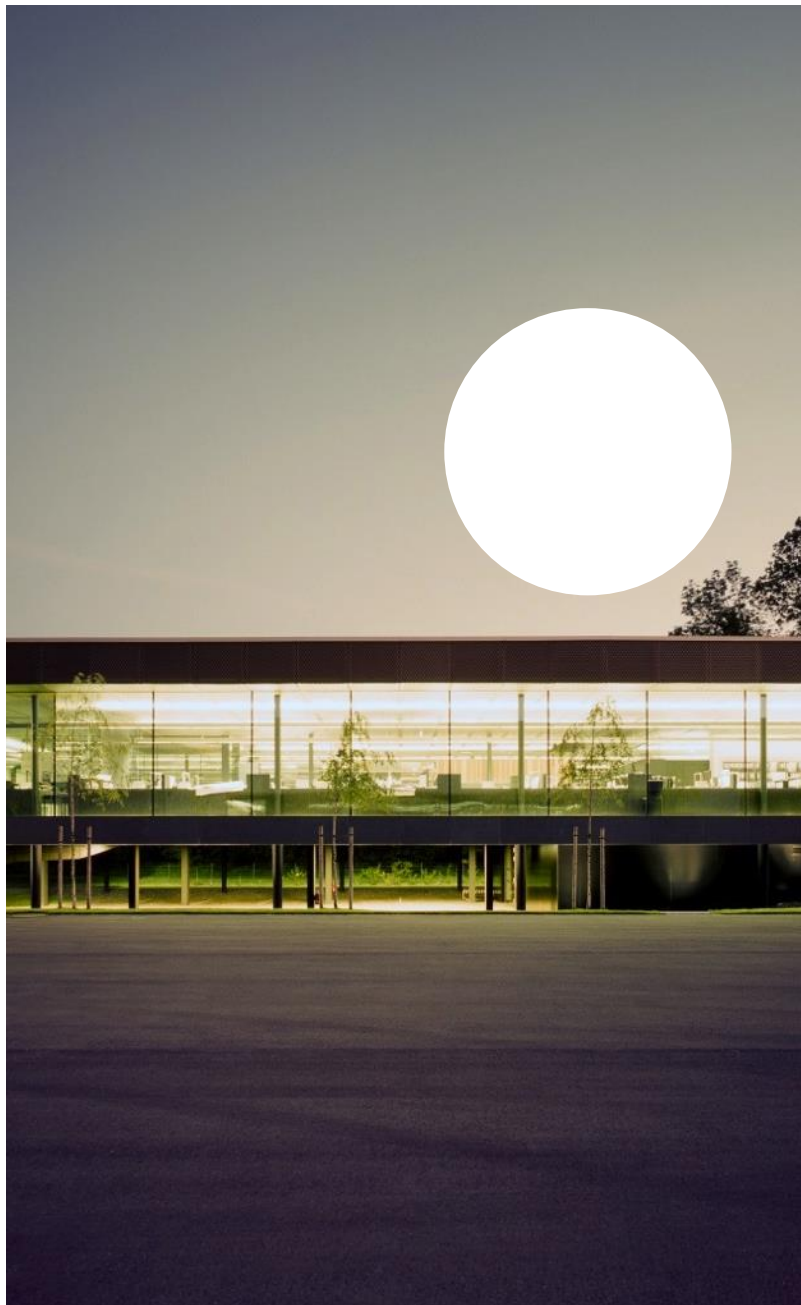


Welcome
Regent Lighting



Large-area Solid State Lighting

Swissphotonics Workshop

Pantheon, MuttENZ

30.10.2014

Agenda

1. Large Area Lighting: Applications
2. How do such luminaires look like
3. Modules and the advantage of standardisation (Zhaga)
4. Where is the status of standardisation for such applications

Large Area Lighting: Applications



Use:

- Offices and large surfaces
- For ergonomic base illumination
- Used for practical and cost reasons: When space use is not yet defined
- As there is no possibility to adapt to changes in use, normally installed in a uniform pattern matching the ceiling
- The fix installation is normally integrated into the ceiling structure
- Often the luminaires are direct emitting and thus quite efficient
- Design: Can well be integrated in the esthetics of the ceiling, matching the ceiling plates in size (600x600, 625x625, 900x900, 1200x1200, 1200x300, 1200x600)

Large Area Lighting: Applications



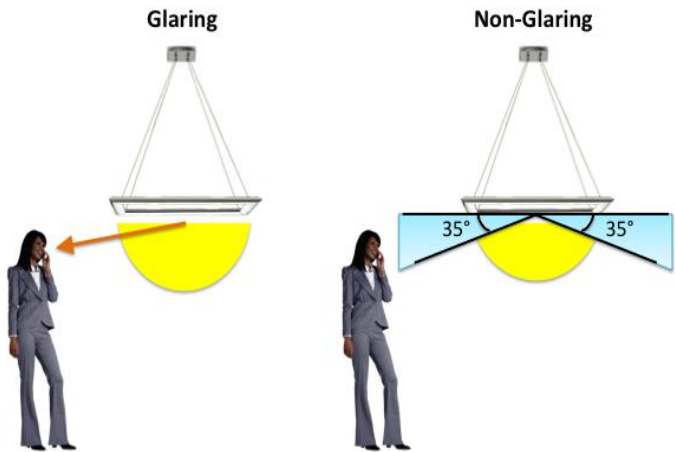
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Alternative:

- Free standing luminaires
- They can be standing in the way, as they require floor space
- More flexible in position and can be changed while changing the purpose of the surface or while relocating to a different surface or building

Large Area Lighting: How do such luminaires look like

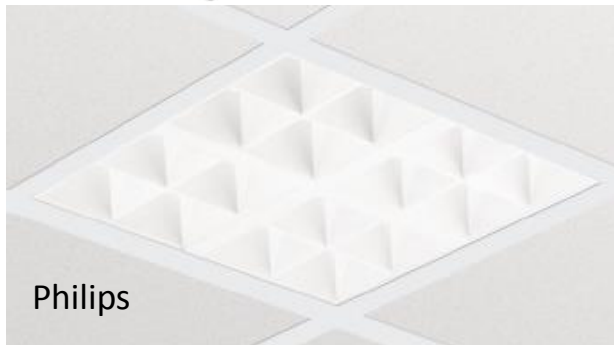


Glare:

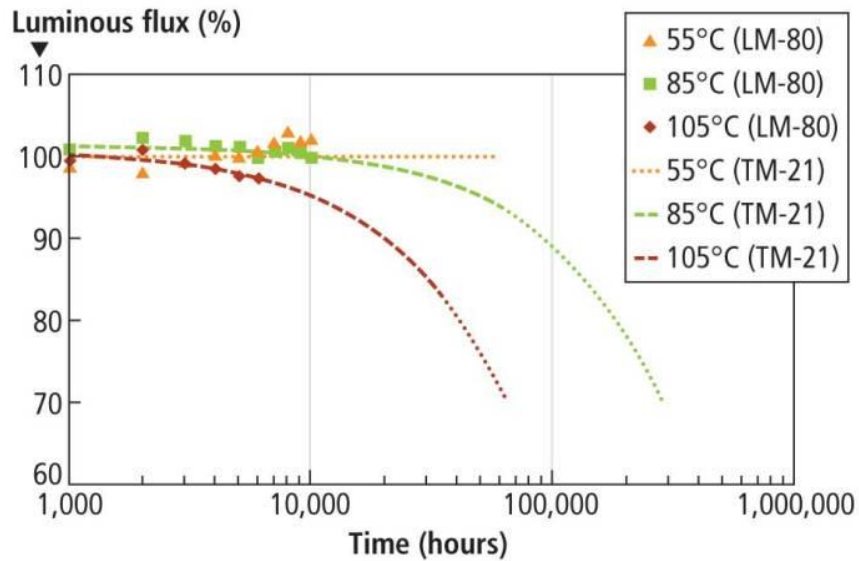
In office spaces limiting glare is essential

This is achieved by:

- Hiding the source
- Redirecting flow downward (louvers)



Smart lighting



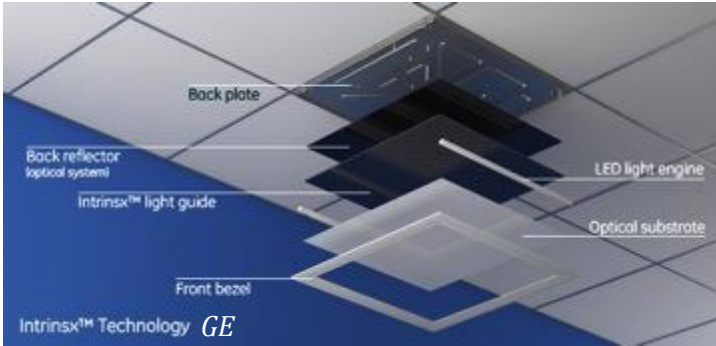
Smart lighting modules are used to account for:

- Deteriorations of the light sources in brightness
- Deteriorations of the light sources in color point
- Corrections in color point when dimming



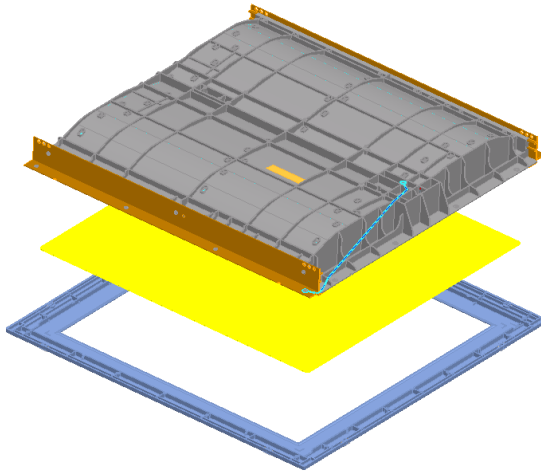
- Many added features like i.e. daylight simulations

Large Area Lighting: Existing Modules



Technologies:

- Light guide solutions
- Through diffusor
- Backlight



Why Standardized Modules



Modules, especially standardized ones, are used in luminaires to develop quickly and ensure future proofness.

The worldwide biggest organization which leads this effort of standardization is called Zhaga. It has liaisons to all other big standardisations groups.

Currently this area lighting is almost being neglected and based on simple technology with no “smartness”.

Interchangeable light sources

The lighting industry is used to work with standardized light sources

- G5, E27, G9, ...

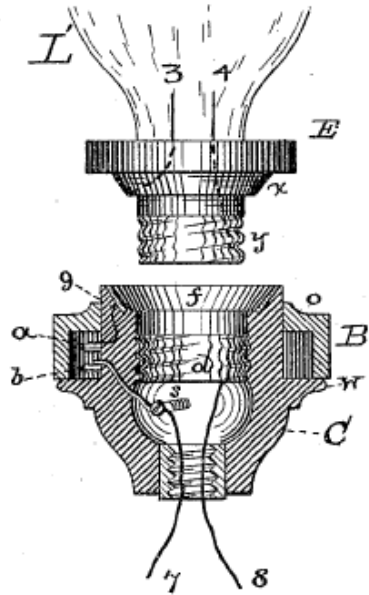
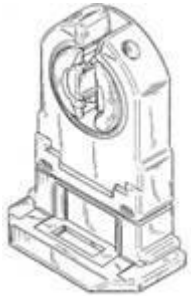
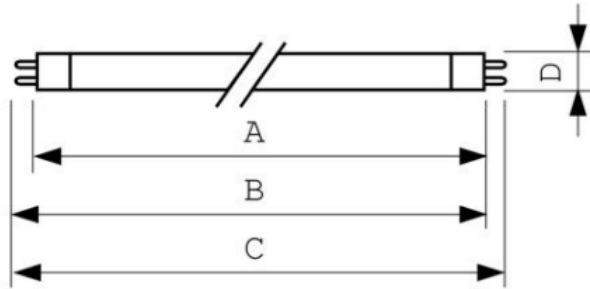
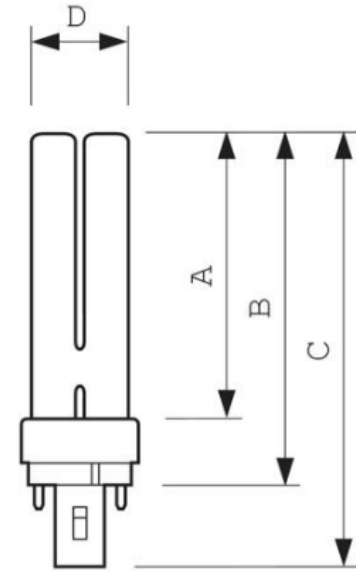


Fig. 1.



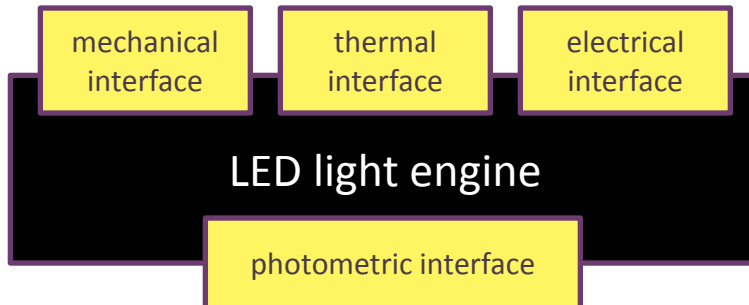
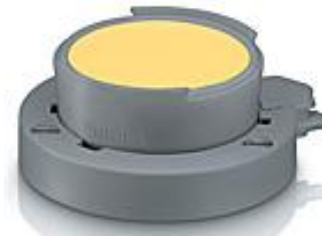
What is the goal of Zhaga



Industry specifications with the long term goal to convert them to international standards.

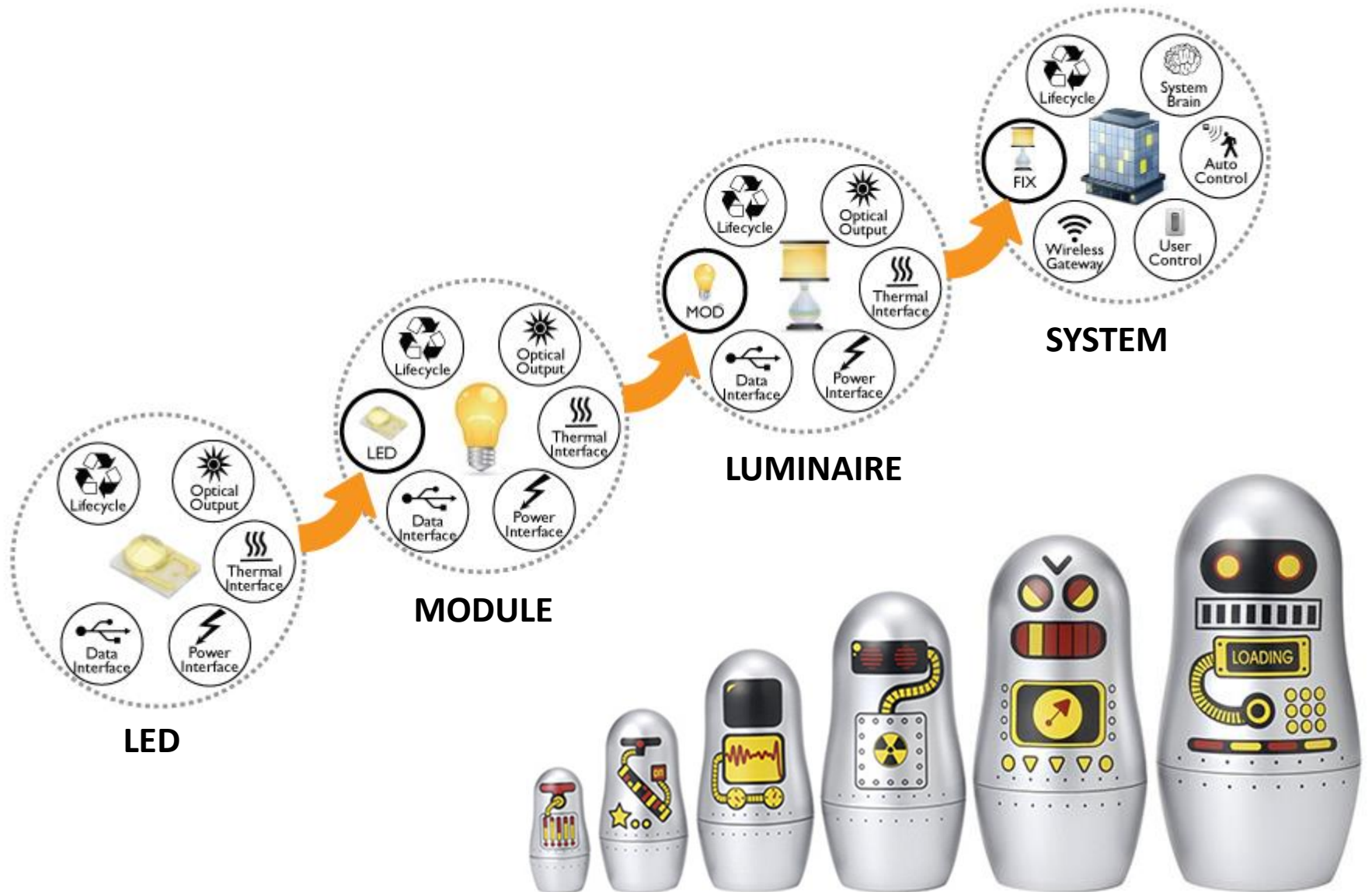
Zhaga specifies *only* what is necessary to enable the *interchangeability* of light engines from different manufacturers.

The design freedom inside the light engines and in the luminaires is maximized.

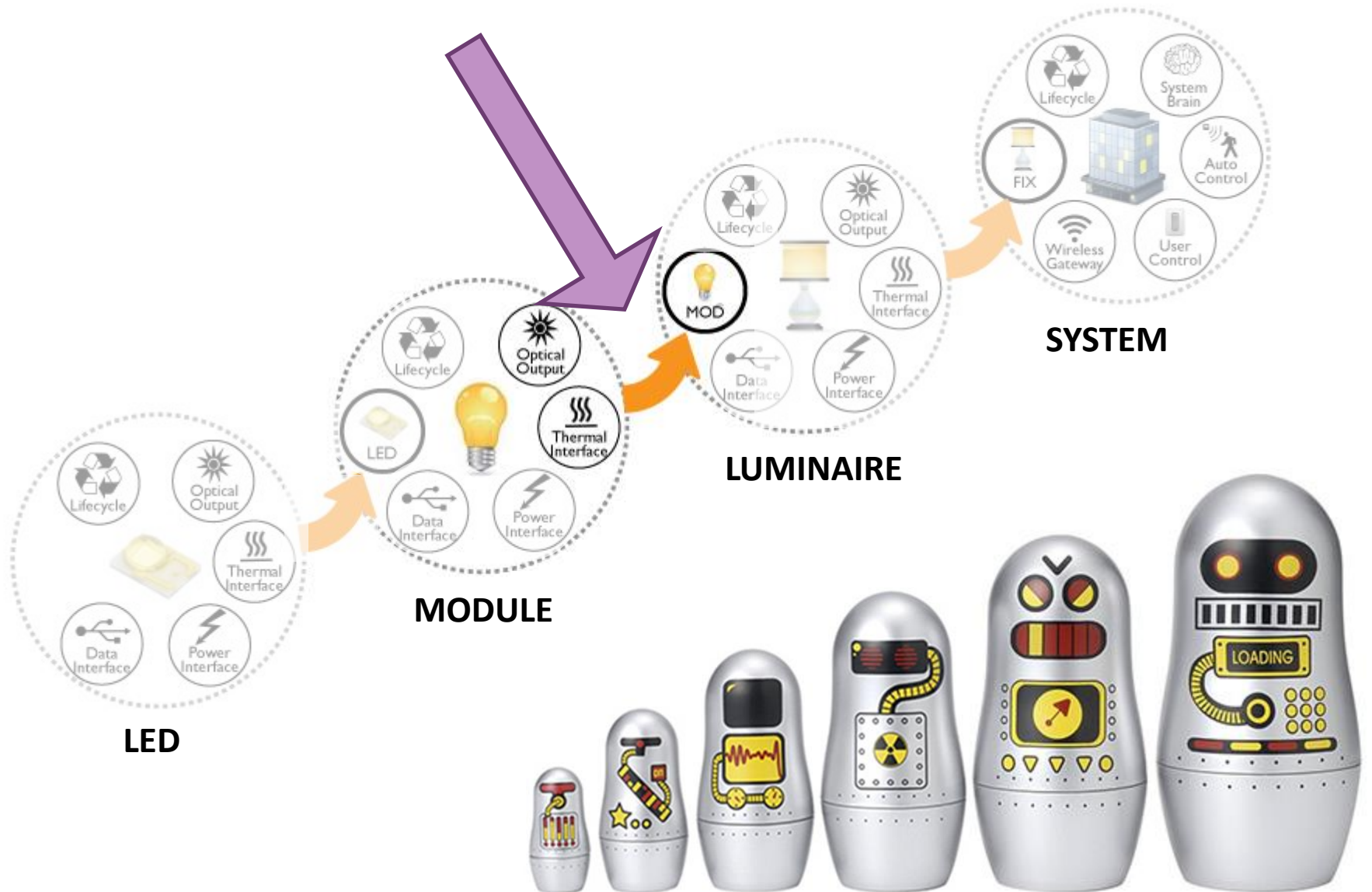


Zhaga treats the inside of a light engine as a 'black box'

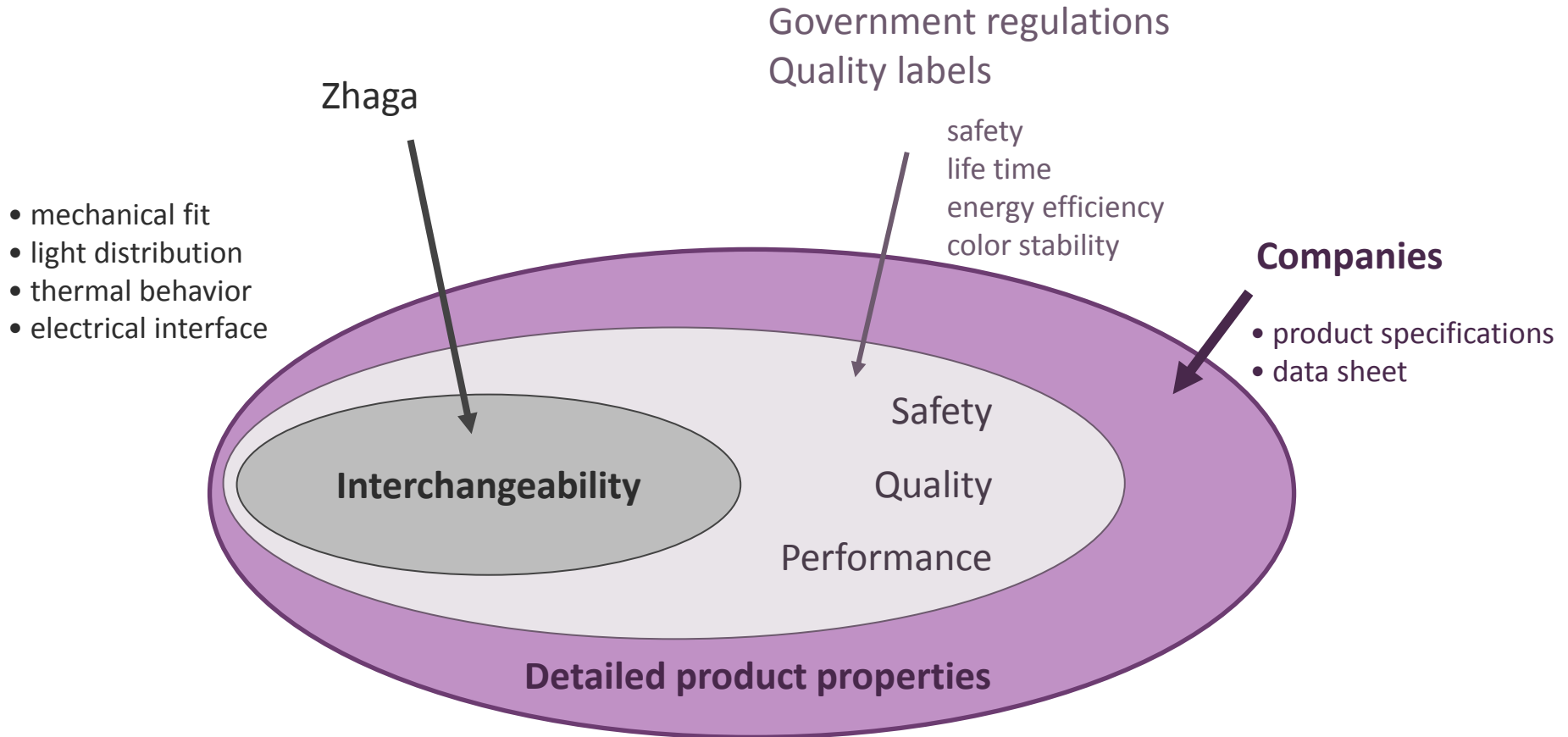
LED lighting systems use many specifications and standards



Specifications needed for interchangeability



Out of scope: performance, quality, safety



Zhaga specifies only a small part of the product properties

Standardization **does NOT mean** Commoditization

Non value added differentiation

- Outer dimension
- Optical contact area
- Fixing hole position
- Diameter of light emitting surface

vs

Value added differentiation

- Choice of material and finishing
- Color temperature / color rendering
- Luminance uniformity
- Light intensity distribution
- Module efficacy
- Thermal contact area
-

- Non value added differentiation
→ Standardization removes arbitrary variation
- Value added differentiation
→ Proprietary innovation provides competitive edge

Zhaga does not touch: Safety, Quality & Efficiency

Products must be safe. Governments set standards for product safety and all LED lighting products have to meet those rules.

- Zhaga specifications need not add anything to these standards.
- That's why Zhaga specifications don't say anything about safety aspects of products.

The same applies to quality and efficiency rules:

- Lifetime expectancy is not specified
- Colour stability is not specified
- Lumens per Watt is not specified

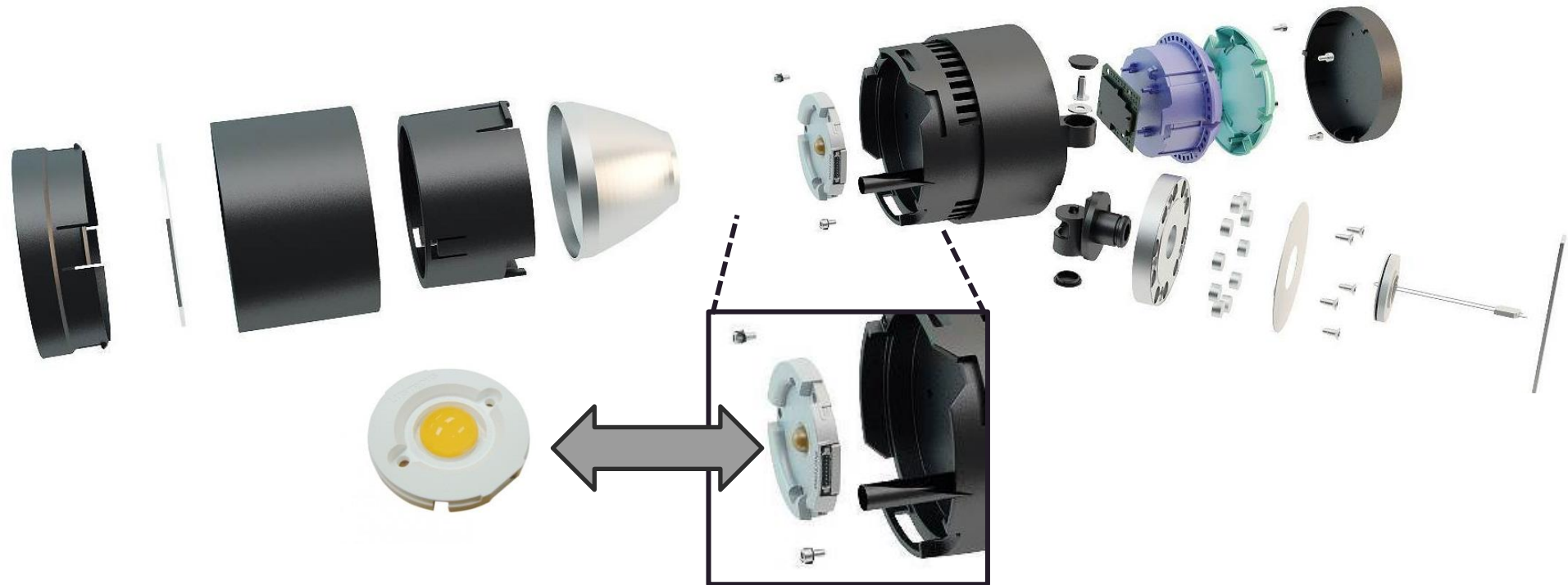
Why not?

- Because it's not necessary for interchangeability
- Not all applications need i.e. the same quality or efficiency

What does Zhaga mean by Interchangeability

No change of the luminaire necessary when changing the module.

- No change in mechanical fixation (screws, holders)
- No change in optics
- No change in cooler



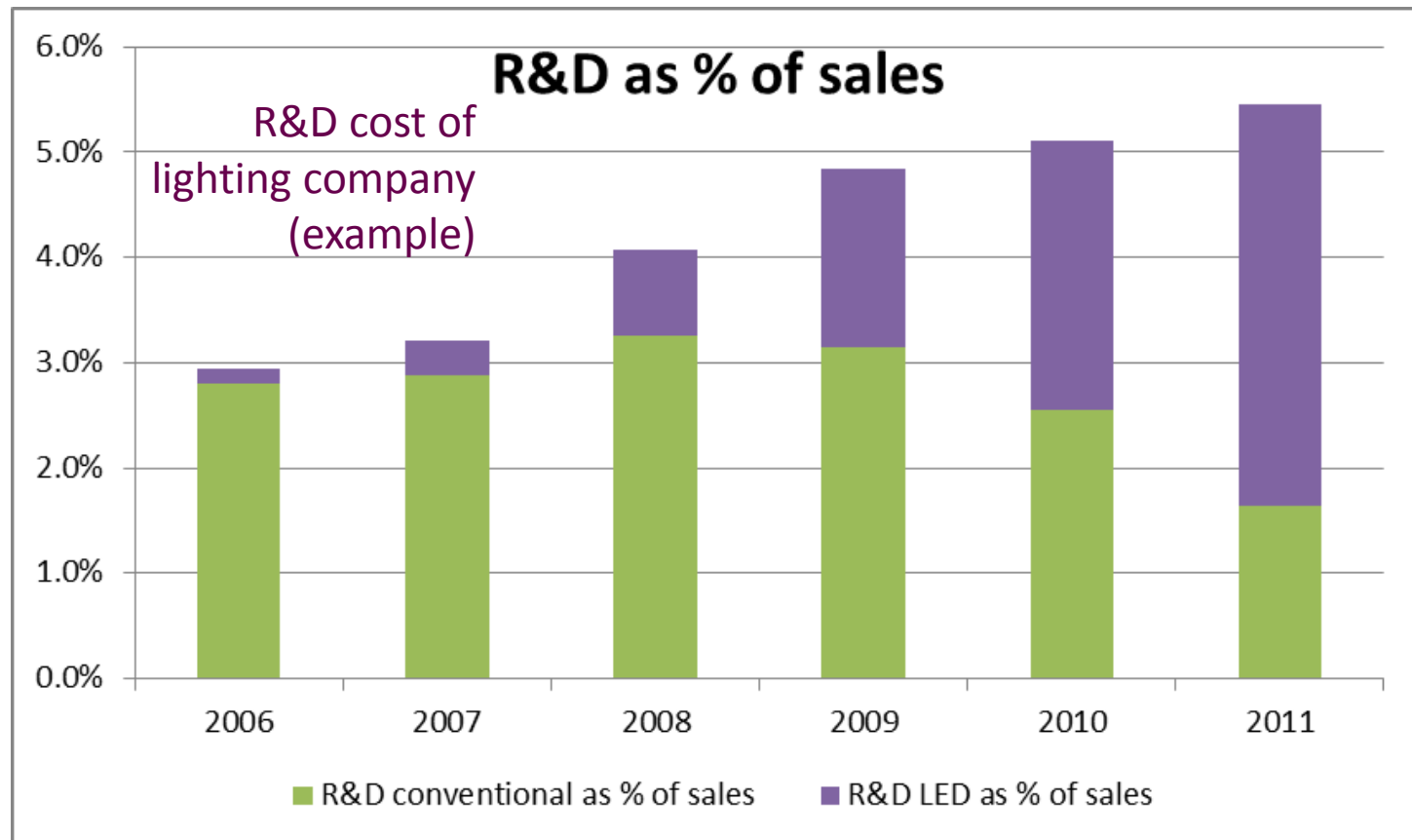
Risks for Luminairemakers

Changing LEDs => High R&D costs for LED lighting

Change LED => Change luminaire

LED changes every 6 months

High R&D costs



Risks for Luminairemakers

Since the introduction of LEDs the R&D cost has risen dramatically
Roughly every 6 months the efficiency of the LEDs rises. Therefore, all LED modules and luminaires have to be adjusted

The risk of non-standardized LEDs is great, as it is unclear what the next generation will bring and what has to be changed in a luminaire

The tooling cost for housings, optics and assembly components would have to be adjusted regularly

Risk: If a supplier would go out of business and there would be no compatible second source. One is at the mercy of a supplier and bound to him

Limited choice of performance parameters

How does Zhaga help Luminairemakers?

Simpler Sourcing

- Availability of an alternative source for the same module
- Easier negotiations with suppliers as cost of change is lower.

Faster “Time to Market”

- Easier integration of new modules facilitates keeping pace with the faster innovation-cycles of the LED technology
- The innovation-cycles can happen within the modular system of the light source and ensure the future of the luminaire model

Less R&D cost

- Less cost for adjustments and & Re-Engineering of existing luminaires

How does Zhaga help Luminairemakers?

More choice in CCT, flux, CRI, reliability, stability, lifetime expectancy, etc.

- Possibility to offer a broader portfolio of luminaires without bigger R&D cost
- Possibility to have different price/performance categories within a luminaire portfolio

Less risk

- Less risk of a supplier bottleneck
- Smaller inventory in stock necessary
- Fewer outdated LEDs in stock

Lower prices of modules?

- Maybe later when Zhaga modules will be produced in larger quantities and by more suppliers.

Published Books / What is Zhaga working on

7 +3 Books

“Book 1: General”

- Definitions
- Principles
- ECG dimensions

Book 2: Socketable LLE with integrated ECG (65 mm base)

Light Emitting Surface
59mm round



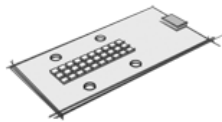
Book 3: Point Source LLE with separated ECG

Light Emitting Surface
9mm – 23mm round



Book 4: Street Light Engine

Light Emitting Surface
Rectangular
30 mm x 7,5 mm
42 mm x 10,5 mm
60 mm x 15 mm



Book 5: Socketable LLE with separate ECG

Light Emitting Surface
9mm – 23mm round



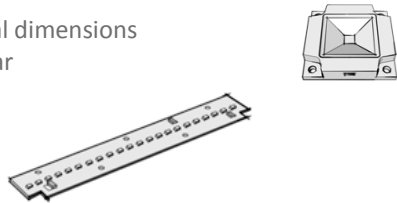
Book 6: Socketable LLE with integrated ECG

Light Emitting Surface
92mm round



Book 7: Office LLE with separate ECG

Mechanical dimensions
Rectangular
L6W6
L28W2
L28W4
L28W28



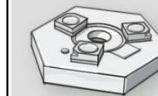
Book 8: Socketable LLE with integrated ECG – (85 mm base)

Light Emitting Surface
59mm round



Books in development:

Book 9*



Book 10*



Book 11*



Thank You

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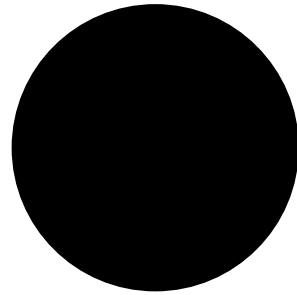
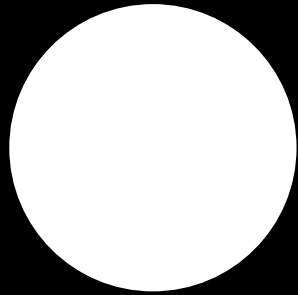
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Thank You
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