

# Mobile computing and artificial intelligence for diet management

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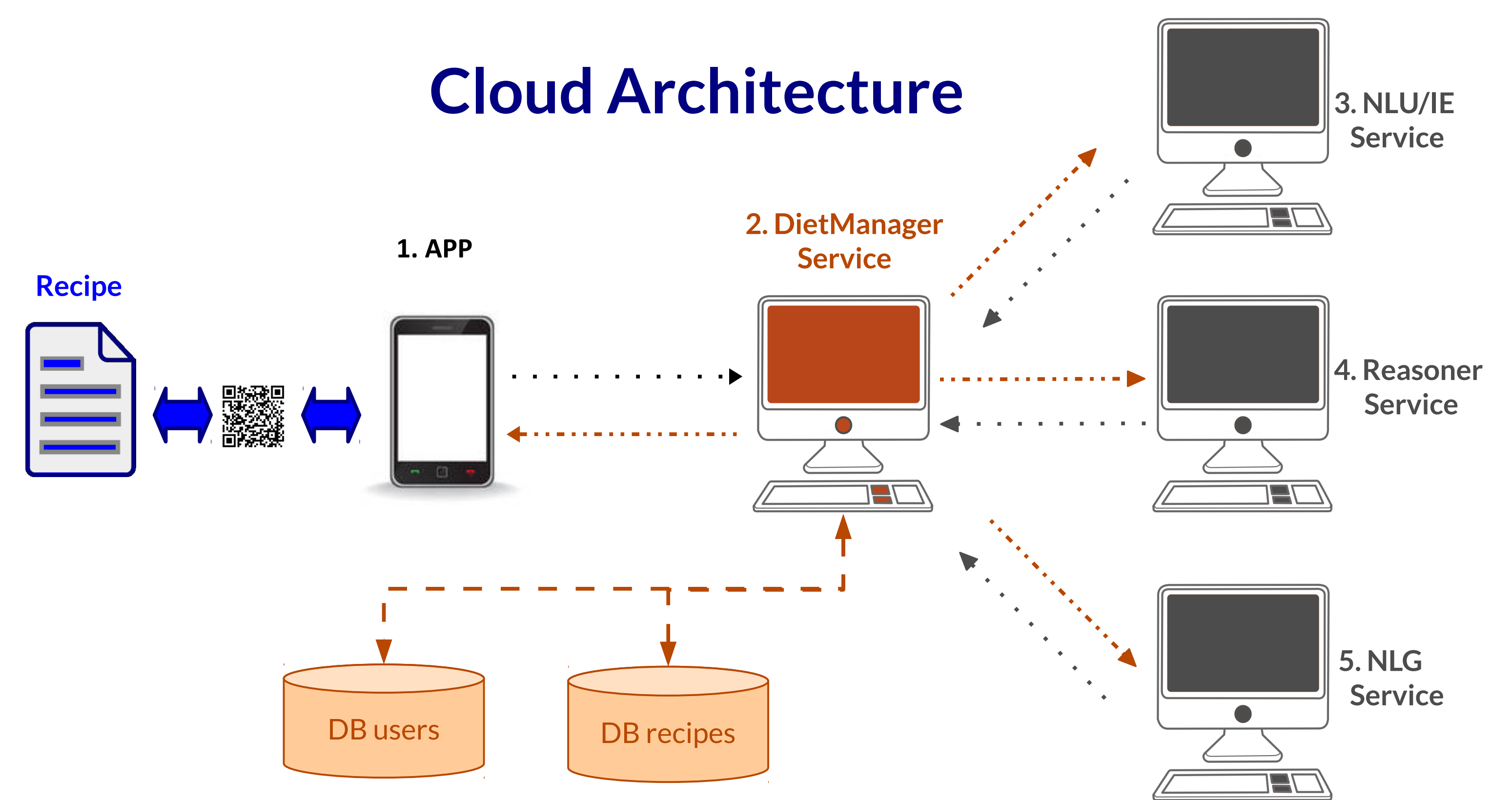
## The MADiMAN project

<http://di.unito.it/madiman>

- Cloud Architecture
- Artificial Intelligence for diet management
  - NLP for recipe analysis
  - Automate Reasoning about diet and recipes
  - Persuasive multimedia NLGeneration



## Cloud Architecture

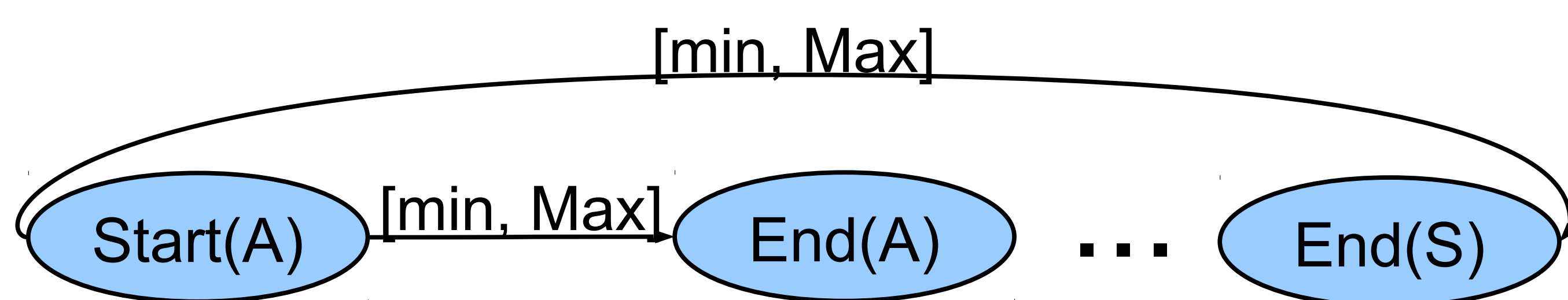


## NLP for recipe analysis

- Rule-based approach -> Drools, <http://www.drools.org>
- Patterns: <number> ("g" | "gr" | "gram") "of" <ingredient>

- normalization of all quantities in grams
- vague; expressions ("a glass of water") are standards in some cultures

## Simple Temporal Problems for diets

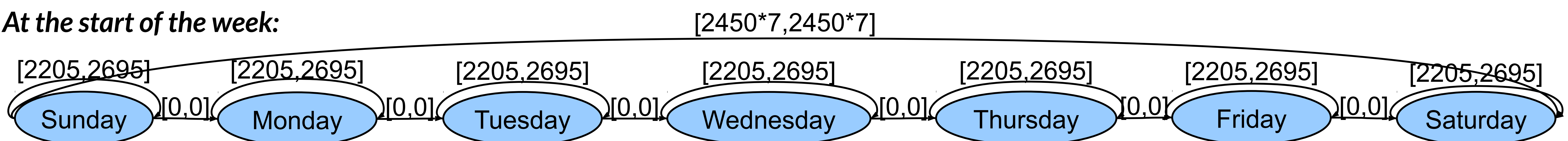


STP with energy (kcal) instead of time: strict dietary constraints over a week, and allow of  $\pm 10\%$  a day.

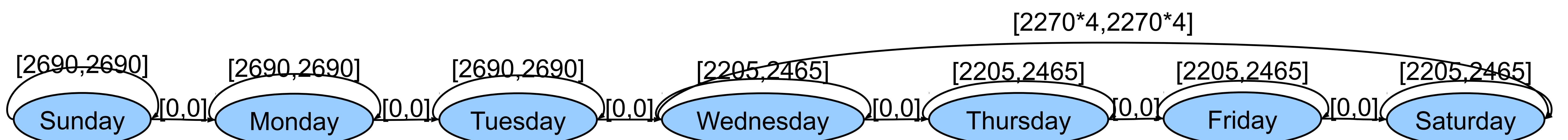
The constraint propagation (Floyd-Warshall's all-pairs shortest paths,  $O(n^3)$ ) checks the consistency and gives the minimum and maximum distance between each pair.

Example: 40 years, male, 1.80 cm, 71.3 kg, sedentary lifestyle. Total energy requirement: 2450 kcal/day

At the start of the week:



Assuming that John ate 2690 kcal on Sunday, Monday and Tuesday and propagating the constraints (only the most significant edges are shown): John has to eat 2270 kcal/day and for reaching such goal he has to eat between 2205 and 2465 kcal/day



## Persuasive NLGeneration

### Persuasive Theories

- CAPTology, Fogg 2002
  - Tool - Media - SocialActor
- 6 principles, Cialdini 2009
  - Reciprocity: obligation to return a favor
  - Scarcity: value to scarce products
  - Authority: value to the opinion of experts
  - Consistency: people do what they said
  - Consensus: people do as other people do
  - Liking: we say yes to people we like

### Persuasive Message Templates

Class	Deviation	Message	Translation
I.1	IPO	Questo piatto non va affatto bene, contiene davvero pochissime proteine!	This dish is not good at all, it's <u>too poor</u> in proteins!
I.2	IPO	Ora non puoi mangiare questo piatto perché è poco proteico. Ma se domenica mangi un bel piatto di fagioli allora lunedì potrai mangiarlo.	You cannot have this dish now because it <u>doesn't provide enough</u> proteins, but if you eat a nice dish of beans on Sunday, you can have it on Monday.
C.1	IPO	Va bene mangiare le patatine ma nei prossimi giorni dovrai mangiare più proteine.	It's OK to eat chips but in the next days you'll have to eat <u>more</u> proteins.
C.2	IPO	Questo piatto va bene, è solo un po' scarso di proteine. Nei prossimi giorni anche fagioli però! :)	This dish is OK, but it's a bit <u>poor</u> in proteins. In the next days you'll need beans too! :)
C.3	-	Ottima scelta! Questo piatto è perfetto per la tua dieta :)	Great choice! This dish is perfect for your diet :)