



Science For A Better Life

Mobile and Cloud Computing in the Environment of Engineering Software

A Vision

December 3rd, 2014 | Michael Ring | Rev. 0.7



Bayer Group

- **113,200** employees
- Full year sales: EUR **40.2** billion
- **289** subsidiaries
- R&D expenditures: EUR **3.2** billion

As of February 28, 2014

Bayer Technology Services – a Bayer Subsidiary



Holding company

Bayer AG

Corporate Center

Business areas

Bayer HealthCare

Bayer CropScience

Bayer MaterialScience

Service areas

Bayer Business Services

Currenta

Bayer Technology Services

Employees 2,300*

Full Year Sales EUR 470 million

Global network 22 offices in 10 countries

*as permanent or fixed-term contracts, in FTE. As of December 31, 2012





Innovation at Bayer

Addressing Unmet Market Needs

Challenges

Increased demand in growth markets, higher life expectancy, increasing requirements on healthcare industry

Growing need for food, feed and renewable resources

Increasing quality of life, scarcer resources

Our Approach

Bayer HealthCare:

Improving the health of people and animals; break-through innovation for diseases with a high medical need

Bayer CropScience:

Solutions tailored to customer requirements, from seed to shelf

Bayer MaterialScience:

New applications for high-tech materials and leading-edge processes technology

Innovation Highlights

Important launches:

- Xarelto™
- Eylea™
- Stivarga™

Important launches:

- Alion™
- Poncho™ / Votivo™
- Xpro™ family

Process advances:

- Using CO₂ as a component of synthesis
- Oxygen-depolarized cathode technology for the production of chlorine from salt



In line with our mission “Bayer: Science For A Better Life”

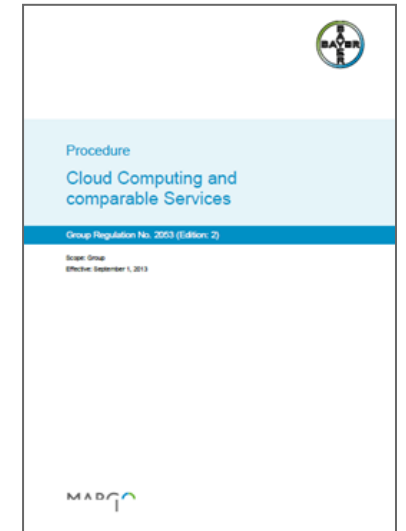
The Cloud is Everywhere



Bayer Definition of Cloud Computing

- Convenient access to a shared pool of resources
- On-demand
- configurable
- Via the Internet
- Rapidly provisioned and released
- Minimal management effort
- Minimal interaction with service provider

➤ „The systematic analysis outlined in this procedure can also be applied to other, comparable external services, even if not labeled as ,Cloud“

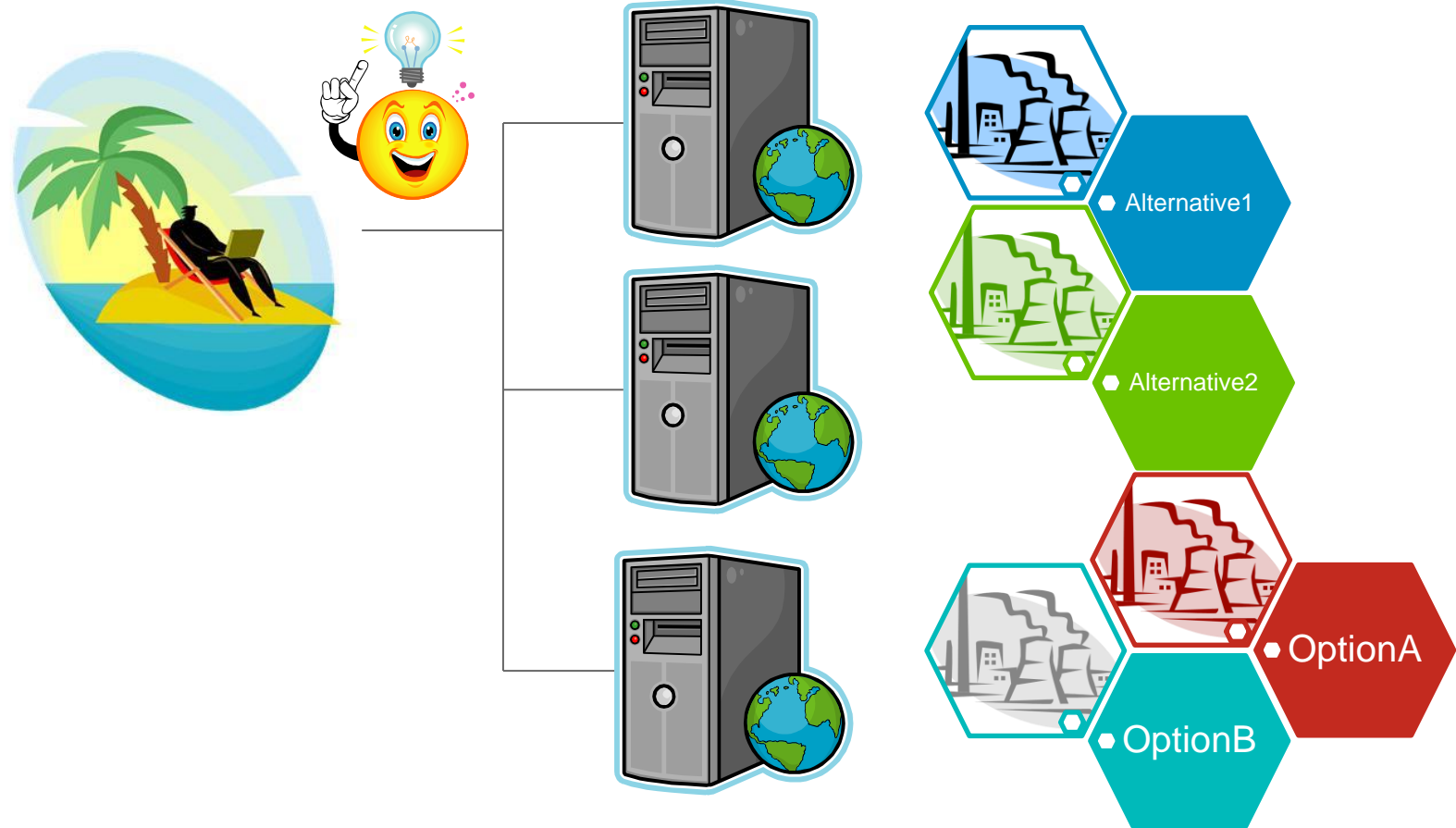


Source: Bayer Group Regulation No. 2053 (Edition:2), September 1, 2013

Where can Cloud Solution help Engineers

- **Unlimited Server Access**

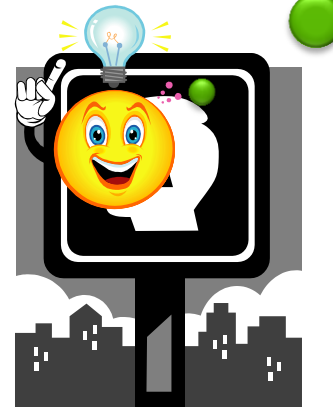
- Rendering
- Case Studies
- Spontaneous
- Without any preparation



Where can Cloud Solution help Engineers

- **Unlimited Server Access**
- **Accessibility**
 - Get an information
 - Where you are
 - When you want it
 - Without thick client application
 - With every device

If the
information
exists, you will
get the
information!



Where can Cloud Solution help Engineers

- **Unlimited Server Access**
- **Accessibility**
- **Global Engineering**
 - World-wide available
 - Multinational Teams (Follow The Sun)
 - No (regional) company environment



Enhanced Possibilities

- Data stay where it's originated
- Use the latest versions of software (transparency)
 - Without the burden to migrate
- Computer Systems communicate with each other (interoperability)
- Internet of Things / Industry 4.0
- Engineering Apps get their data from the Engineering Cloud

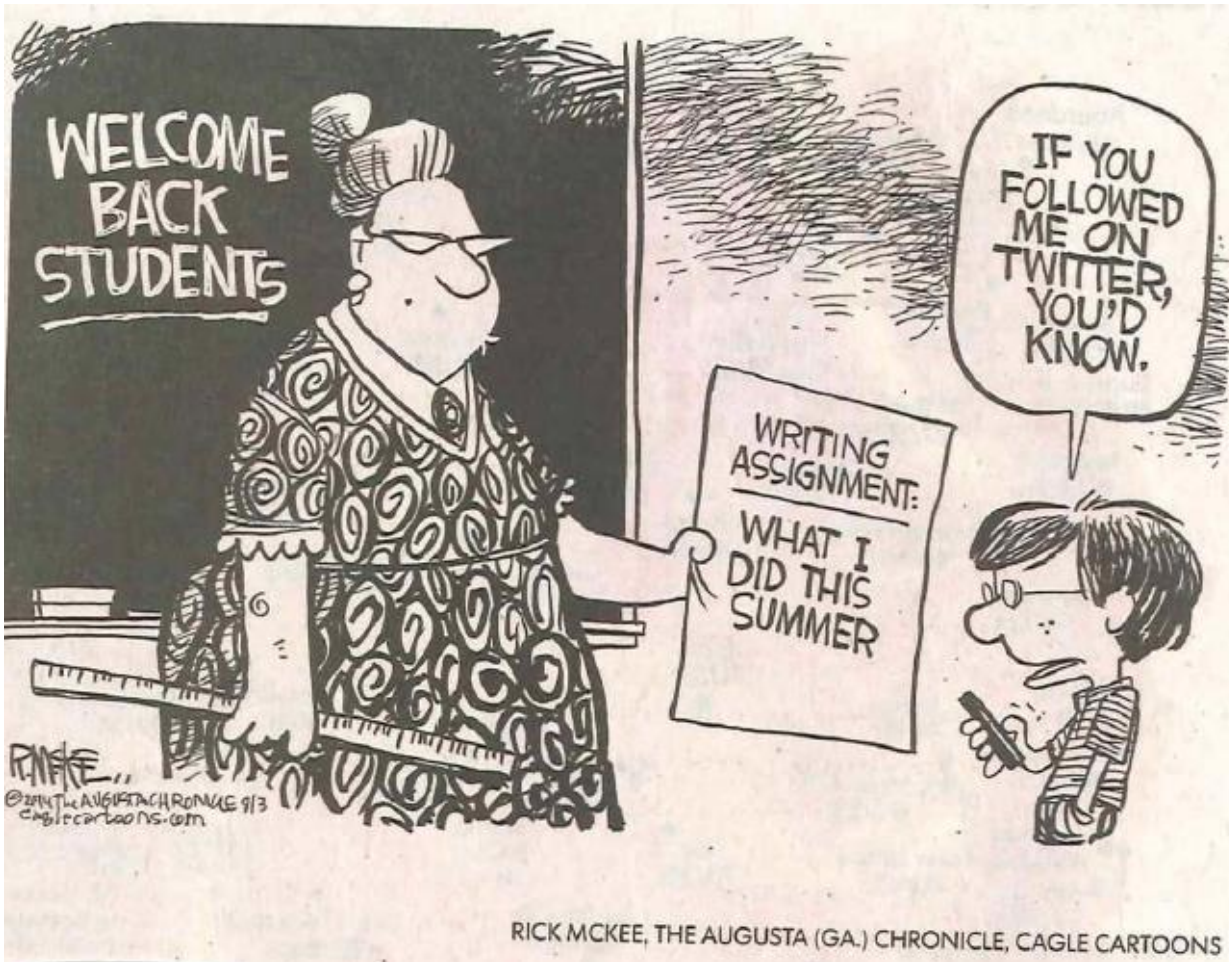




Today's Engineering Application

- Today's products are
 - For specialist
 - With tremendous functionality
 - Highly customizable
 - Uncomfortable Search Tools
- Providers are selling
 - Hyper-care
 - Weeks of training
 - Consultant

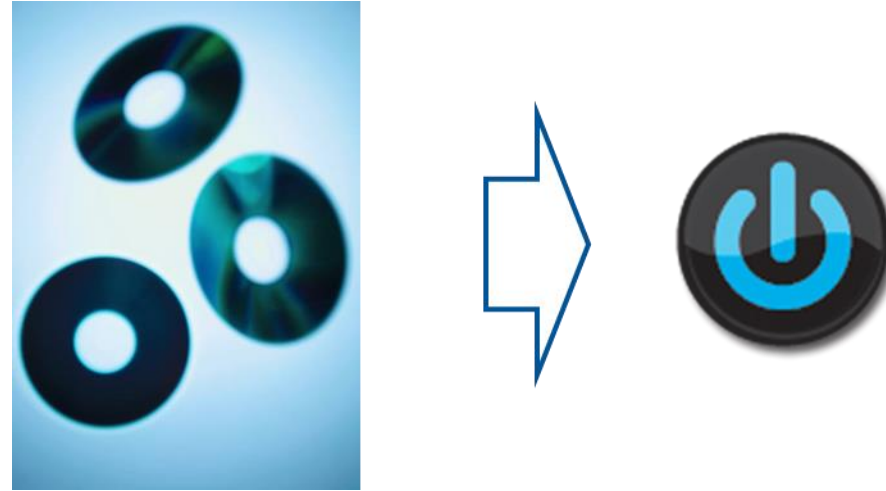
Tomorrows users - The users are changing



Source : USAToday 08/05/14

Requirements of Tomorrows Systems

- **Availability**



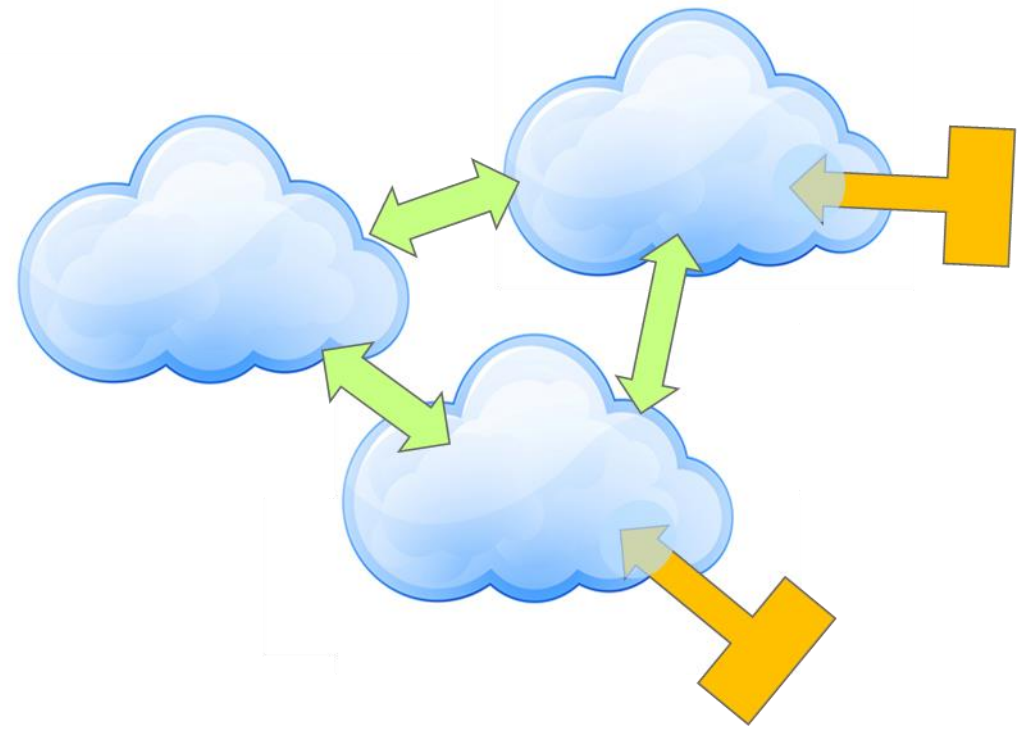
Requirements of Tomorrows Systems

- Availability
- **New Devices**



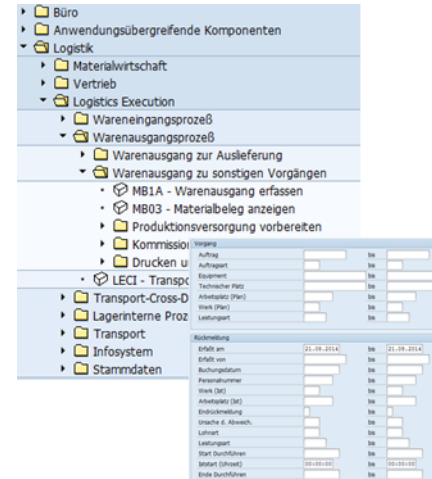
Requirements of Tomorrows Systems

- Availability
- New Devices
- **Connected**

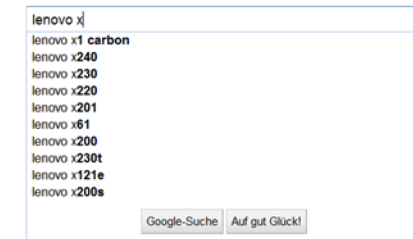


Requirements of Tomorrows Systems

- Availability
- New Devices
- Connected
- **Search Engines**



Navigation	Erstellt am	21.09.2014	21.09.2014
Erstellt von			
Rechnungsdatum			
Personalnummer			
Werk (ME)			
Abrechnungs (ME)			
Endbuchhaltung			
Umsatz d. Abrechn.			
Leistung			
Leistungsart			
Start Durchführen			
Status (Status)			
Ende Durchführen			

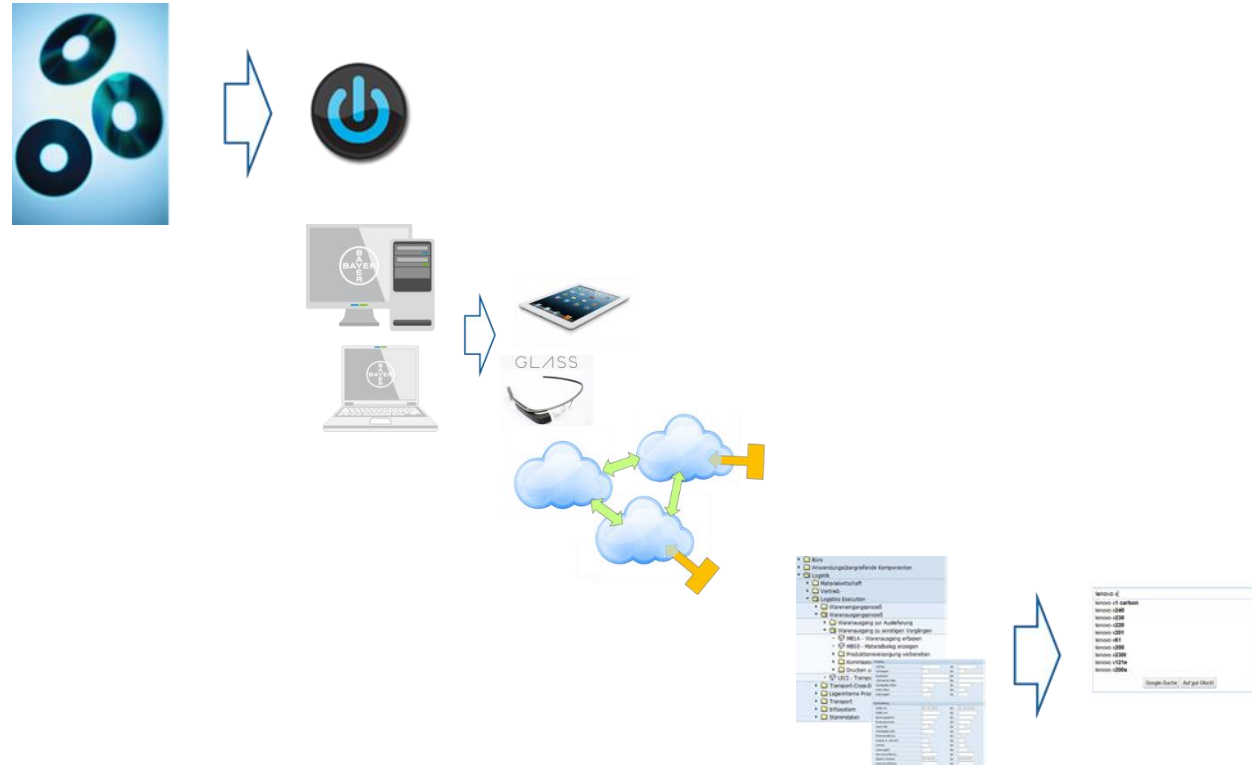



lenovo x1 carbon
lenovo x240
lenovo x230
lenovo x220
lenovo x201
lenovo x61
lenovo x200
lenovo x230t
lenovo x121e
lenovo x200s

Google-Suche Auf gut Glück!

Requirements of Tomorrows Systems

- Availability
- New Devices
- Connected
- Search Engines

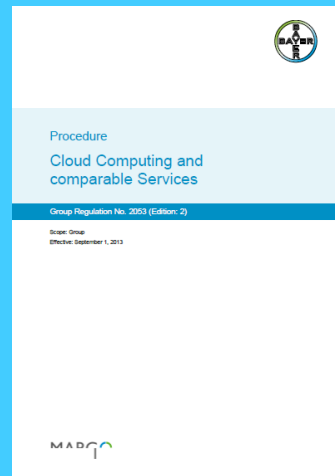
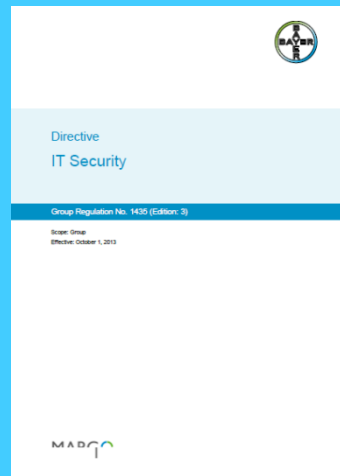


The Experts will care about their disciplines and not about the software.

Bayer is Ready for Cloud Services

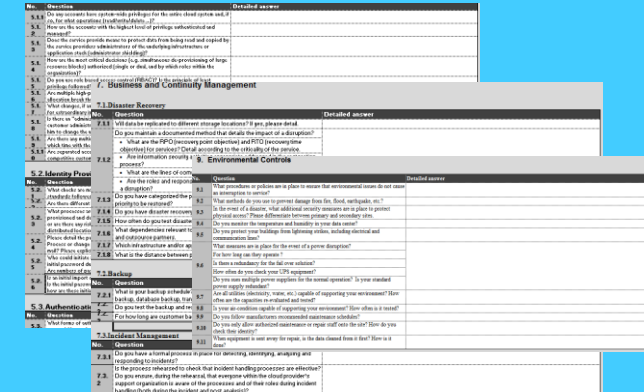
Group Regulations

- IT-Security
- Cloud Computing and comparable Services



Assessment

- Business Benefits
- Risk and Compliance
- IT architecture



Common Decision

- Data Owner
- Business Owner
- Information Security
- IT Security
- Procurement

Information Classification	CSP Trust Classification	Cloud Service Classification		Approval
		Service Control	Data Separation	
-	-	-	very high	further special approval not required
SECRET	high	high, medium, low	high	explicit owner consent to process the decrypted data in the service
RESTRICTED, INTERNAL	high, medium	high, medium, low	high, medium	further special approval not required
			low	explicit owner consent to non-separation of data in the service

Message to the Cloud Service Provider

- ☐ Bayer is already using Cloud Services
- ☐ But not for Engineering Applications

- Show the benefits of Cloud Solutions!
- Where are the MUST-Have?
 - Show the innovation of Cloud Solutions!
 - Show the Business Cases!



Forward-Looking Statements

This presentation may contain forward-looking statements based on current assumptions and forecasts made by Bayer Group or subgroup management.

Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual future results, financial situation, development or performance of the company and the estimates given here. These factors include those discussed in Bayer's public reports which are available on the Bayer website at www.bayer.com.

The company assumes no liability whatsoever to update these forward-looking statements or to conform them to future events or developments.

Contact



Michael Ring
Manager CAE & Global Licensing

Phone: +49 2133 51 29226

FAX: +49 2133 51 29239

e-mail: Michael.ring@bayer.com



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Thank you!