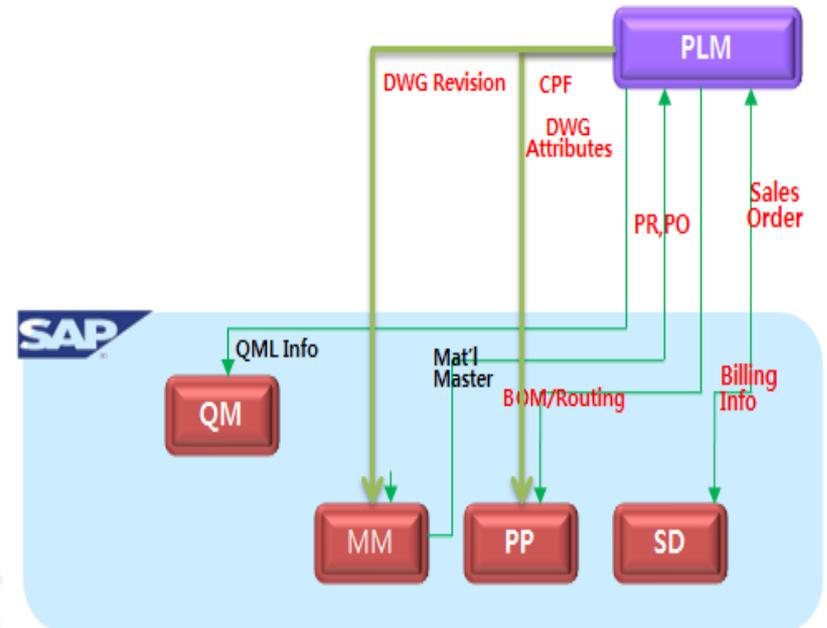
2 PLM 도입과정 (1단계->2단계->안정화->Next)

안정화 단계 (2010 10~Now)

- **ERP & MES 연계 고도화**
- PLM 기반의 업무 표준화
- 주요 Product Data 값의 DQM(Data Quality Management) 활동
- TFT에서 상시 조직으로 PLM 업무이관

ERP & MES 연계 고도화

- Manufacturing BOM, 원가 관련 Drawing Attribute 의 ERP 혹은 MES 연결을 강화하여 업무 효율성 증대와 시스템 통합 정도를 더욱 강화시킴





2 PLM 도입과정 (1단계->2단계->안정화->Next)

안정화 단계 (2010 10~Now)

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PLM 기반의 업무 표준화

- 각 공장에서 시행되는 유사한 업무를 PLM 환경으로 적극 포함
- 신규 공장 인수 시 PLM 사용자 교육을 최우선 실시하여 PLM 에 구축된 Global 업무절차를 따르도록 함





2 PLM 도입과정 (1단계->2단계->안정화->Next)

안정화 단계 (2010 10~Now)

- ERP & MES 연계 고도화
- PLM 기반의 업무 표준화
- **주요 Product Data 값의 DQM(Data Quality Management) 활동**
- TFT에서 상시 조직으로 PLM 업무 이관

DQM 활동

- 주요 Drawing Attributes 값의 Consistency 확보
- Classification 관리를 통한 Attribute 별 Possible Entry Value 관리

데이터 품질이 업무에 미치는 영향

의사 결정 지연

- 부정확한 리포트에 기초한 잘못된 의사 결정
- 리포트 신뢰도에 대한 불신 증대. 수작업 증가. 보고 비용 증가.

신규 시스템 도입 지연

- Single Source of Truth, Single View of Data
- Data ownership(Stewardship) 부재로 커뮤니케이션 비용 증가

비즈니스 운영 오류 (생산, 판매, 물류 등)

- 잘못된 자재 정보로 인한 조업 차질
- 잘못된 제품, 고객 정보로 인한 영업 비효율
- 통합되지 못한 협력사 정보로 인한 구매 비용 증대

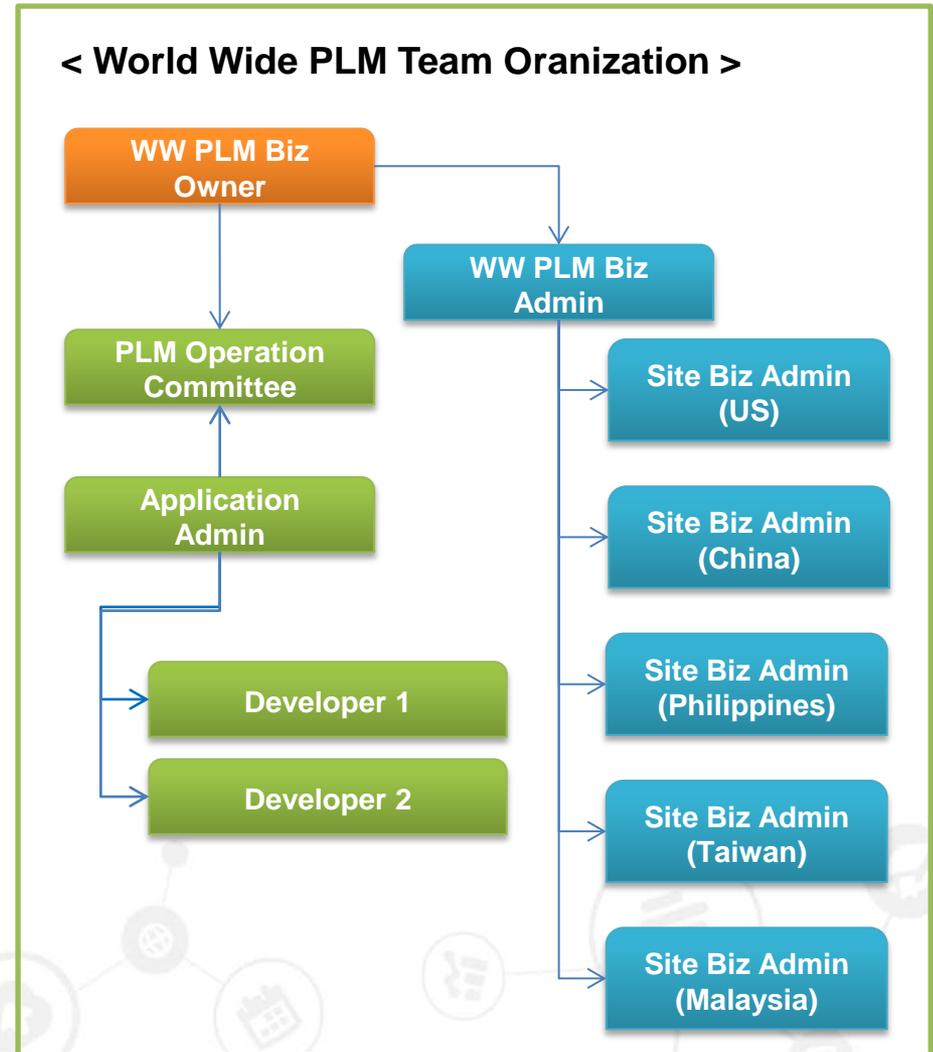
IT 활용도 저하 ▶ 시스템 경영 불가 ▶ 지속 경영 실패



2 PLM 도입과정 (1단계->2단계->안정화->Next)

안정화 단계 (2010 10~Now)

- ERP & MES 연계 고도화
- PLM 기반의 업무 표준화
- 주요 Product Data 값의 DQM(Data Quality Management) 활동
- **TFT에서 상시 조직으로 PLM 업무이관**





2 PLM 도입과정 (1단계->2단계->안정화->Next)

안정화 단계 (2010 10~Now)

- 유지
 - **Classification**
 - Role
 - Authority
 - Other Menu

- 개발
 - Server
 - Enhancement
 - Project

Classification 관리 현황 및 형태

- 340 개의 Classification 관리를 통해 사용자의 Invaidd 값 입력 방지
- Classification 간 Mother vs Child 관계설정

Classification Management

Classification Type * : DESIGN-PKG Group

Update	Child Save	Add	Template Save	Code	Name	useYN	Flag1	Flag2	Flag3
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	02	...				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	03	Dual-LF	Y		tpanc;choiyn;df...	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	04	FC Bumping	Y		ibpark;jross;keng...	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	05	FCBGA	Y		dbrad;dmcca;fha...	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	06	fcCSP	Y		drobi;greme;hiks...	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	07	Memory Modules	Y		amani;jmiks;jmlim	

Child Classification Link

Child Classification Type * : Package Type

Parent Classification : FCBGA

Code	Name	useYN	Flag1	Flag2	Flag3	Desc
119	...	N				
12	FINAL TEST	Y		RDARV		
<input checked="" type="checkbox"/>	FCLGA AS	N		DMCCA		SOLC
<input checked="" type="checkbox"/>	FCBGA AS	N		DMCCA		SOLC
<input checked="" type="checkbox"/>	FCPGA	Y		DMCCA		
<input checked="" type="checkbox"/>	SUPERFC AS	N		DMCCA		SOLC
124	FCOSP AS	N		VPERE MDEVI		SOLC
125	M2CSP	Y		bmle		



2 PLM 도입과정 (1단계->2단계->안정화->Next)

안정화 단계 (2010 10~Now)

- 유지
 - Classification
 - **Role**
 - Authority
 - Other Menu

- 개발
 - Server
 - Enhancement
 - Project

User Role 관리

- 여러 조건 값을 기준으로 담당자 Auto Assign
- 28개 Menu 에서 75개 종류의 사용자 Role 이 관리되고 있음

Assign User to Role							
User	<input type="text"/>						
Object	BR <input type="text"/>						
<input type="button" value="Search"/>							
Update	Add	Delete					
<input type="checkbox"/>	Object Name	Role Name	Condition	Assignee	Remark	Modier	Modify
<input type="checkbox"/>	BR	PE_Reviewer	pkgGroup=QFN, site=ATK, plant=K1, bizType=Assembly	HongBae Kim		EungGi Lim	20
<input type="checkbox"/>	BR	PE_Reviewer	bizType=ALL, pkgGroup=QFN, site=ATK, plant=ALL	SeungMin Kwak		Amkor Tech Adm...	20
<input type="checkbox"/>	BR	PE_Reviewer	bizType=ALL, pkgGroup=Quad-LF, site=ATK, plant=ALL	Jaehyeon Seo		Amkor Tech Adm...	20
<input type="checkbox"/>	BR	MDM_Revie...	bizType=Assembly, pkgGroup=QFN, site=ATK, plant=K1	YunJung Ko		ChangYoung Park	20
<input type="checkbox"/>	BR	MDM_Revie...	bizType=Assembly, pkgGroup=QFN, site=ATK, plant=K1	GaHui Park		Amkor Tech Adm...	20
<input type="checkbox"/>	BR	MDM_Revie...	bizType=Assembly, pkgGroup=Quad-LF, site=ATK, plant=K1	YunJung Ko		ChangYoung Park	20
<input type="checkbox"/>	BR	MDM_Revie...	bizType=Assembly, pkgGroup=Quad-LF, site=ATK, plant=K1	GaHui Park		Amkor Tech Adm...	20
<input type="checkbox"/>	BR	MDM_Revie...	bizType=Test, pkgGroup=ALL, site=ATK, plant=K1	YunJung Ko		ChangYoung Park	20
<input type="checkbox"/>	BR	MDM_Revie...	bizType=Test, pkgGroup=ALL, site=ATK, plant=K1	GaHui Park		Amkor Tech Adm...	20



2 PLM 도입과정 (1단계->2단계->안정화->Next)

안정화 단계 (2010 10~Now)

- 유지
 - Classification
 - Role
 - **Authority**
 - Other Menu

- 개발
 - Server
 - Enhancement
 - Project

권한 관리

- 사용자의 근무지와 소속 부서에 따라 PLM Access 수준을 관리함
- 24 개의 PLM Library 와 27 개의 Product Group 이 소속 부서 기준으로 관리되고 있음

Information		
User ID	cheel	Organization
E-mail Address	Cheehwai.Lee@amkor.com	Phone Number
Dept.		Manager
Local Time Zone	Malaysia	

PLM Library Information	
PLM Library Name	Role
Material	Members
TIMS	Members
QIFO	Members
Test Wafer	Members
Customer PO	Guest

PLM Product Information	
PLM Product Name	Role
Discrete	Quality Engineer
Dual-LF	Quality Engineer
Quad-LF	Quality Engineer



2 PLM 도입과정 (1단계->2단계->안정화->Next)

안정화 단계 (2010 10~Now)

- 유지
 - Classification
 - Role
 - Authority
 - **Other Menu**

- 개발
 - Server
 - Enhancement
 - Project

User Support

- Customer & Vendor 정보관리
- Change Assignment
- Drawing Interface
- Object Deletion

Linked Object ?

Object

Type: Number: Name:

Source Object (5 total objects)

Number	Title	Actions	Version	State
DE136410	DE136410, 8005, BCM7435UC0, SOLDER BUMPING, ghsie	...	A.5	Design
DE136410	DE136410, 8005, BCM7435UC0, SOLDER BUMPING, ghsie	...	A.4	Design
DE136410	DE136410, 8005, BCM7435UC0, SOLDER BUMPING, ghsie	...	A.3	Design
DE136410	DE136410, 8005, BCM7435UC0, SOLDER BUMPING, ghsie	...	A.2	Design
DE136410	DE136410, 8005, BCM7435UC0, SOLDER BUMPING, ghsie	...	A.1	Under Review

Linked Object (12 total objects)

Source Numbrme	Source Version	Number	Title	Version	State
<input type="checkbox"/> DE136410	A.5	6005009691	MASK,14",PI,BCM7435UC0,636135MD/T5	A.3	Released
<input type="checkbox"/> DE136410	A.4	6005009691	MASK,14",PI,BCM7435UC0,636135MD/T5	A.3	Released
<input type="checkbox"/> DE136410	A.3	6005009691	MASK,14",PI,BCM7435UC0,636135MD/T5	A.3	Released
<input type="checkbox"/> DE136410	A.3	6005009691	MASK,14",PI,BCM7435UC0,636135MD/T5	A.2	Released
<input type="checkbox"/> DE136410	A.2	6005009691	MASK,14",PI,BCM7435UC0,636135MD/T5	A.2	Released
<input type="checkbox"/> DE136410	A.5	6005009792	MASK,14",UBM,BCM7435UC0,636135M...	A.3	Released



2 PLM 도입과정 (1단계->2단계->안정화->Next)

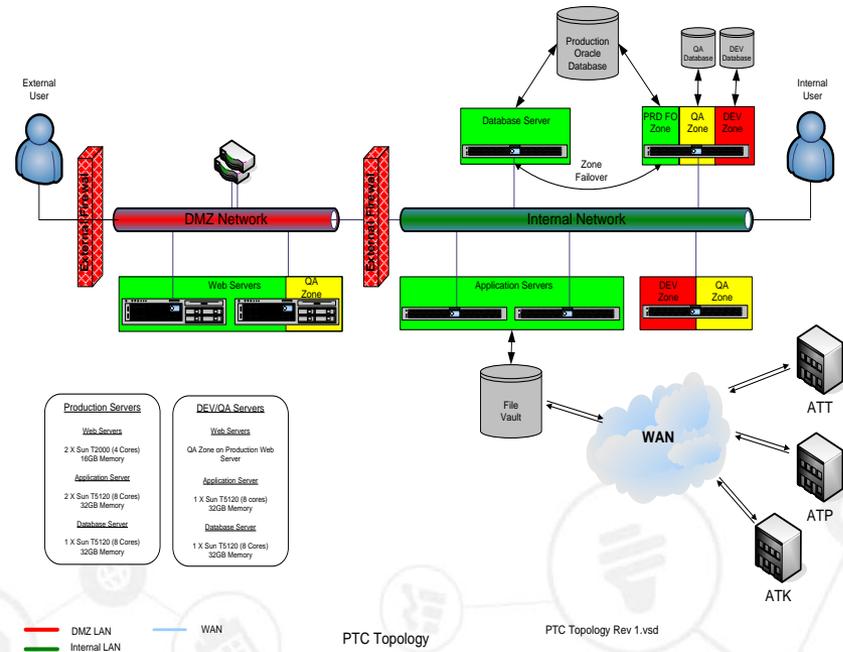
안정화 단계 (2010 10~Now)

- 유지
 - Classification
 - Role
 - Authority
 - Other Menu

- 개발
 - **Server**
 - Enhancement
 - Project

Server운영 형태

- DEV & Test Server 개발 및 검증
- PRD Server
- 외부 유저에게 제한된 Menu 및 Data 접근만 허용





2 PLM 도입과정 (1단계->2단계->안정화->Next)

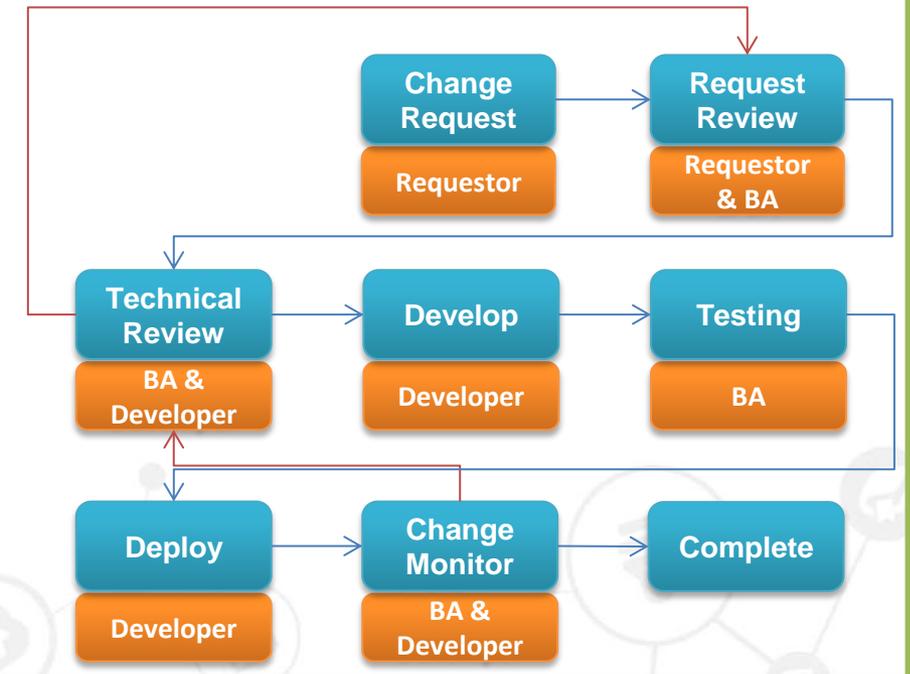
안정화 단계 (2010 10~Now)

- 유지
 - Classification
 - Role
 - Authority
 - Other Menu

- 개발
 - Server
 - **Enhancement**
 - Project

개발 관리 절차

- ALM 시스템을 이용한 체계적인 PLM 매뉴 개발 & 변경 진행
- 월 평균 6건의 PLM 매뉴 개발 & 변경





2 PLM 도입과정 (1단계->2단계->안정화->Next)

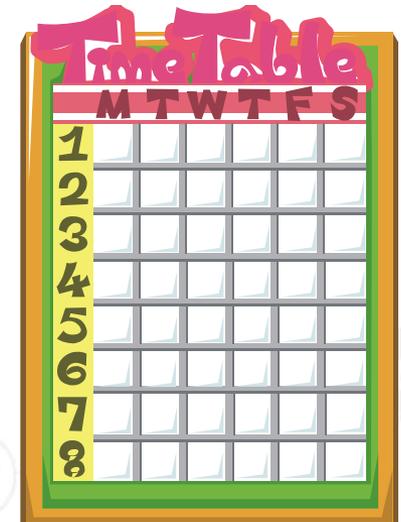
안정화 단계 (2010 10~Now)

- 유지
 - Classification
 - Role
 - Authority
 - Other Menu

- 개발
 - Server
 - Enhancement
 - **Project**

2014 Project

- Manufacturing BOM Baseline 도입 (2014 1Q)
- Amkor Malaysia PLM Open (2014 2Q)
- Amkor Taiwan Build Request (2014 3Q)
 - Auto Master Data Creation
 - Master Data I/F to ERP
 - Marking I/F to MES

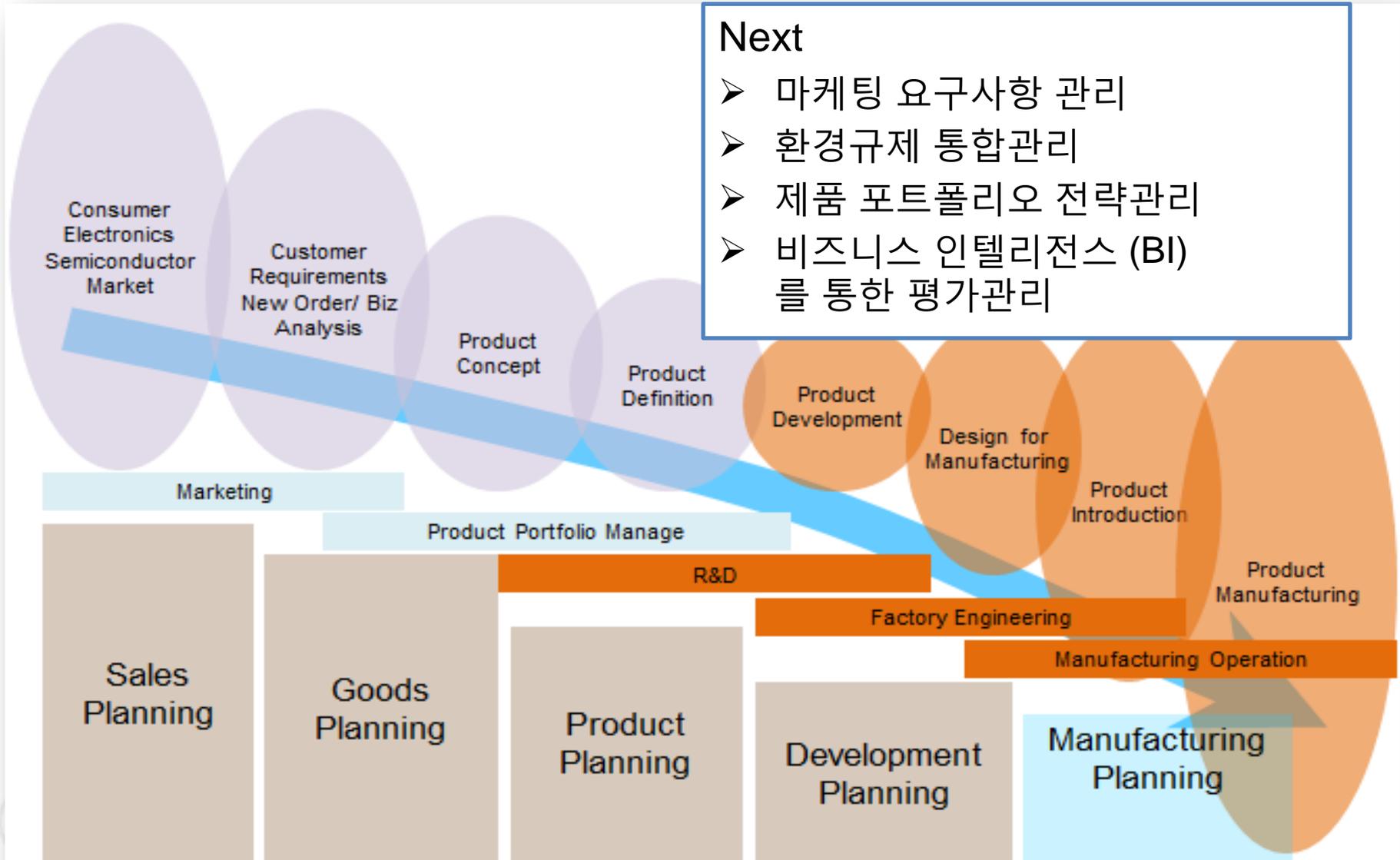




2 PLM 도입과정 (1단계->2단계->안정화->Next)

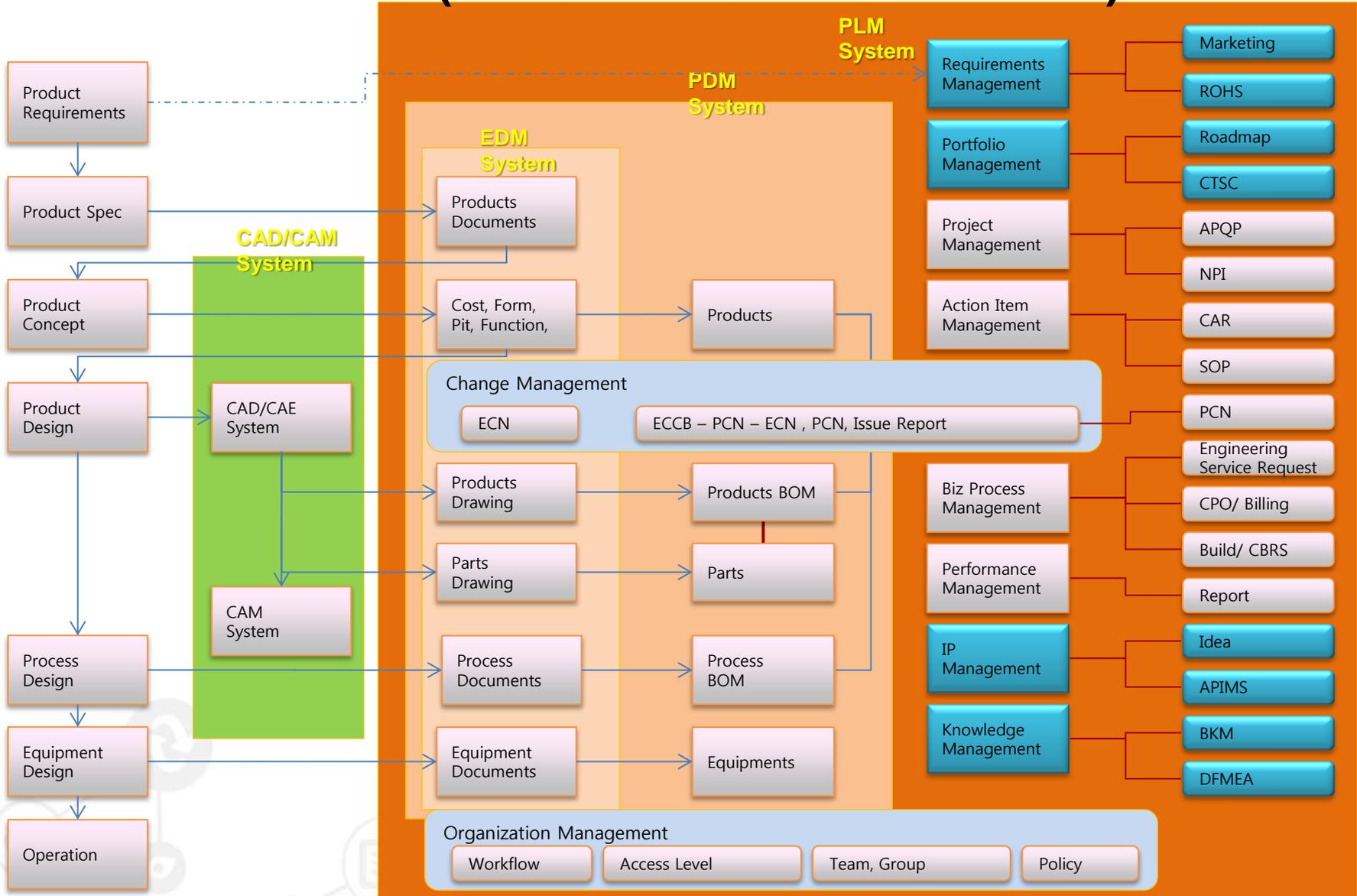
Next

- 마케팅 요구사항 관리
- 환경규제 통합관리
- 제품 포트폴리오 전략관리
- 비즈니스 인텔리전스 (BI) 를 통한 평가관리





2 PLM 도입과정 (1단계->2단계->안정화->Next)





감사합니다 Natick
Grazie Danke Ευχαριστίες Dalu
Thank You Köszönöm
Tack Obrigado
Спасибо Dank Gracias
谢谢 Merci Seé
ありがとう

