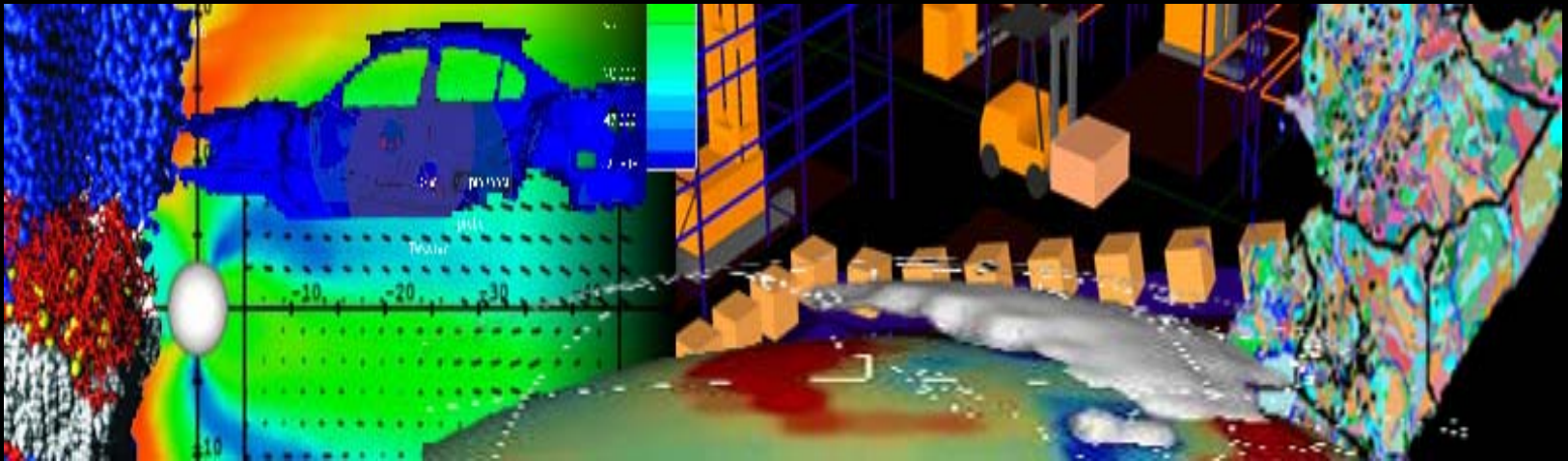


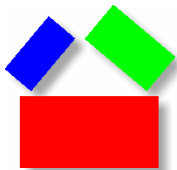
DATA CENTER

DATA CENTER

Make sense of your data

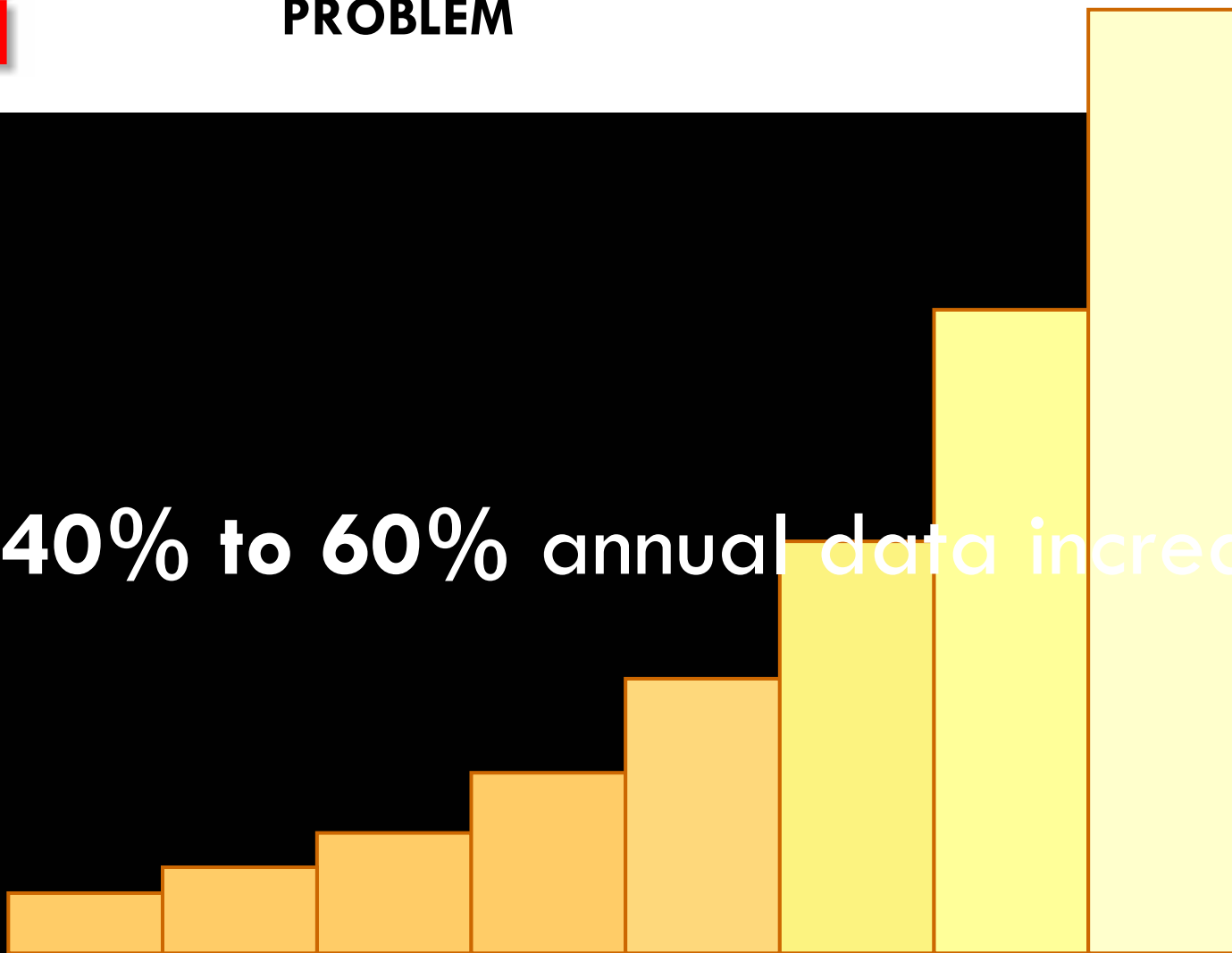


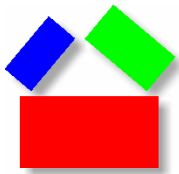
David Brock, Founder and Director
Data Center
Massachusetts Institute of Technology



PROBLEM

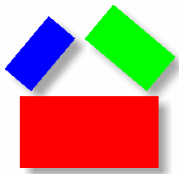
40% to 60% annual data increase





PROBLEM

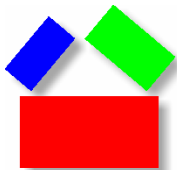
What are you going to do
with all your
Data?



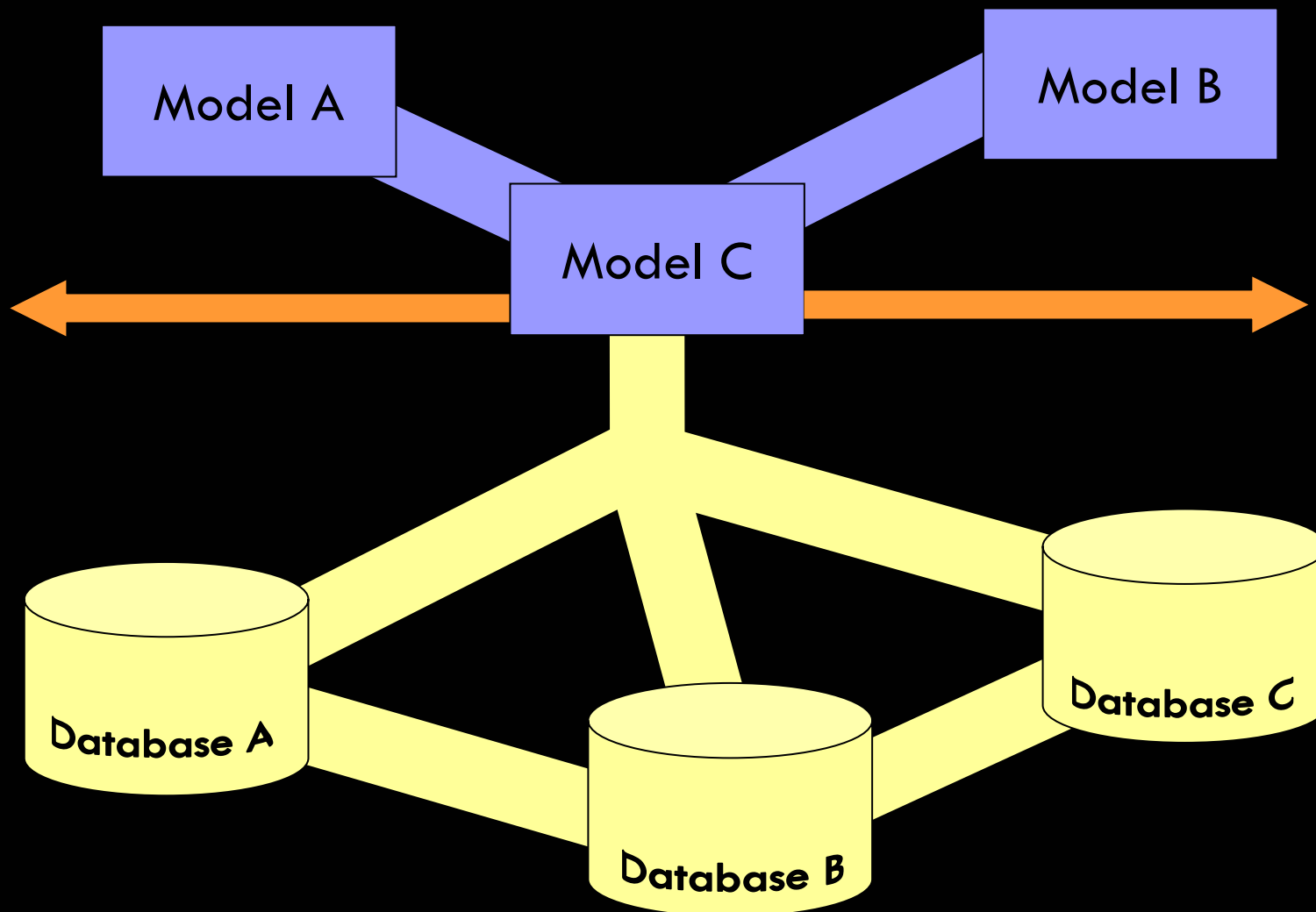
DATA CENTER

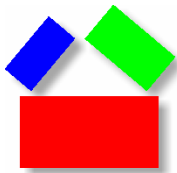
DATA CENTER

Make sense of your data

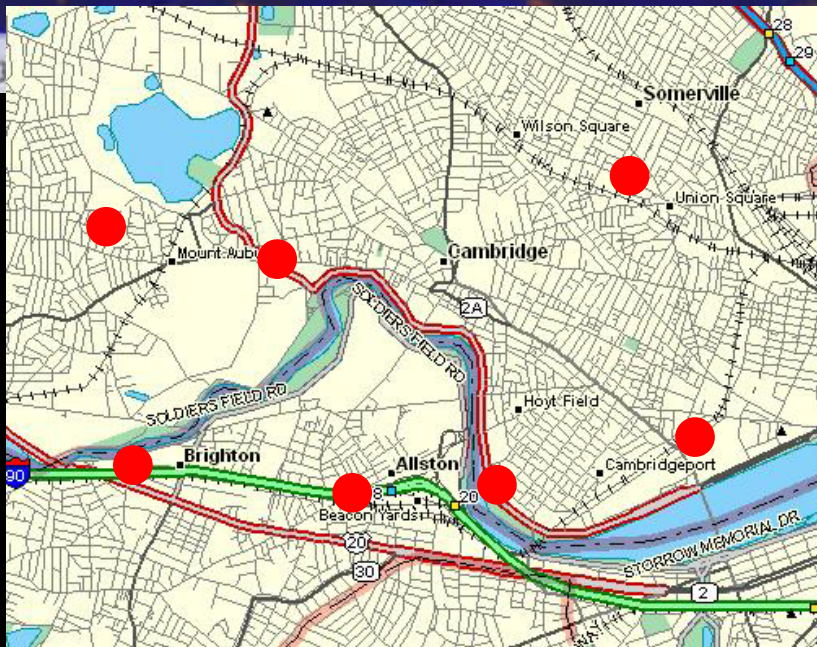
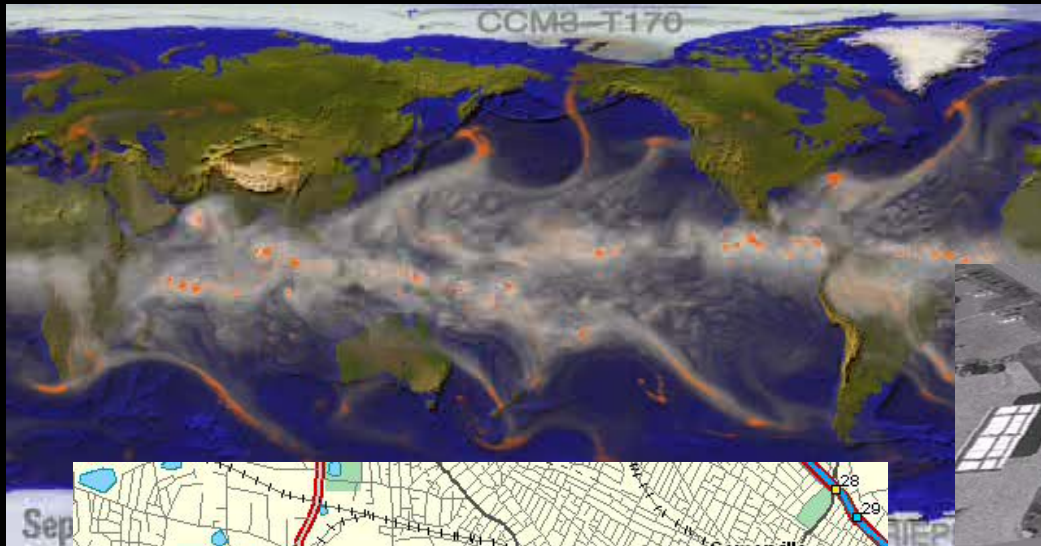


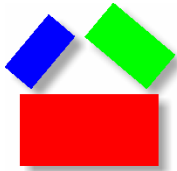
VISION





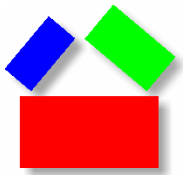
EXAMPLE - LOGISTICS





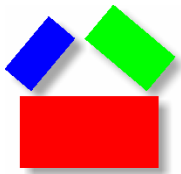
EXAMPLE - LOGISTICS





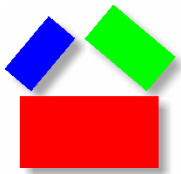
DATA



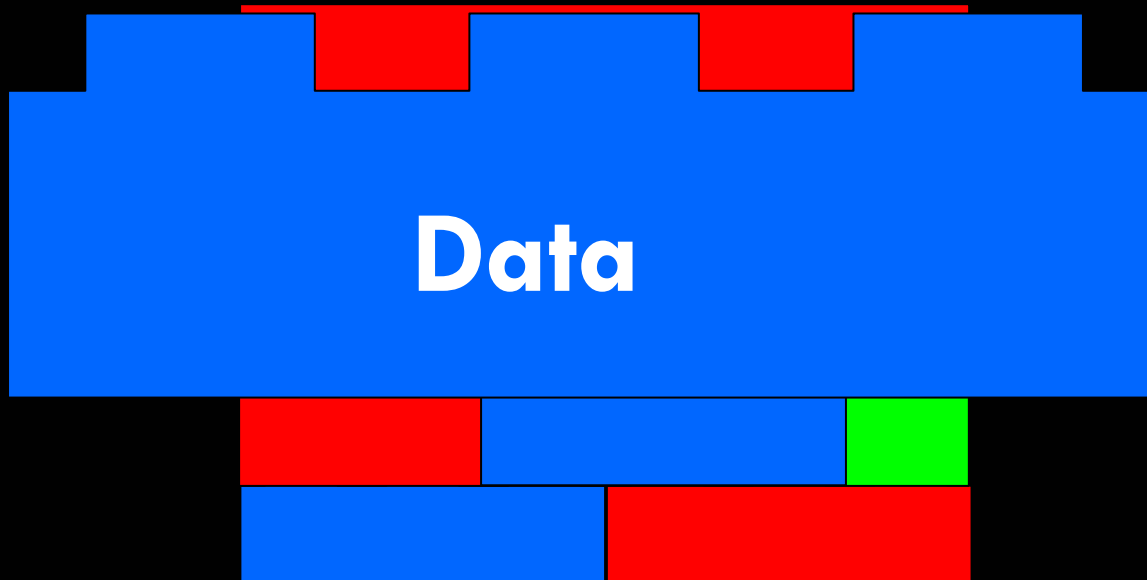


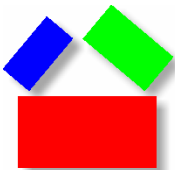
DATA

Data

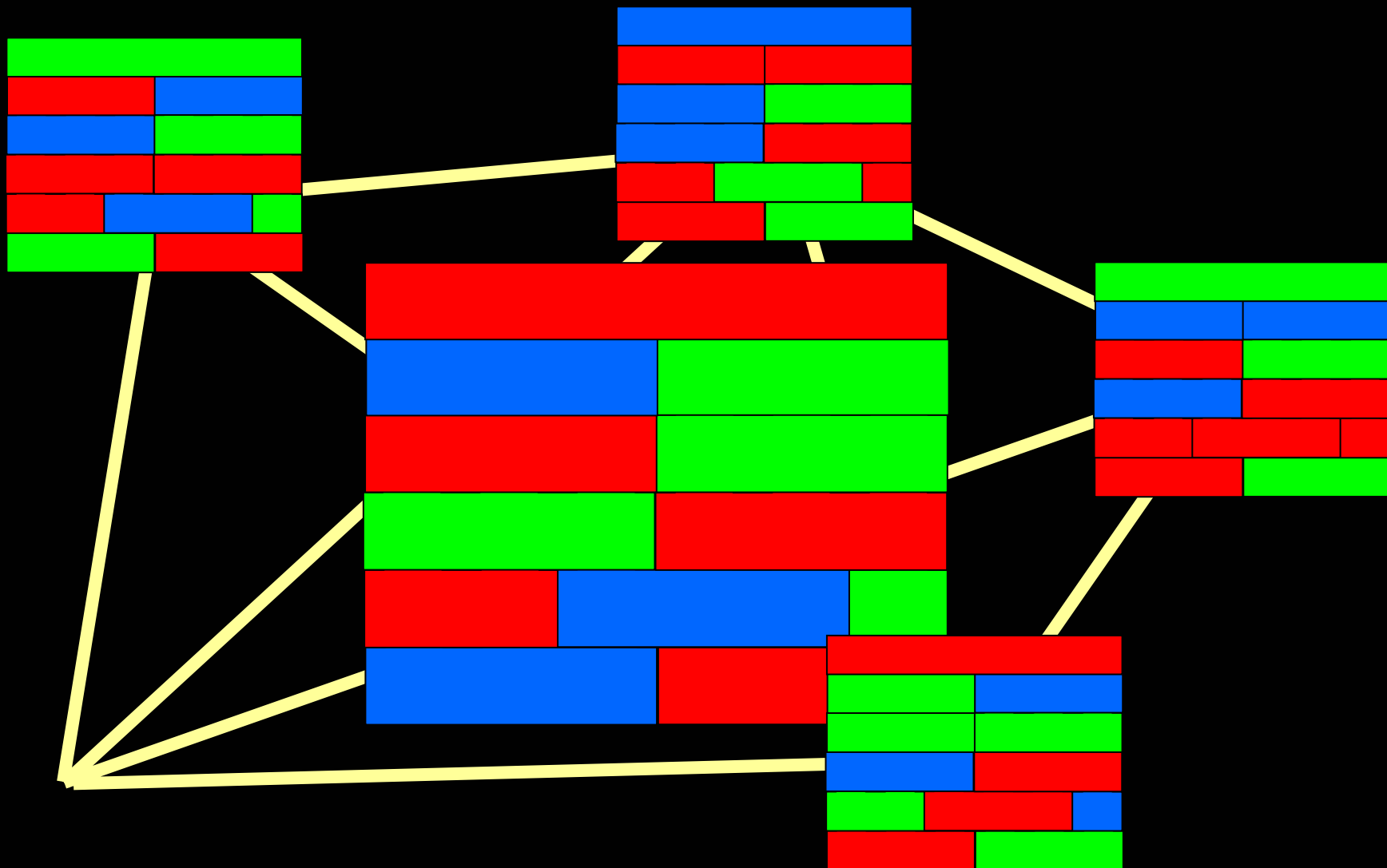


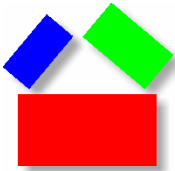
DATA



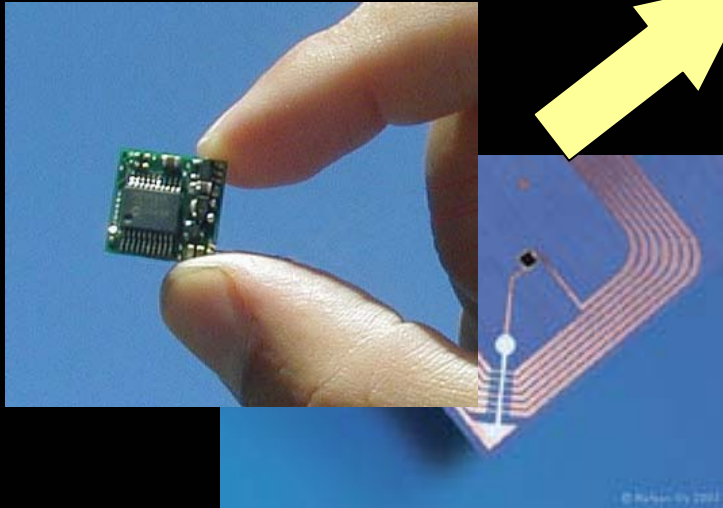
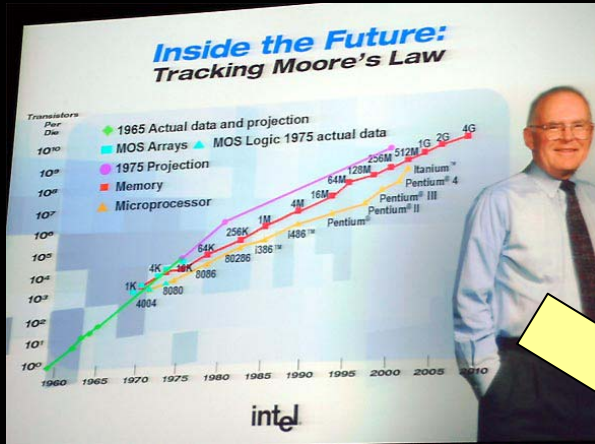


DATA NETWORK

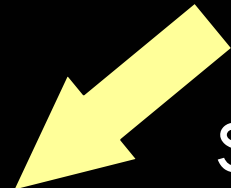




DRIVERS



XML
HTML
EPC
TCP/IP
HTTP
SOAP



U.S. Census Bureau
AMERICAN COMMUNITY SURVEY

Available in this Section

- Data Tables Main
- 2002 Data Profiles
- 2001:2002 Change Profiles
- 2002:2000 Change Profiles
- Special Tabulations
- CD-ROM Order/Details
- Detailed Tables
- 2001 Data Profiles
- 2000:2001 Change Profiles
- 2000 Data Profiles
- 1999 Data Profiles

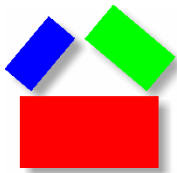
Warnings and Forecasts | Graphical Forecasts | National Maps | Radar | Rivers | Satellite

Go to State / Region | Click on Map to Zoom In

30 40 50 60 70 80 90 100 110

Low Temperature (F) Ending Tue Jul 06 2004 8AM EDT (Tue Jul 06 2004 12Z)

National Digital Forecast Database
Experimental graphic created 07/05/2004 11:36PM EDT



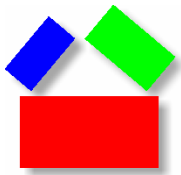
VISION

Mission

- **Make sense of your data**

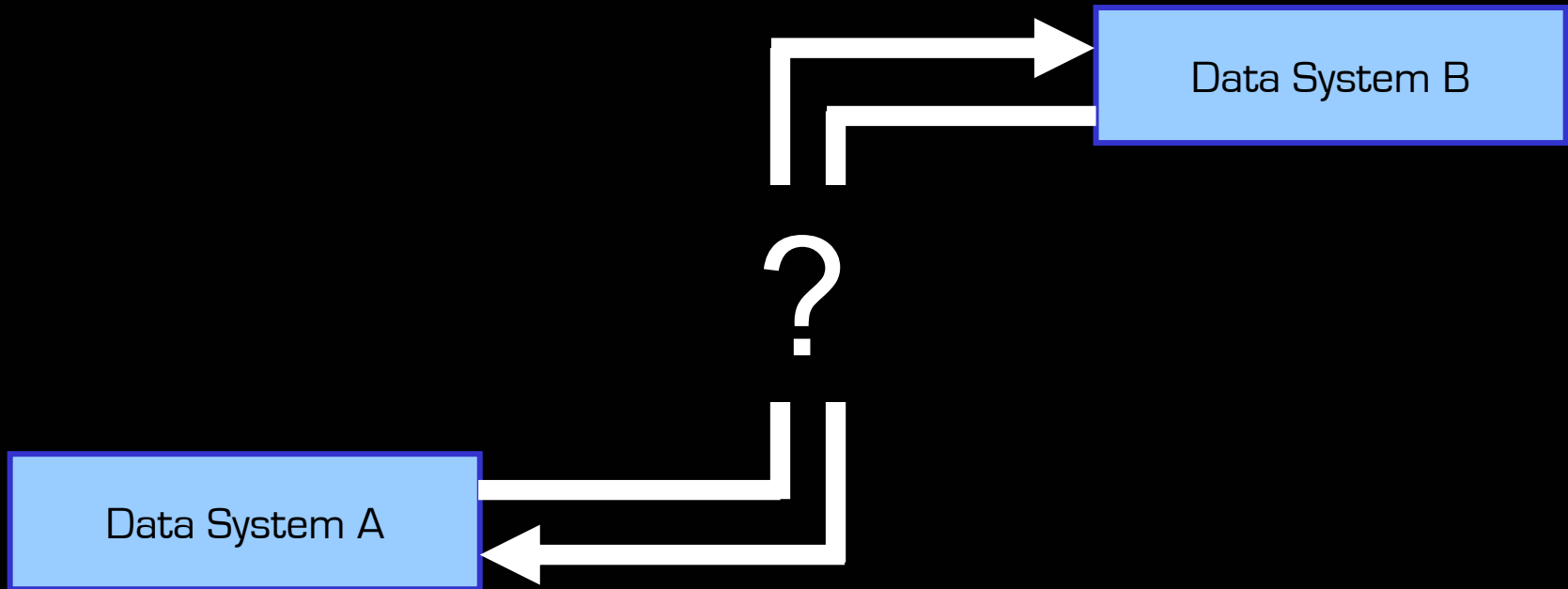
Task

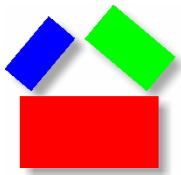
- **Create the standards and systems for interoperable data and modeling**



VISION

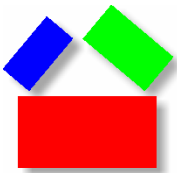
How do we synchronize data?





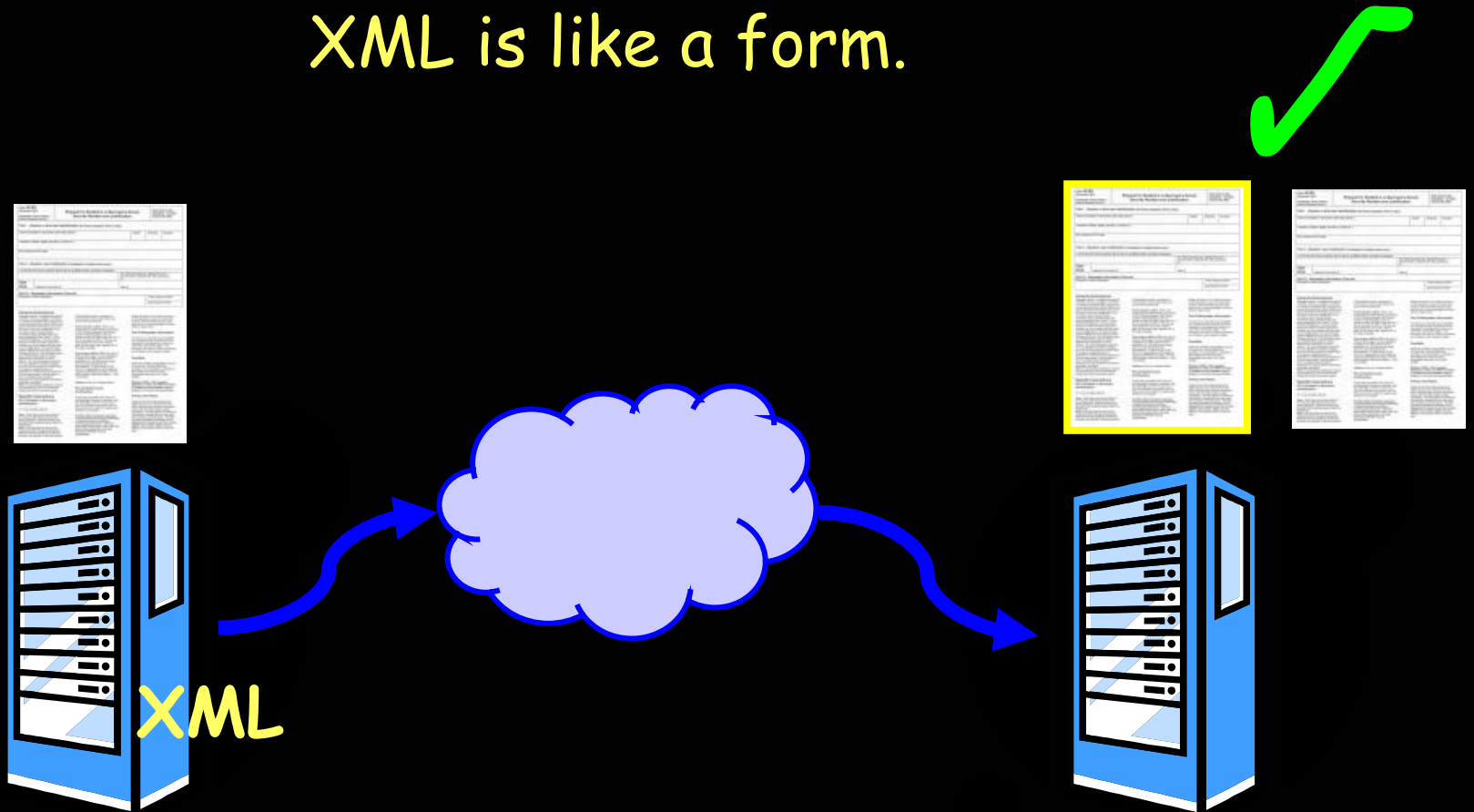
SOLUTION

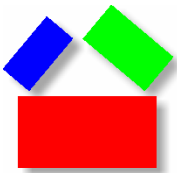
XML



XML

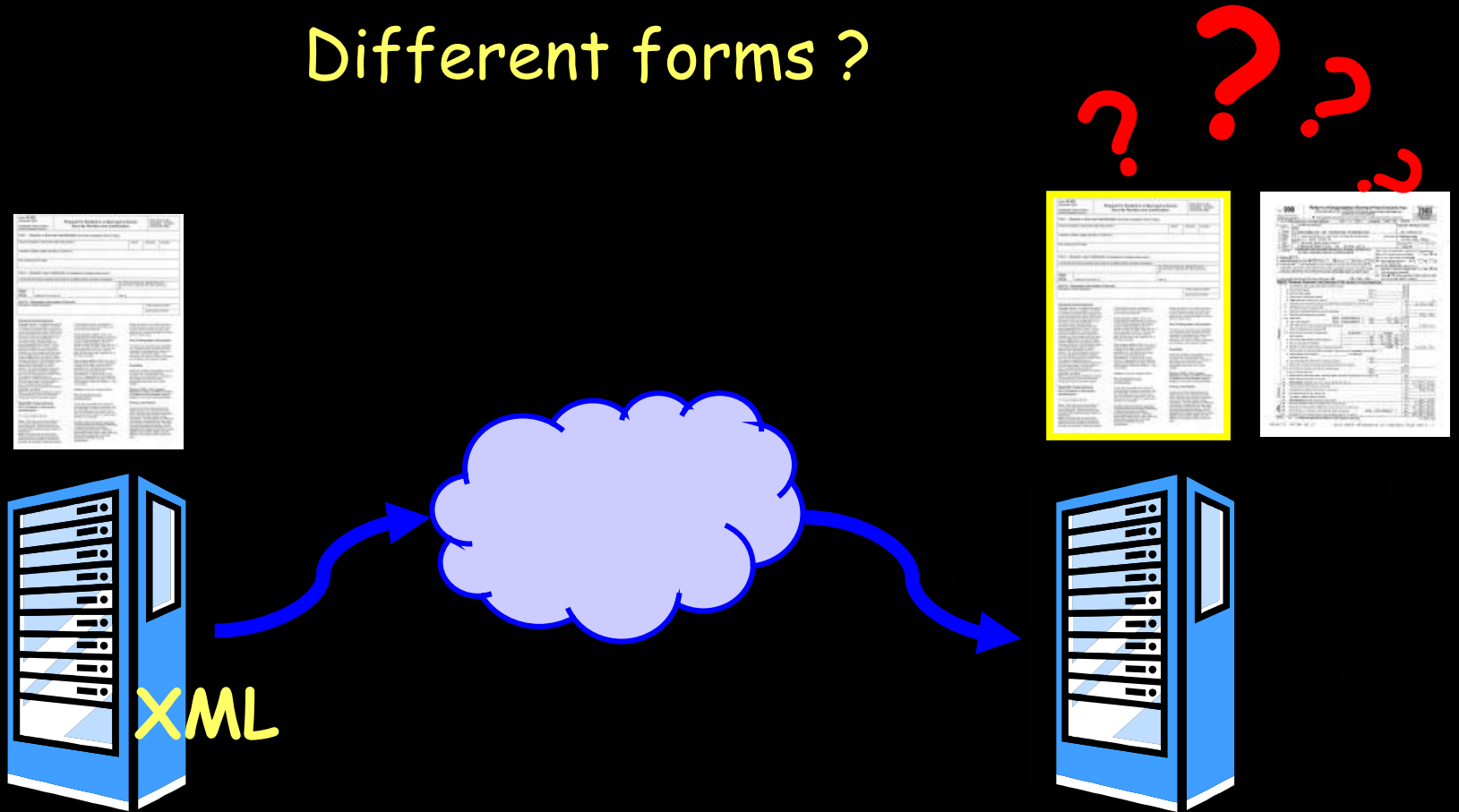
XML is like a form.

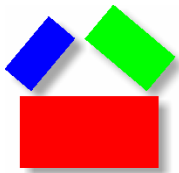




PROBLEM

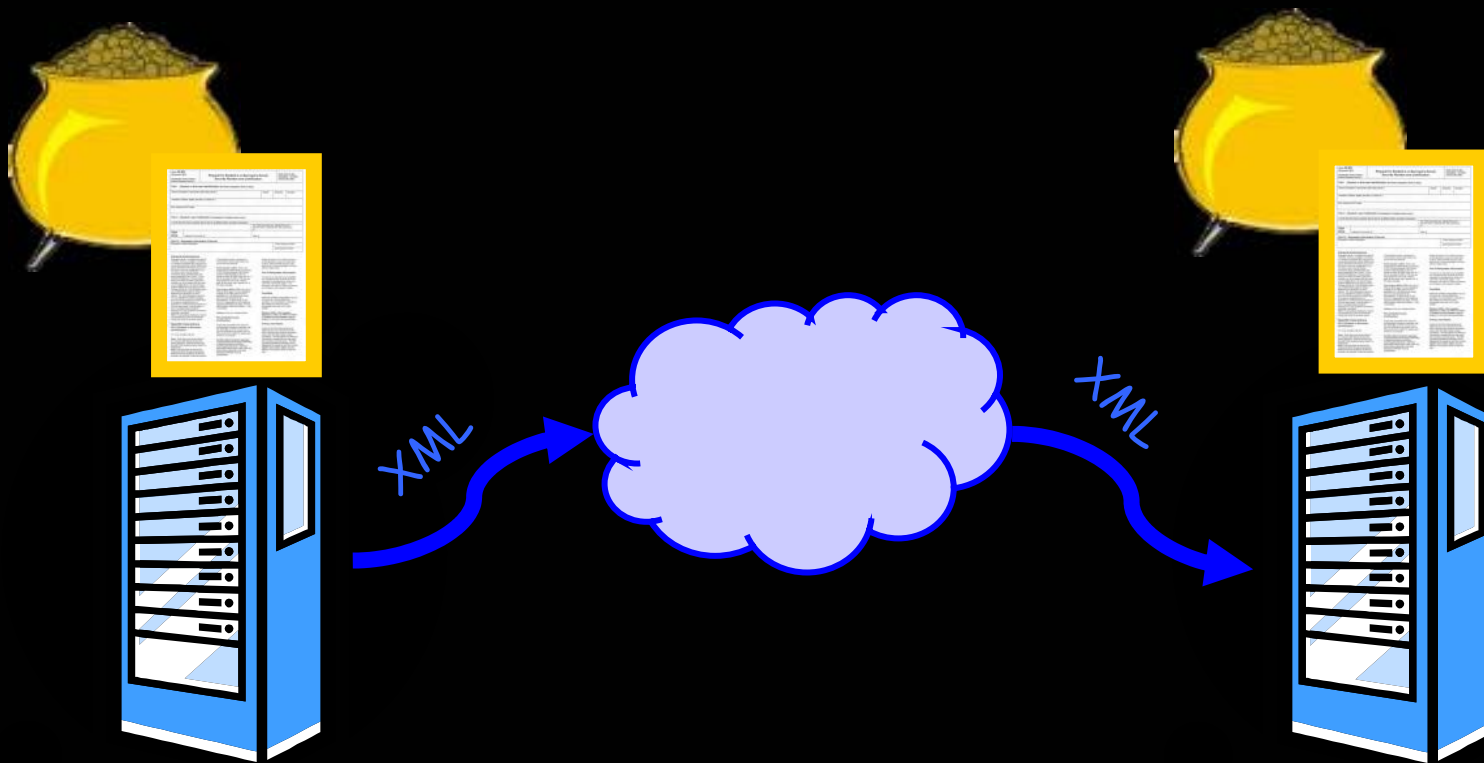
Different forms ?

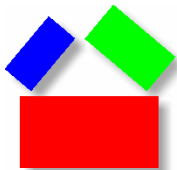




STANDARD

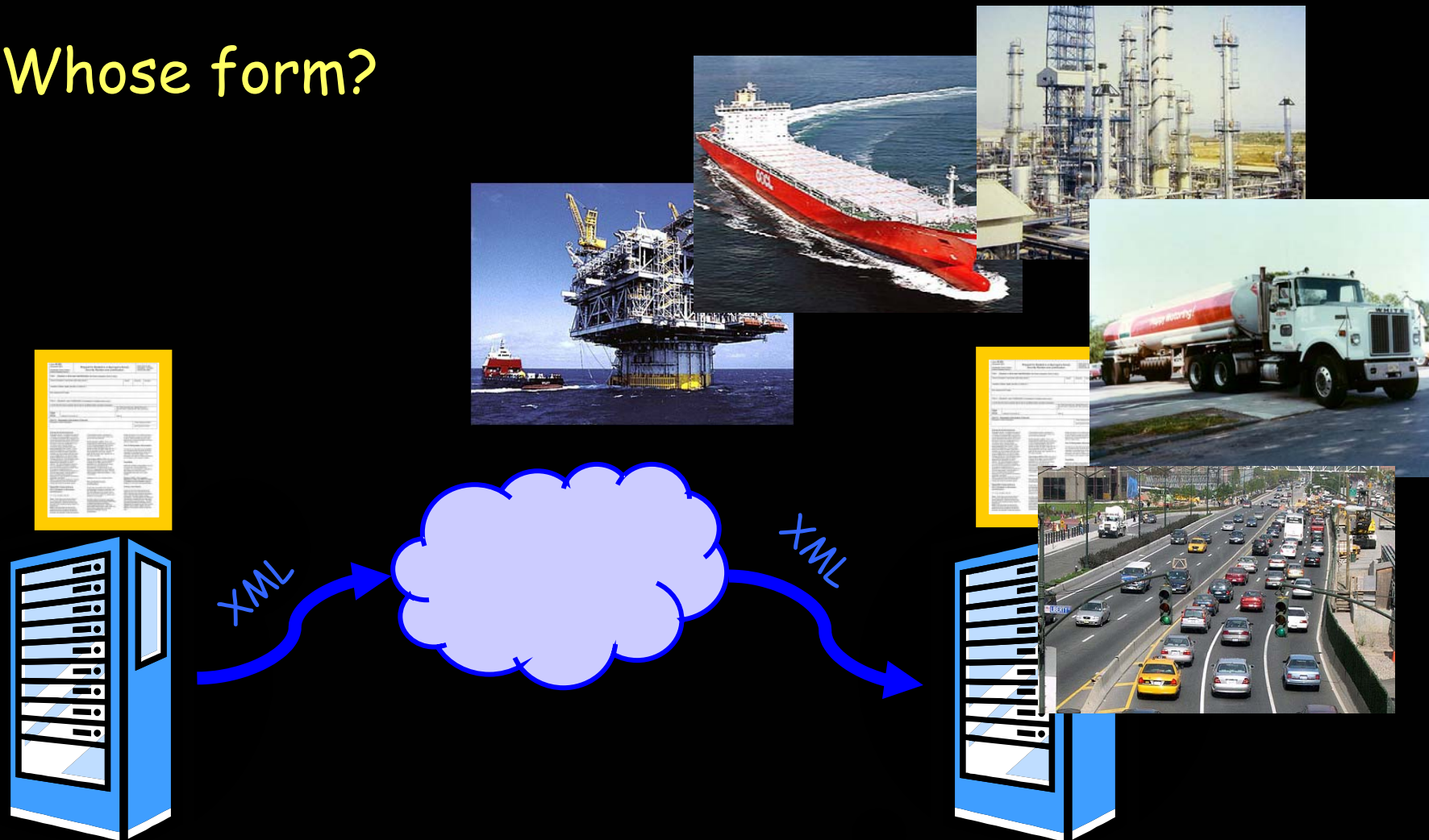
Can't we just agree on one form?

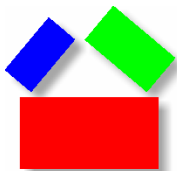




STANDARD?

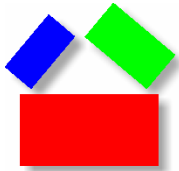
Whose form?



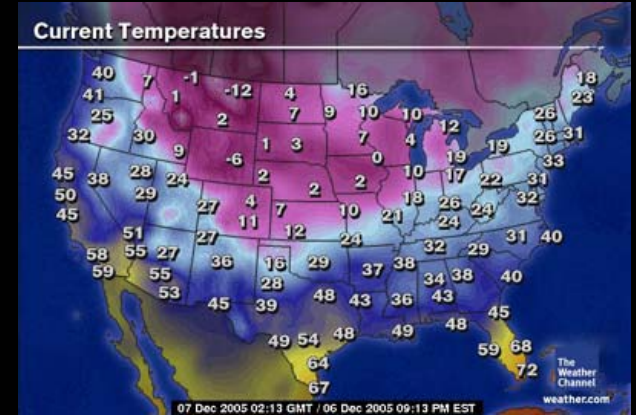


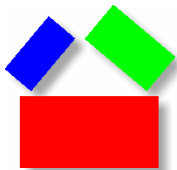
STANDARDS?

| | | | | | | | | | | | |
|----------|----------|----------|-------------|----------|------------|----------|------------|----------------|----------|------------|------------|
| 4ML | ARML | BiblioML | CIDX | eBIS-XML | HTTP-DRP | MatML | ODRL | PrintTalk | SHOE | UML | XML F |
| 5AML | ARML | BCXML | xCIL | ECML | HumanML | MathML | OeBPS | ProductionML | SIF | UBL | XML Key |
| 6AML | ASML | BEEP | CLT | eCo | HyTime | MBAM | OFX | PSL | SMML | UCLP | XMLife |
| 7AML | ASML | BGML | CNRP | EcoKnow | IML | MISML | OIL | PSI | SMBXML | UDDI | XML MP |
| 8AML | ASTM | BHTML | ComicsML | edaXML | ICML | MCF | OIM | QML | SMDL | UDEF | XML News |
| 9AML | ATML | BIBLIOML | Covad xLink | EMSA | IDE | MDDL | OLife | QAML | SDML | UIML | XML RPC |
| 0AML | ATML | BIOML | CPL | eosML | IDML | MDSI-XML | OML | QuickData | SMIL | ULF | XML Schema |
| 1ABML | ATML | BIPS | CP eXchange | ESML | IDWG | Metarule | ONIX DTD | RBAC | SOAP | UMLS | XML Sign |
| 2ABML | ATML | BizCodes | CSS | ETD-ML | IEEE DTD | MFDX | OOPML | RDDI | SODL | UPnP | XML Query |
| 3ACML | AWML | BLM XML | CVML | FieldML | IFX | MIX | OPML | RDF | SOX | URI/URL | XML P7C |
| 4ACML | AXML | BPML | CWMI | FINML | IMPP | MMLL | OpenMath | RDL | SPML | UXF | XML TP |
| 5ACAP | AXML | BRML | CycML | FITS | IMS Global | MML | Office XML | RecipeML | SpeechML | VML | XMLVoc |
| 6ACS X12 | AXML | BSML | DML | FIXML | InTML | MML | OPML | RELAX | SSML | vCalendar | XML XCI |
| 7ADML | AXML | CML | DAML | FLBC | IOTP | MML | OPX | RELAX NG | STML | vCard | XAML |
| 8AECM | BML | xCML | DaliML | FLOWML | IRML | MoDL | OSD | REXML | STEP | VCML | XACML |
| 9AFML | BML | CaXML | DaqXML | FPML | IXML | MOS | OTA | REPML | STEPML | VHG | XBL |
| 0AGML | BML | CaseXML | DAS | FSML | IXRetail | MPML | PML | ResumeXML | SVG | VIML | XSBEL |
| 1AHML | BML | xCBL | DASL | GML | JabberXML | MPXML | PML | RETML | SWAP | VISA XML | XBN |
| 2AIML | BML | CBML | DCMI | GML | JDF | MRML | PML | RFML | SWMS | VMML | XBRL |
| 3AIML | BML | CDA | DOI | GML | JDox | MSAML | PML | RightsLang | SyncML | VocML | XCFF |
| 4AIF | BannerML | CDF | DeltaV | GXML | JECMM | MTML | PML | RIXML | TML | VoiceXML | XCES |
| 5AL3 | BCXML | CDISC | DIG35 | GAME | JLife | MTML | PML | RoadmOPS | TML | VRML | Xchart |
| 6ANML | BEEP | CELLML | DLML | GBXML | JSML | MusicXML | PML | RosettaNet PIP | TML | WAP | Xdelta |
| 7ANNOTEA | BGML | ChessGML | DMML | GDML | JSML | NAML | PML | RSS | TalkML | WDDX | XDF |
| 8ANATML | BHTML | ChordML | DocBook | GEML | JScoreML | xNAL | P3P | RuleML | TaxML | WebML | XForms |
| 9APML | BIBLIOML | ChordQL | DocScope | GEDML | KBML | NAA Ads | PDML | SML | TDL | WebDAV | XGF |
| 0APPML | BIOML | CIM | DoD XML | GEN | LACITO | Navy DTD | PDX | SML | TDML | WellML | XGL |
| 1AQL | BIPS | CIML | DPRL | GeoLang | LandXML | NewsML | PEF XML | SML | TEI | WeldingXML | MGML |
| 2APPEL | BizCodes | CIDS | DRI | GIML | LEDES | NML | PetroML | SML | ThML | Wf-XML | XHTML |
| 3ARML | BLM XML | CIDX | DSML | GXD | LegalXML | NISO DTB | PGML | SAML | TIM | WIDL | XIOP |
| 4ARML | BPML | xCIL | DSD | GXL | Life Data | NITF | PhysicsML | SABLE | TIM | WITSML | XLF |
| 5ASML | BRML | CLT | DXS | Hy XM | LitML | NLMXML | PICS | SAE J2008 | TMML | WorldOS | XLIFF |
| 6ASML | BSML | CNRP | EML | HITIS | LMML | NVML | PMML | SBML | TMX | WSML | XLink |
| 7ASTM | BCXML | ComicsML | EML | HR-XML | LogML | OAGIS | PNML | Schemtron | TP | WSIA | XMI |
| 8ARML | BEEP | CIM | DLML | HRMML | LogML | OBI | PNML | SDML | TPAML | XML | XMSG |
| 9ARML | BGML | CIML | EAD | HTML | LTSC XML | OCF | PNG | SearchDM-XML | TREX | XML Court | XMTMP |
| 0ASML | BHTML | CIDS | ebXML | HTTPL | MAML | ODF | PrintML | SGML | TxLife | XML EDI | XNS |

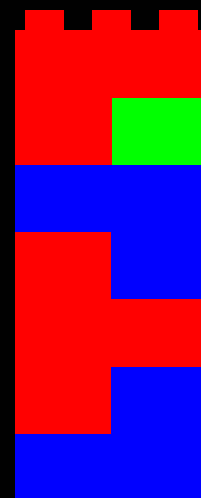
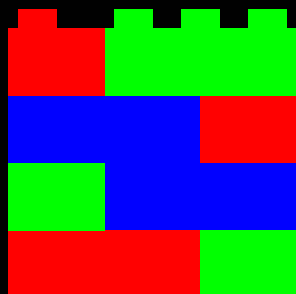
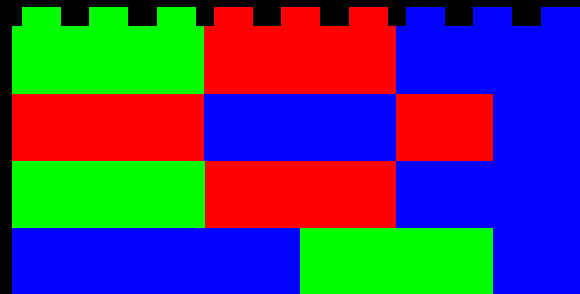
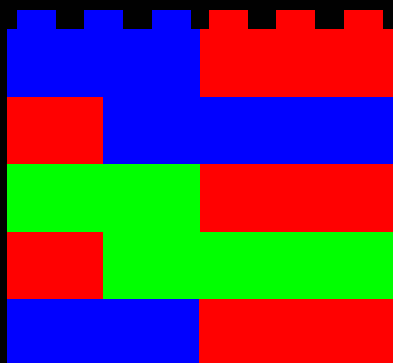


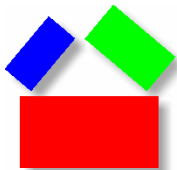
INTEGRATE



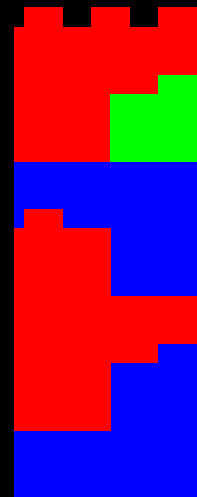
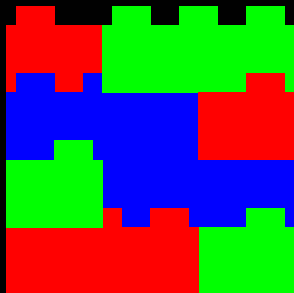
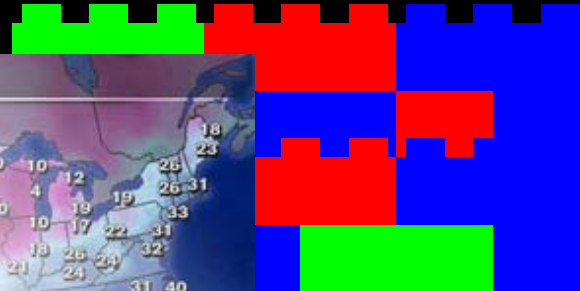
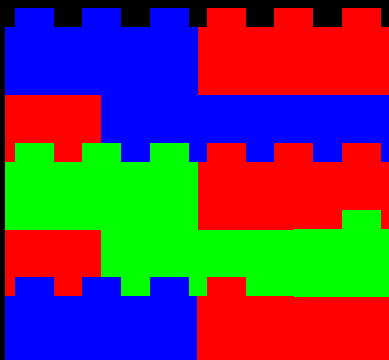


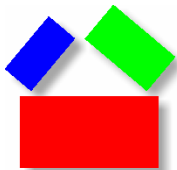
INTEGRATE





INTEGRATE

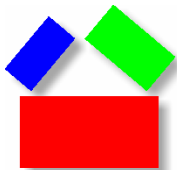




M

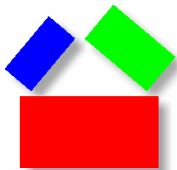
M

A Modeling Language

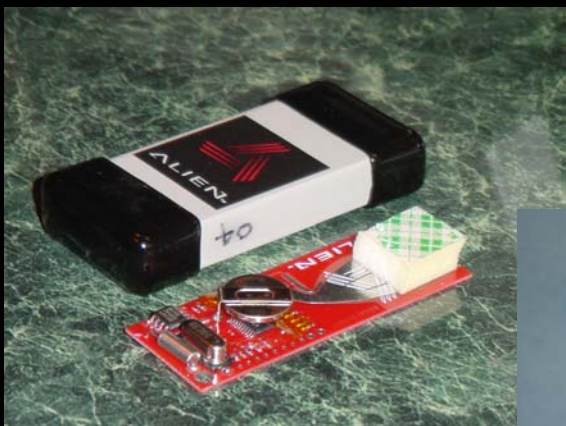


EXAMPLE – SHELF LIFE





EXAMPLE – SHELF LIFE



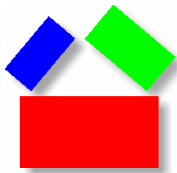
Current Type 3 Tag
w/Temp Sensor



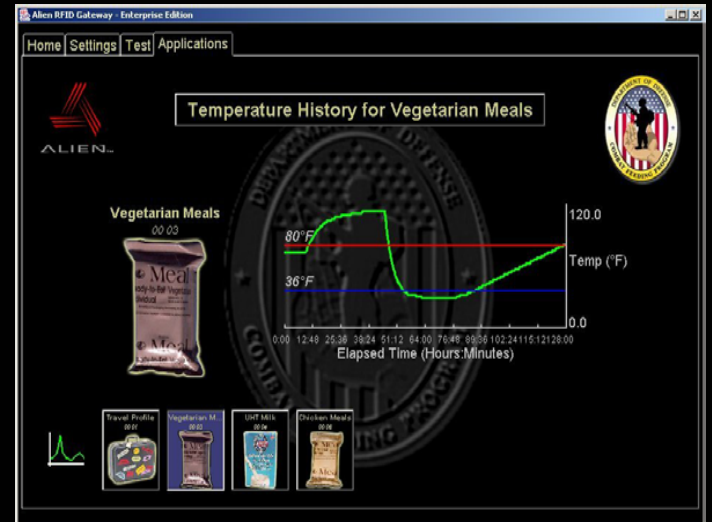
Next Generation
Application Specific
Integrated Circuit
(ASIC)

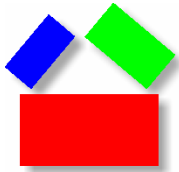


350 Micron NanoBlock™
chips

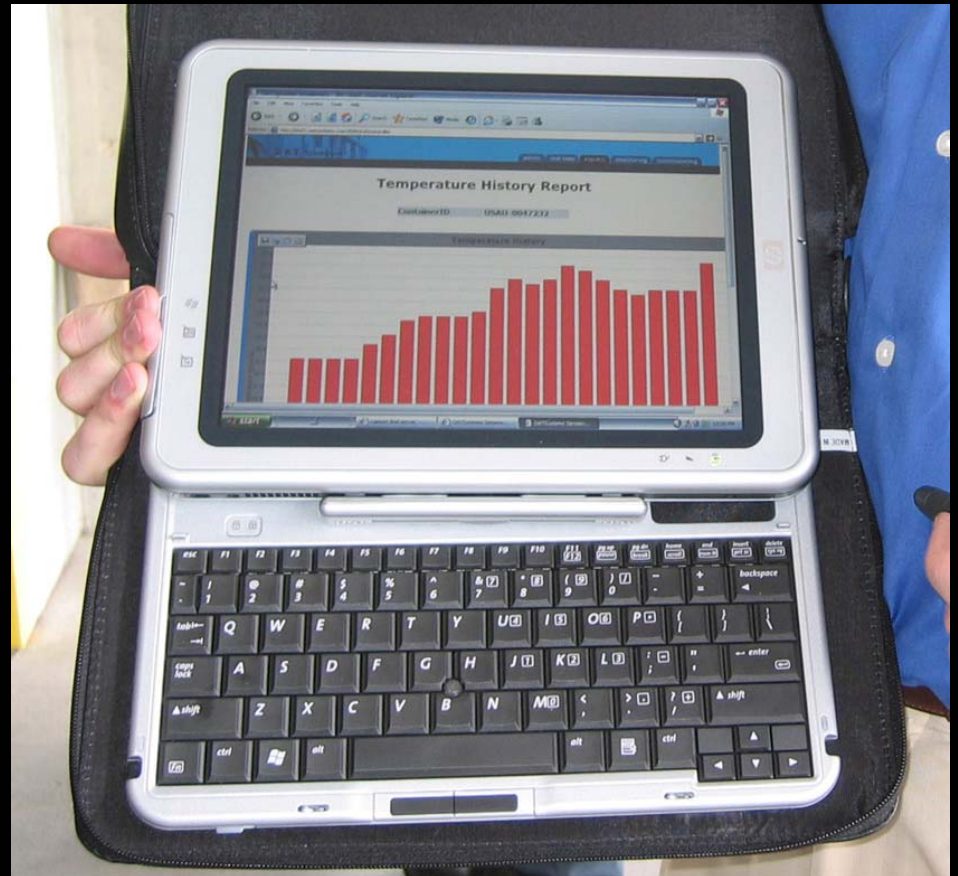


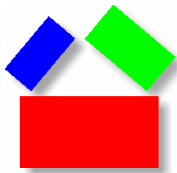
EXAMPLE – SHELF LIFE





EXAMPLE – SHELF LIFE



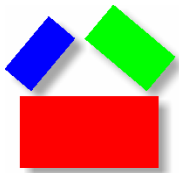


EXAMPLE – SHELF LIFE

$$\frac{\partial Q}{\partial t} = -k_1 e^{\left[-\frac{E_a}{R_g T(t)} \right]} Q^n$$

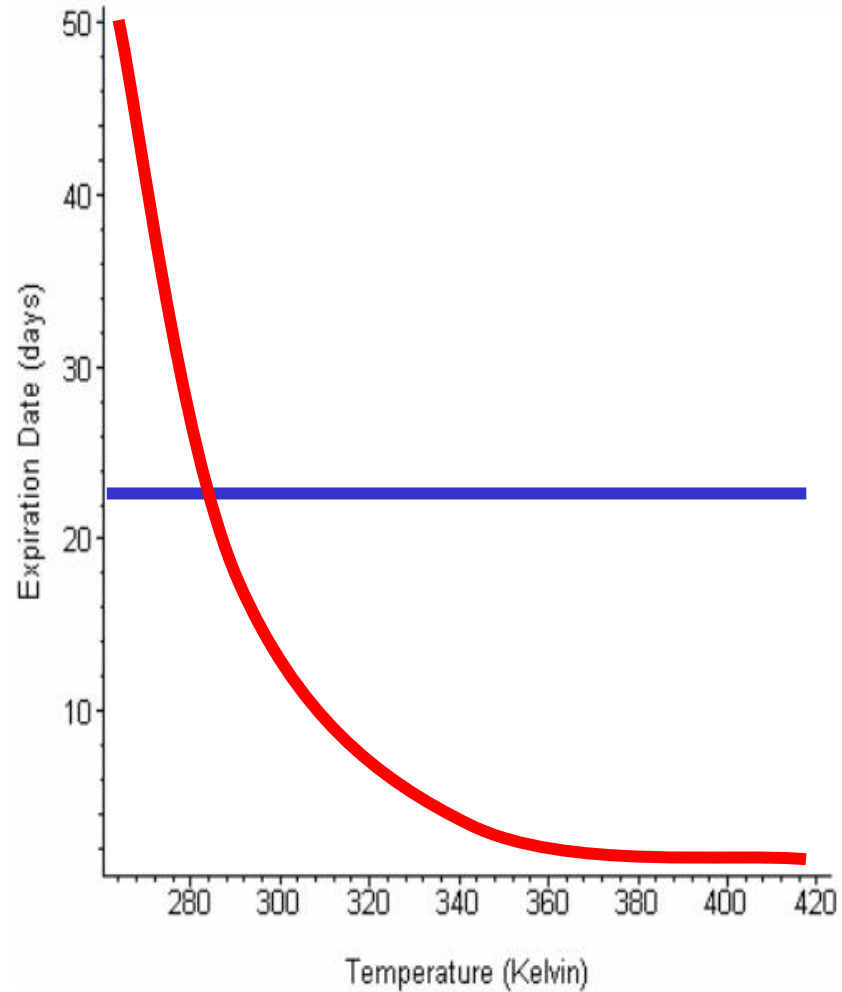
Variables

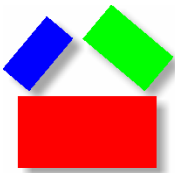
- E_a Activation energy
- k_1 Arrhenius constant
- n Order of the reaction
- T Temperature
- Q Quality
- t Time



EXAMPLE – SHELF LIFE

Q





EXAMPLE – SHELF LIFE

Name: Activation Energy

Desc

Sym

Acce

ID: E

Clas

Type

Unit

Defa

Name: Arrhenius Constant

Desc

Symb

Acce

ID: EF

Class

Type:

Unit:

Defau

Name: Temperature

Desc

Symb

Acce

ID: EF

Class

Type:

Unit:

Defau

Name: Quality

Desc

Sym

Acce

ID: E

Clas

Type

Unit:

Defa

Name: Order of Reaction

Description: Order of Reaction

Symbol: *n*

Access: Read

ID: EPC: 01020084191000001289731

Class: Scalar

Type: Int

Unit:

Default: 1



Food Quality

Name: Food Quality

Description: Food Quality based Arrhenius

Developer: Natick Army Laboratories

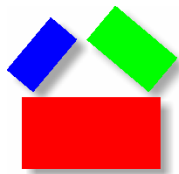
ID: EPC: 010300908808BF60000000AA

Comp: \$0.25 per month

Type: Analytic

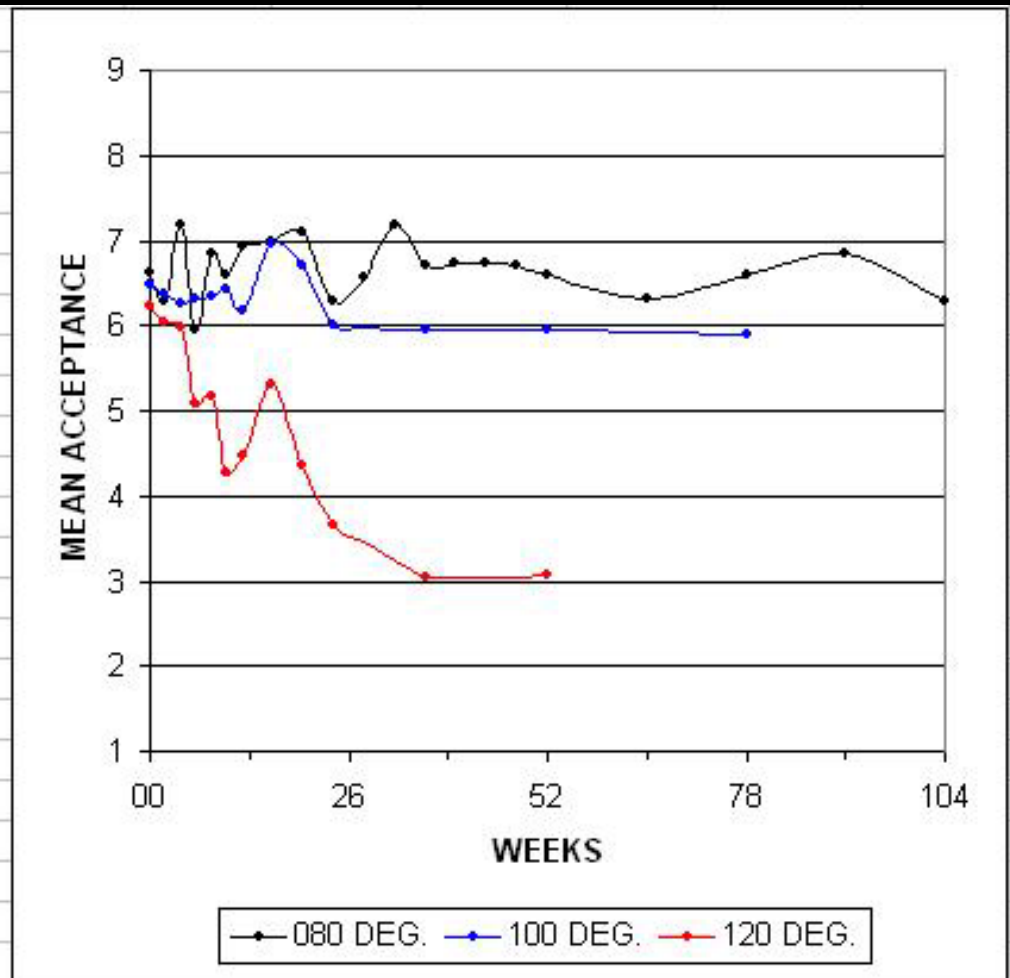
Rate: 1 to 10,000 sec

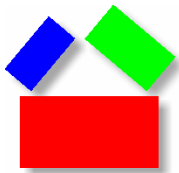
Algorithm:



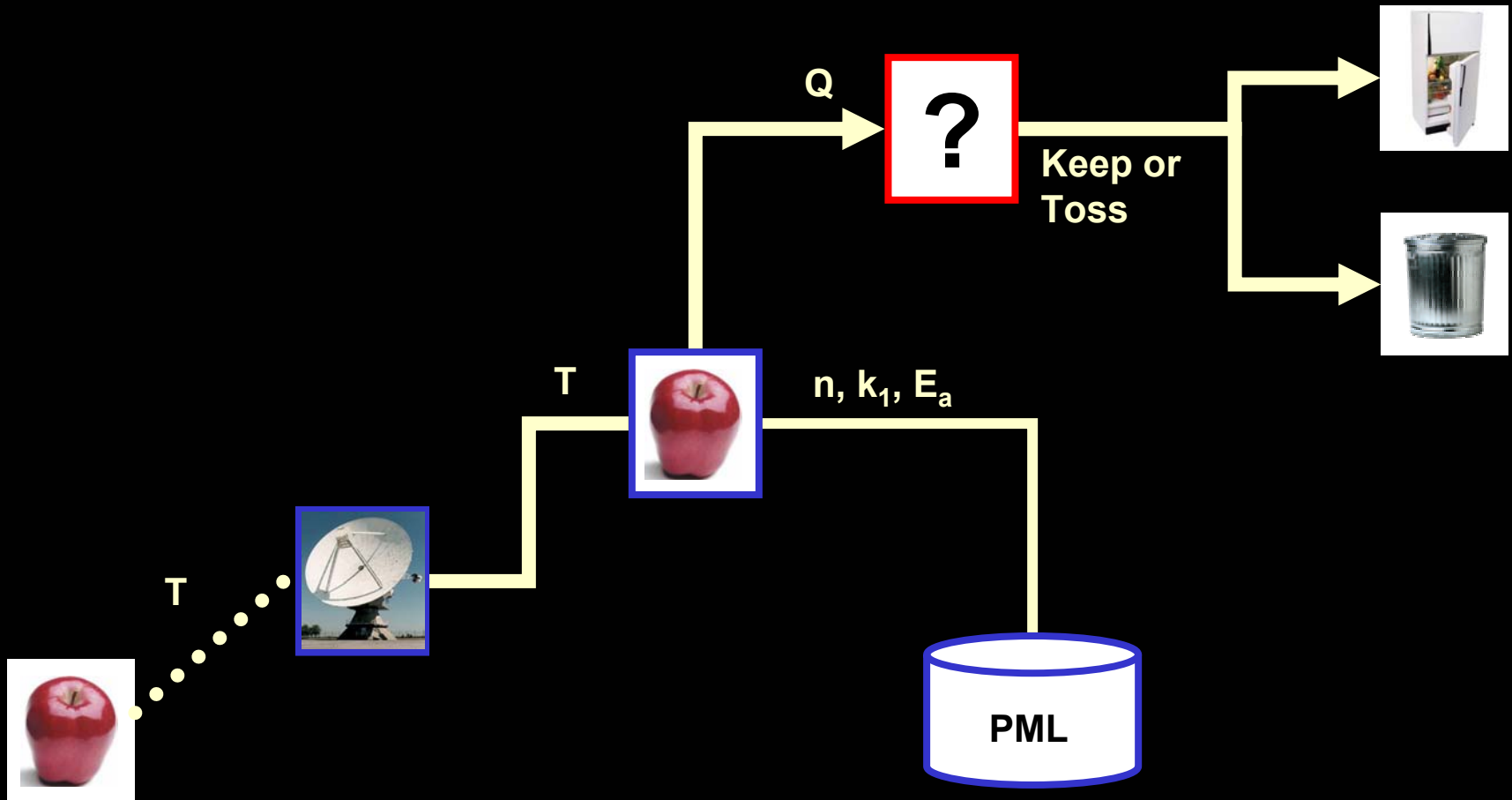
EXAMPLE – SHELF LIFE

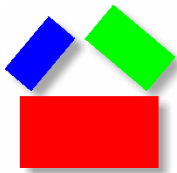
| WKS | 080 DEG. | 100 DEG. | 120 DEG. |
|-----|----------|----------|----------|
| 00 | 6.622 | 6.486 | 6.243 |
| 02 | 6.282 | 6.359 | 6.026 |
| 04 | 7.194 | 6.250 | 5.972 |
| 06 | 5.949 | 6.308 | 5.077 |
| 08 | 6.850 | 6.350 | 5.175 |
| 10 | 6.600 | 6.429 | 4.286 |
| 12 | 6.944 | 6.167 | 4.472 |
| 16 | 7.000 | 6.947 | 5.316 |
| 20 | 7.111 | 6.694 | 4.361 |
| 24 | 6.300 | 6.000 | 3.667 |
| 28 | 6.579 | | |
| 32 | 7.189 | | |
| 36 | 6.694 | 5.944 | 3.028 |
| 40 | 6.730 | | |
| 44 | 6.730 | | |
| 48 | 6.703 | | |
| 52 | 6.583 | 5.944 | 3.056 |
| 65 | 6.316 | | |
| 78 | 6.583 | 5.889 | |
| 91 | 6.842 | | |
| 104 | 6.300 | | |
| 130 | | | |
| 156 | | | |



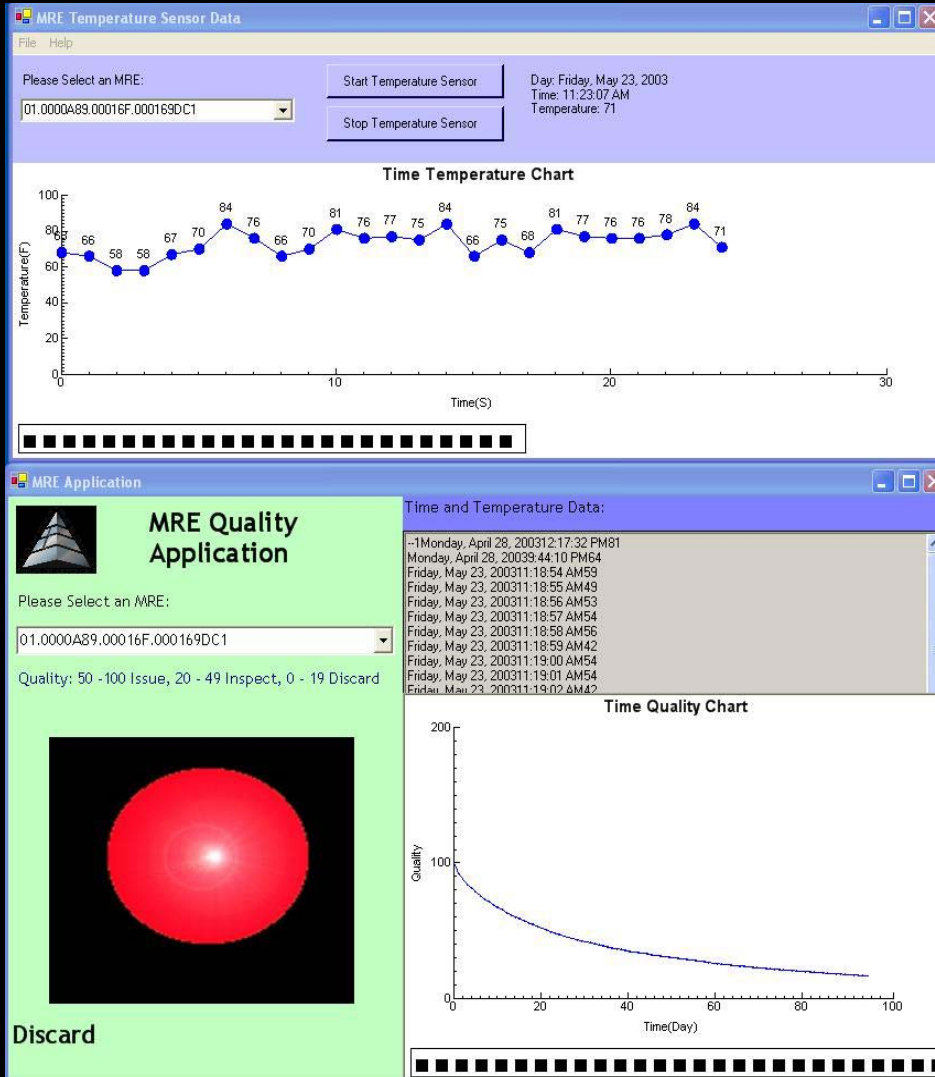


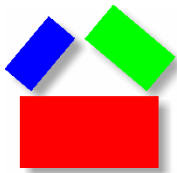
EXAMPLE – SHELF LIFE





EXAMPLE – SHELF LIFE



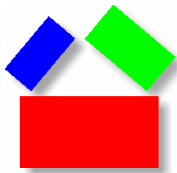


EXAMPLE – SHELF LIFE

- 76 Million cases of foodborne disease
 - 325,000 hospitalizations
 - 5000 deaths*
-
- 1.8 Million deaths from foodborne illness worldwide

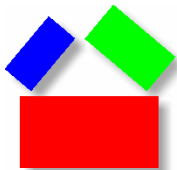
- 91 Million tons of food disposed
- Transported to landfills
- 26% of food supply*

* United States figures



PETROLEUM INDUSTRY WORKSHOP





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