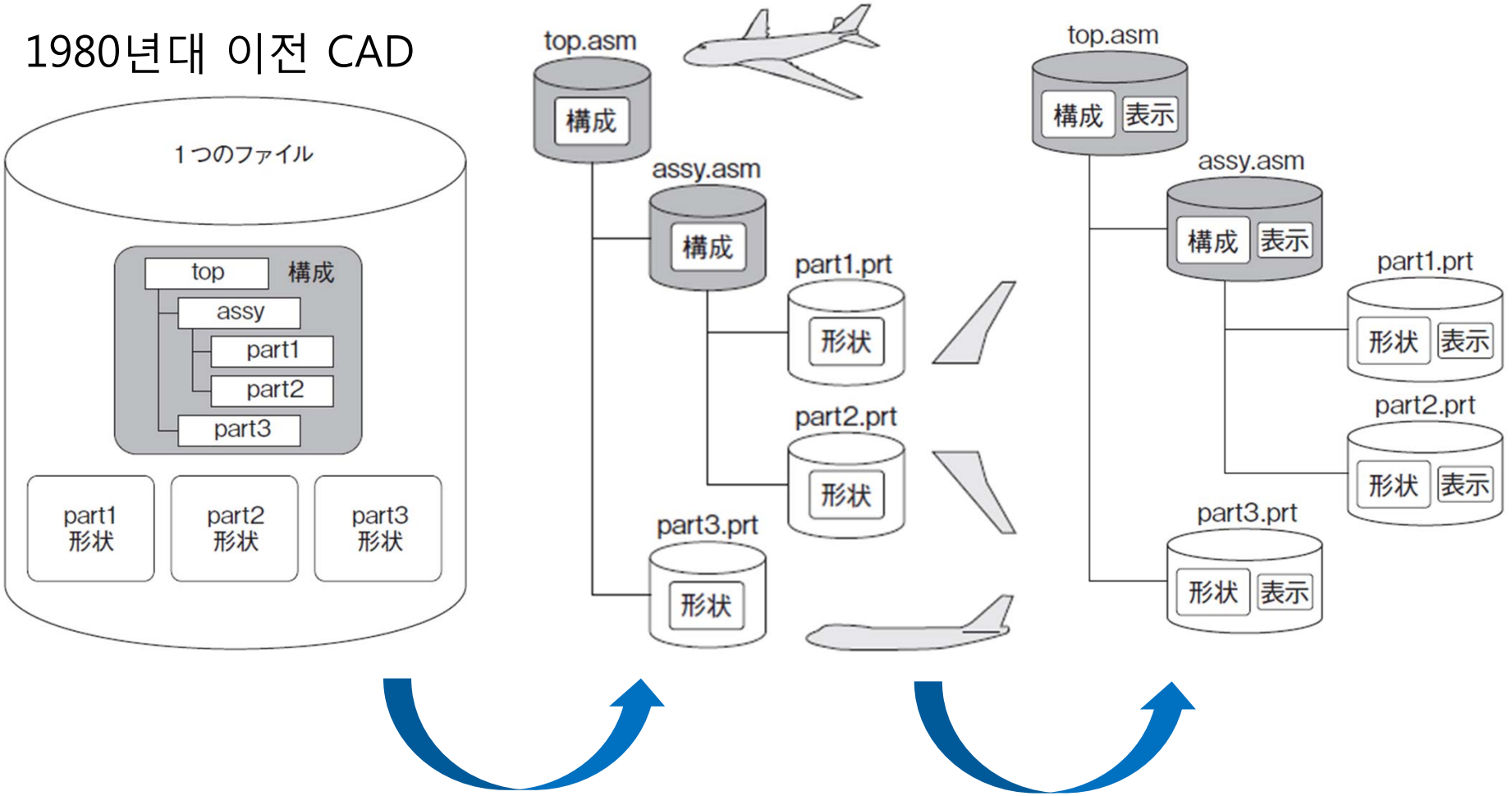
Assembly

- 수 천개 이상의 부품으로 구성된 제품?
- 어셈블리정보(구성정보)와 개별 부품정보의 파일을 분리
  - 어셈블리정보 (파일용량적음): 부품파일명 또는 서브어셈블리파일명, 각각의 위치정보
  - 부품정보: 부품의 3차원 형상, 재료 등의 속성정보
- 장점
  - 부품데이터를 공유하기 쉽다: 업데이트, 데이터 재이용
  - 파일을 세분화
- 단점
  - 동작속도 악화
  - 파일접근시간: 0.01초, 전송속도: 50M/sec 일 때, 4G (6000개의 부품의 공작기계) 데이터 읽는 속도?
  - 해결책: 표시용 3차원정보를 원래의 정보와 함께 보관

1980년대 이전 CAD

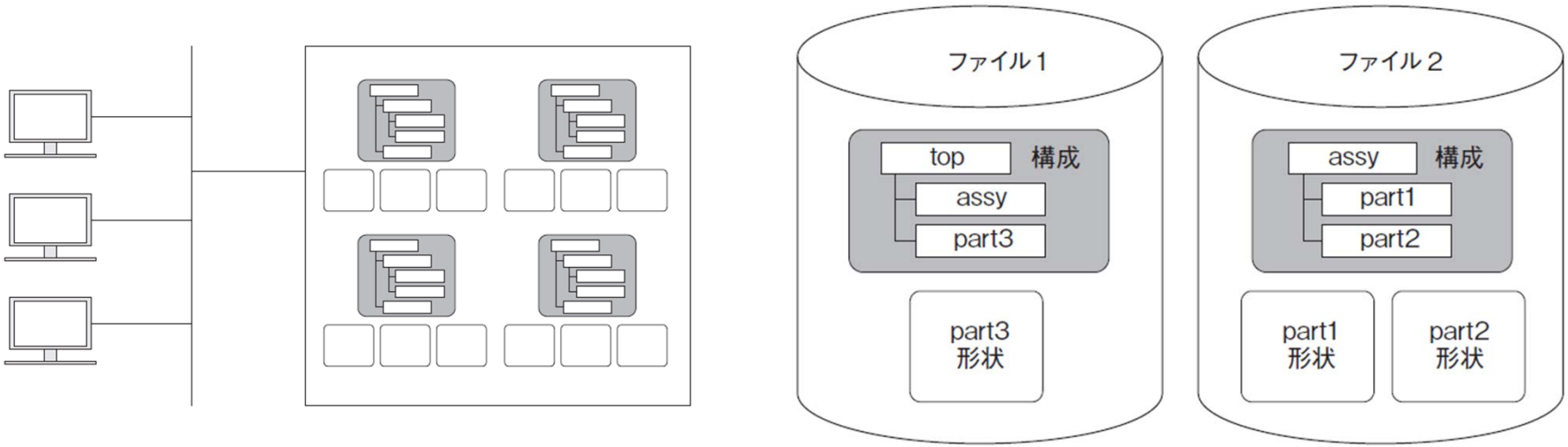


어셈블리 저장 방법

제품명	개발회사	어셈블리의 표현 및 보관방법	
		어셈블리 정보	부품정보
Autodesk Inventor	(미) Autodesk	iam	ipt
CATIA V5	(프) Dassault Systemes	catproduct	catpart (복수 부품 가능)
CATIA V6		데이터베이스로 일괄 관리, 파일없음	
Creo Elements/ Direct Modeling	(미) PTC	sda (인스턴스) sdac (컨텐츠)	sdp (인스턴스) sdpc (컨텐츠)
		pkg (위 정보를 하나로 정리) bdl (pkg +도면파일)	
Creo Elements/ Pro		asm	prt
NX	(미) Siemens PLM Software	prt	prt
Solid Edge		asm	par
SolidWorks	(미) Dassault Systemes SolidWorks	sldasm	sldprt
Spaceclaim	(미) Spaceclaim	scdoc	scdoc
TOPsolid	(프) Missler Software	부품파일 분리 가능	

파일?

- 어셈블리나 부품파일이 존재하지 않고 모두 DBMS(데이터베이스 관리시스템)에서 직접 관리→CATIA V6
  - 단점: CAD 단말에 DBMS가 필요: 도입비용증가
  - 장점: 변경의 관리나 표준부품정보의 유지 용이성 우수
- 파일에 여러 개의 어셈블리나 부품 정보를 갖게 함으로써 파일 수를 줄이는 방법



Assembly Modeling Capabilities

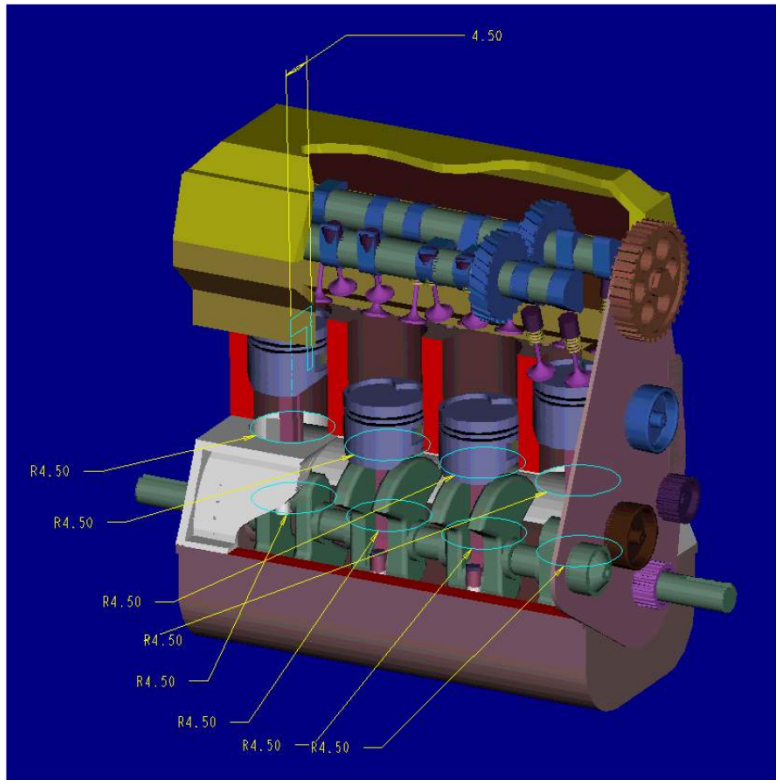
- Basic functions for assembly modeling
- Browsing an Assembly
- Feature for Concurrent Design
- Usage of assembly model
- Simplification of Assemblies

Basic Functions for Assembly Modeling

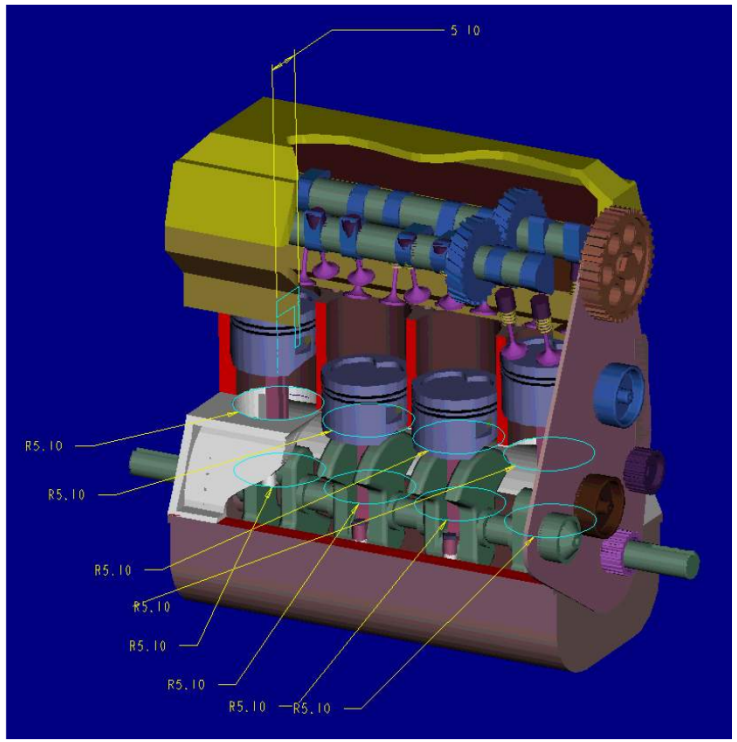
- Provide a logical structure for grouping and organizing parts into assemblies and subassemblies
  - Mating conditions
    - Identify how the part is connected to others
    - e.g. two planar faces of a pair of parts are ***against*** each other or two cylindrical faces are ***coaxial***
    - From which the position and orientation data of parts are derived
  - Instancing information
    - Identify other places in the assembly where the same part is used
- Provide parametric modeling in the assembly
    - Create parametric constraint relationships between parts
    - Measure size and dimension information from one part and apply it to another

Dimension Change Propagation

– Change the diameter of the cylinder



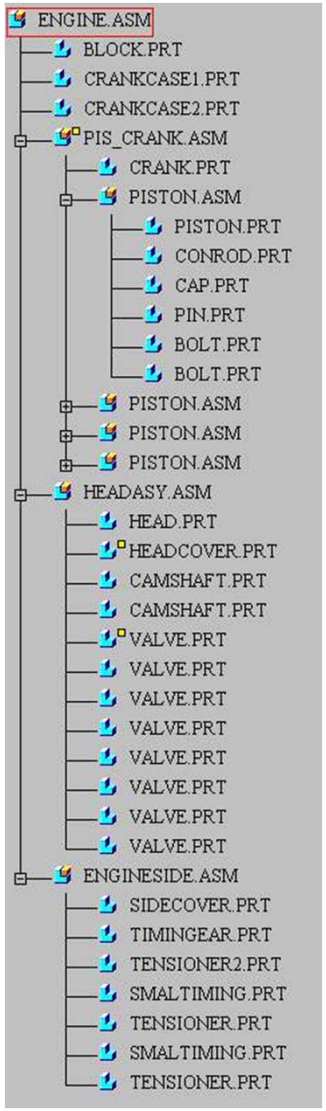
Before modification



After modification

Browsing an Assembly

- Allow users to interact with the system
  - Locating parts
  - Identifying their relationships
  - Accessing CAD models, drawings, and associated part data

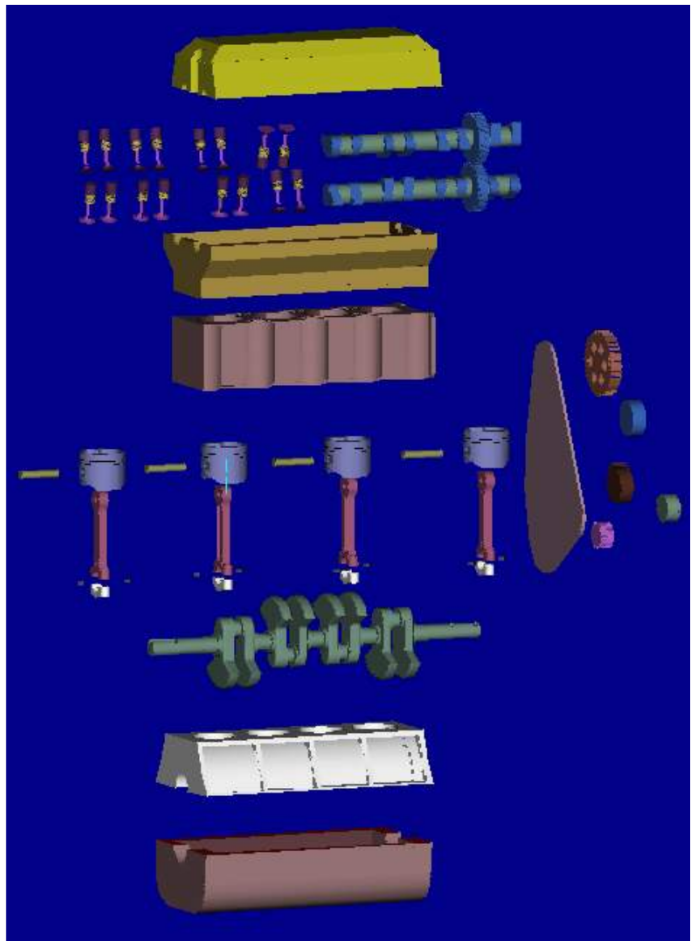


Feature for Concurrent Design

- Provide the functions to effectively manage multiple users accessing the same assembly at the same time
  - check-in/check-out procedures control
- The ability to bring all parts together into a unified assembly and perform engineering analysis
- Communicate part design changes made by someone without disrupting the work of others (challenging problem)
  - Transmit routine updates at a certain periodic intervals or when users request

Usage of Assembly Model

- Exploded View
- Digital mock-ups
  - view assemblies in virtual reality
  - perform packaging studies, interference checks, kinematic analysis, etc.
- Generation of bills-of-material (BOM)



Simplification of Assemblies

- Problems of large assemblies and the complex features on the parts
  - overpower many systems, greatly reducing modeler performance and making required information difficult to find
- Simplification of Complex Assemblies
  - Use the concept of instancing
  - “Agglomeration” : groups an entire assembly or subassembly into a single model
  - Ignore small detail features temporarily when not needed

Web-Based Modeling

- “Publishing” the geometric model
  - to save it in a format that a Web browser can read and put it on a Web page
- Formats
  - Virtual Reality Modeling Language (VRML) : 3D
  - Computer Graphics Metafile (CGM) : 2D
  - Autodesk’s Drawing Web Format (DWF) : 2D