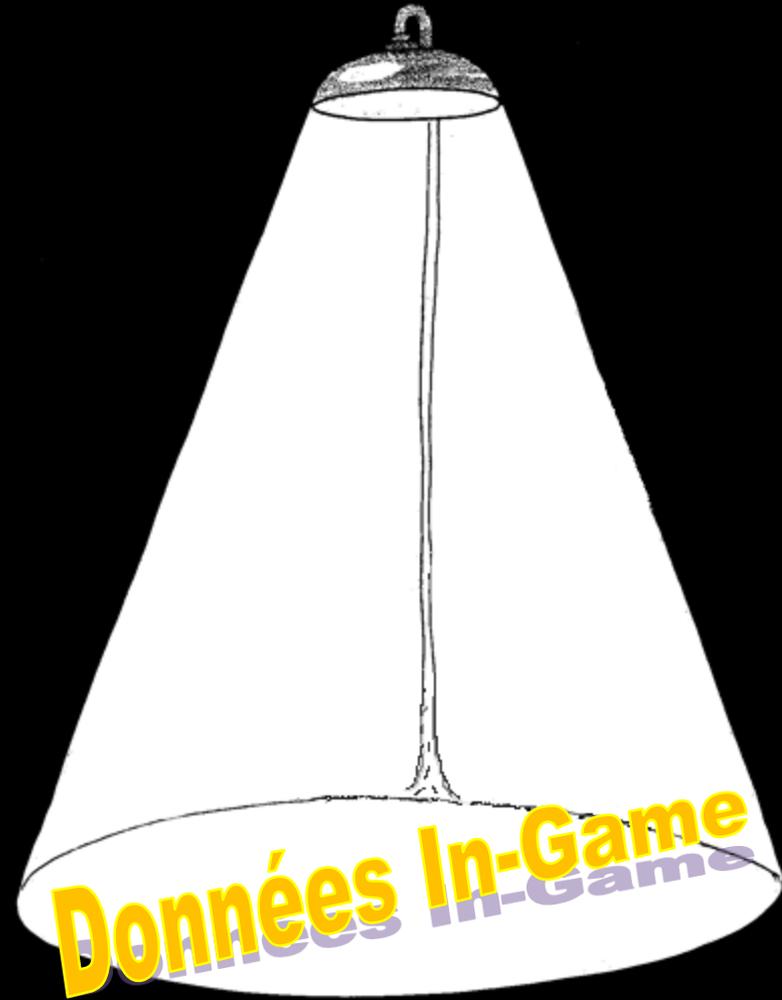


Je ne comprends pas.  
Là où vous cherchez,  
il n'y a ... rien ?



Oui, mais là au moins  
il y a de la lumière !





**Données In-Game**

# QUELQUES QUESTIONS...

**Un composant de planification génère des plans pour chaque personnage (NPC)**  
**Un plan contrôle le comportement de chaque personnage**

**Que peut-on apprendre sur les plans et le composant de planification ?**  
**Comment peut-on caractériser les plans et le composant de planification ?**

**Peut-on améliorer les plans qui contrôlent le comportement des agents ?**  
**Peut-on en apprendre suffisamment de façon à améliorer l'expérience de jeu ?**

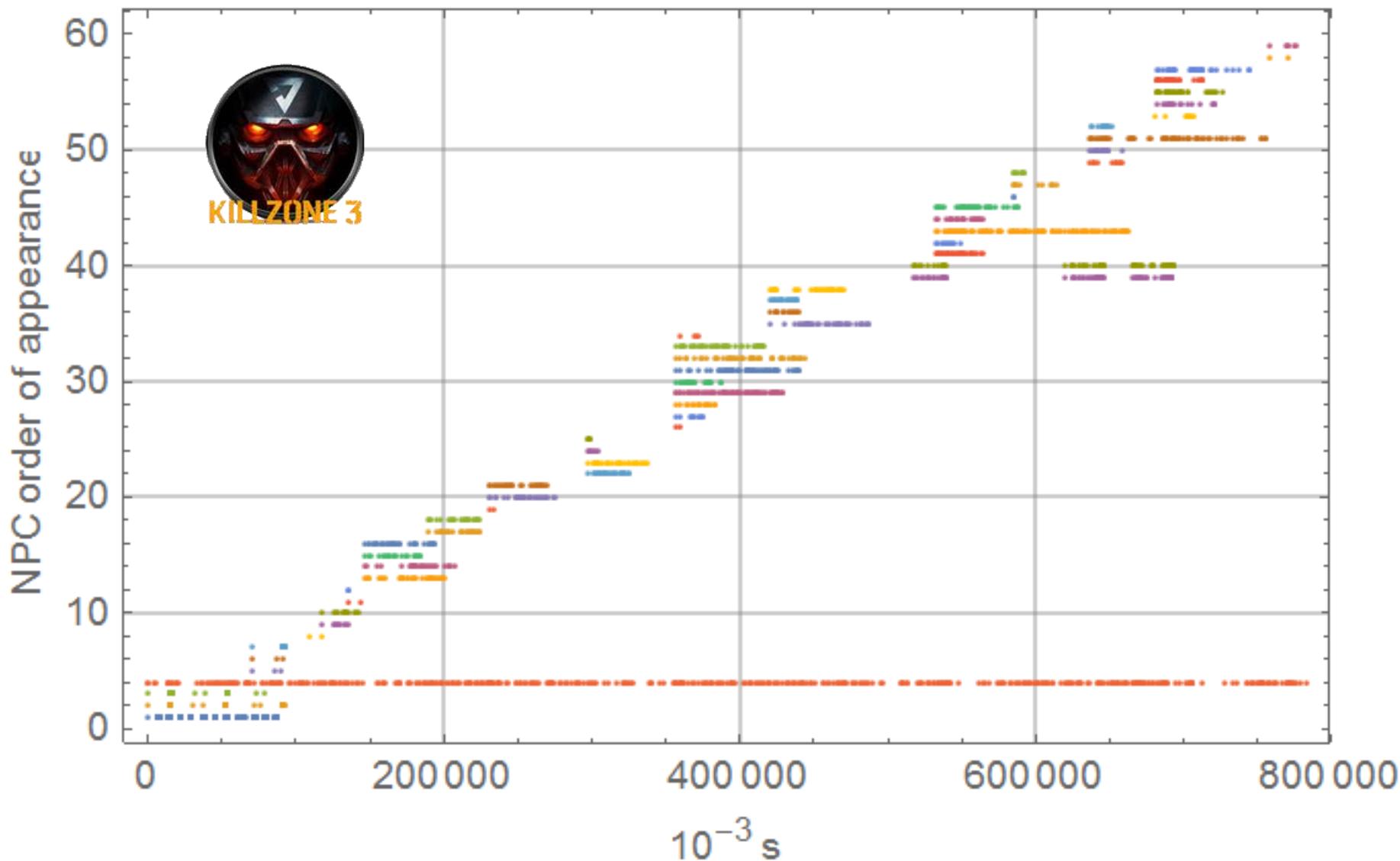
# QUEL VOLUME DE DONNÉES DE PLANIFICATION ?



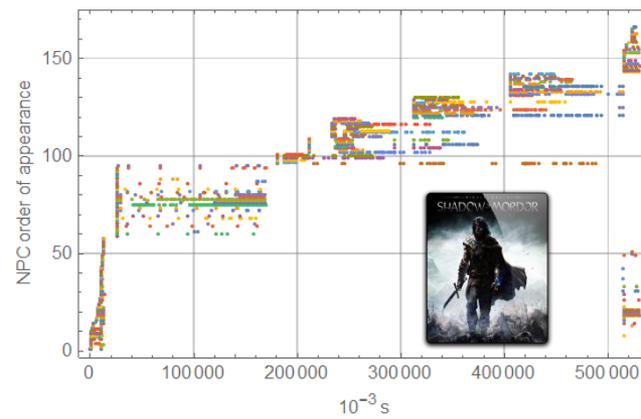
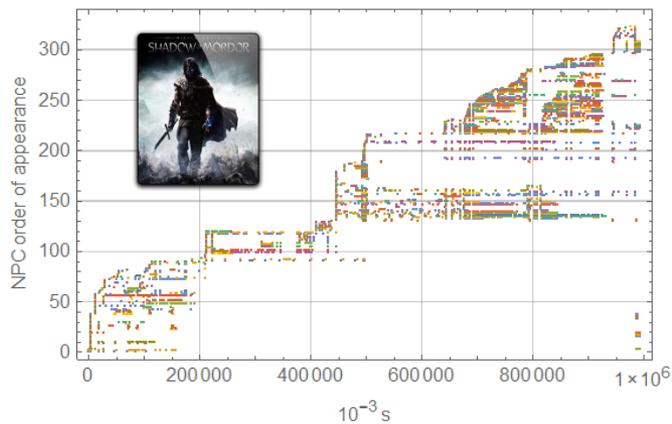
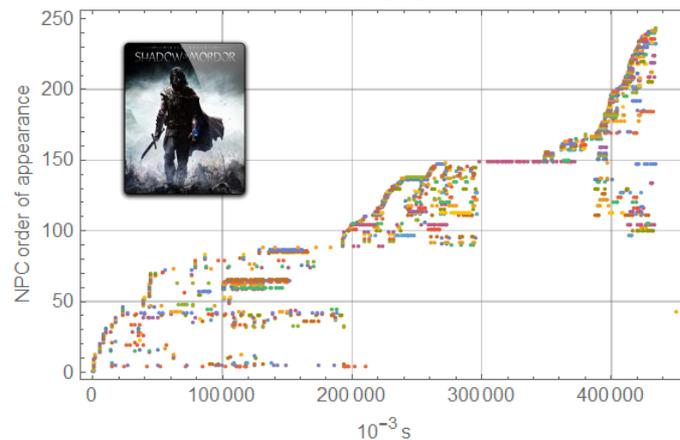
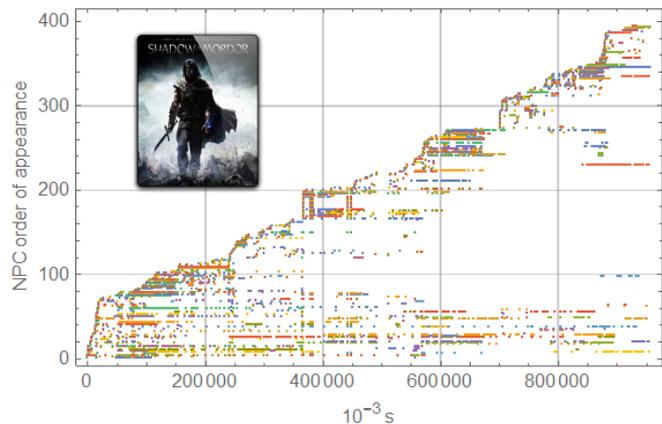
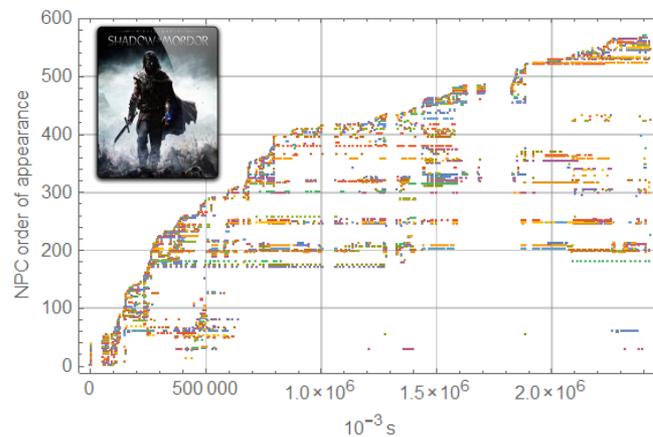
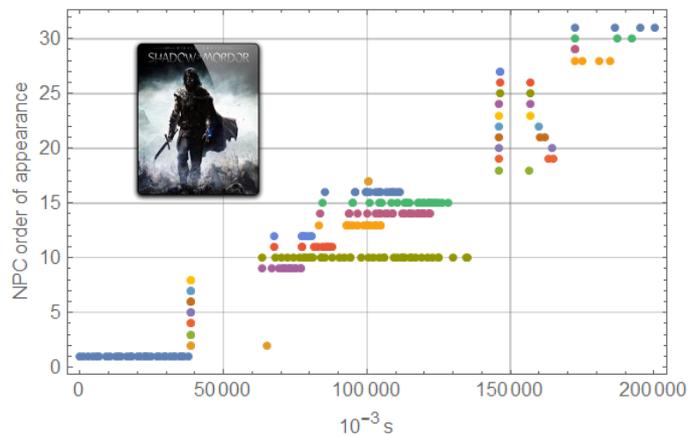
2005	2011	2012	2014	Alpha (FEB/2015)
17 fichiers	1 fichiers	4 fichiers	7 fichiers	4 fichiers
3h 45min	13min	35min	1h 45min	16min
6 679 plans	2 349 plans	8 751 plans	33 316 plans	2 482 plans
0.5 plan/s	3 plans/s	4,1 plans/s	5,25 plans/s	2,5 plans/s
55 actions	44 actions	137 actions	75 actions	13 actions

(13/NOV/2015)

# QUAND A-T-ON BESOIN D'UN PLAN ?



# QUAND A-T-ON BESOIN D'UN PLAN ?

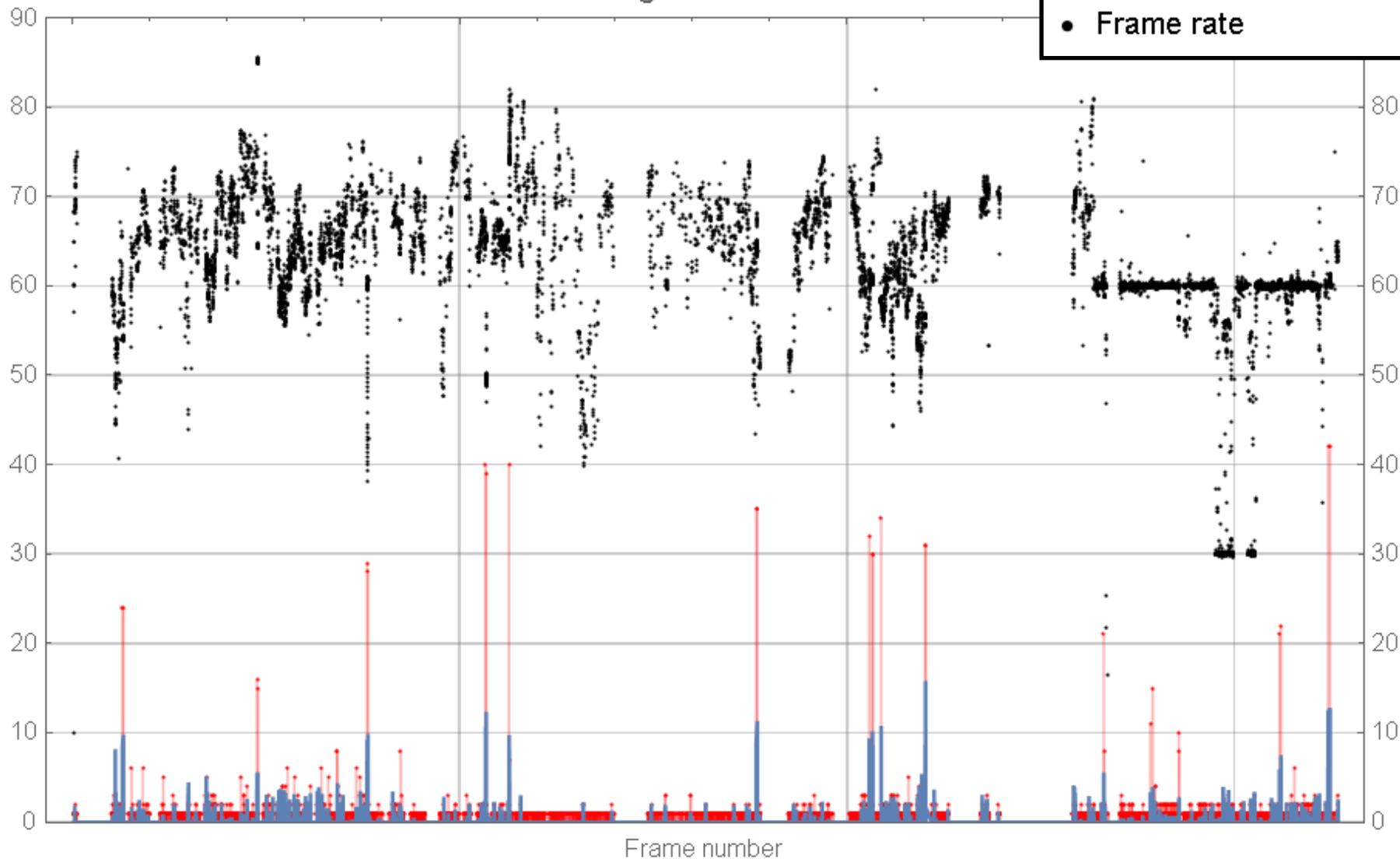


# FAUT-IL UN BUDGET PLUS IMPORTANT POUR LA PLANIFICATION ?

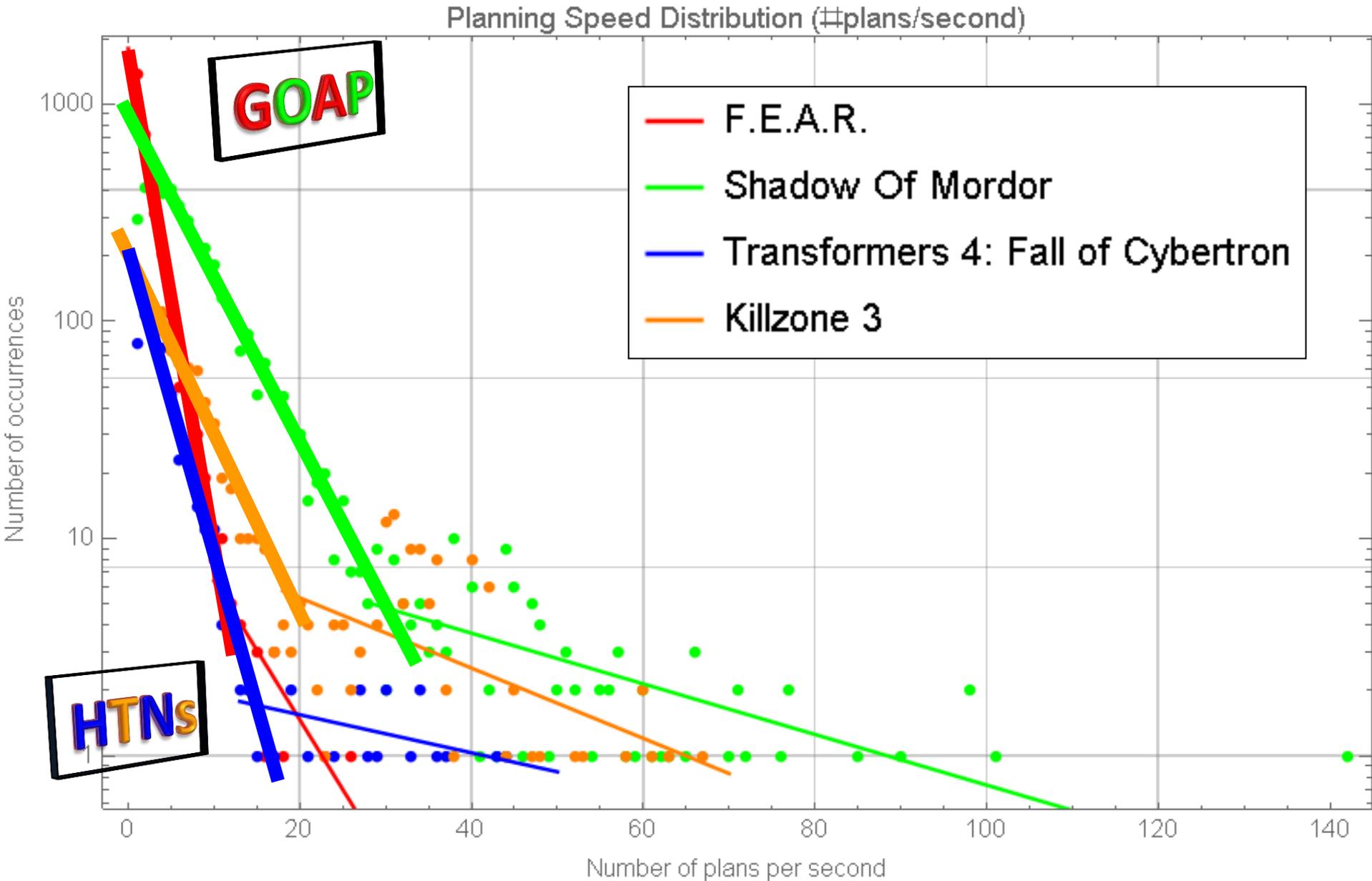


Does Planning affect the frame rate?

- Number of plans per frame
- Milliseconds per frame
- Frame rate



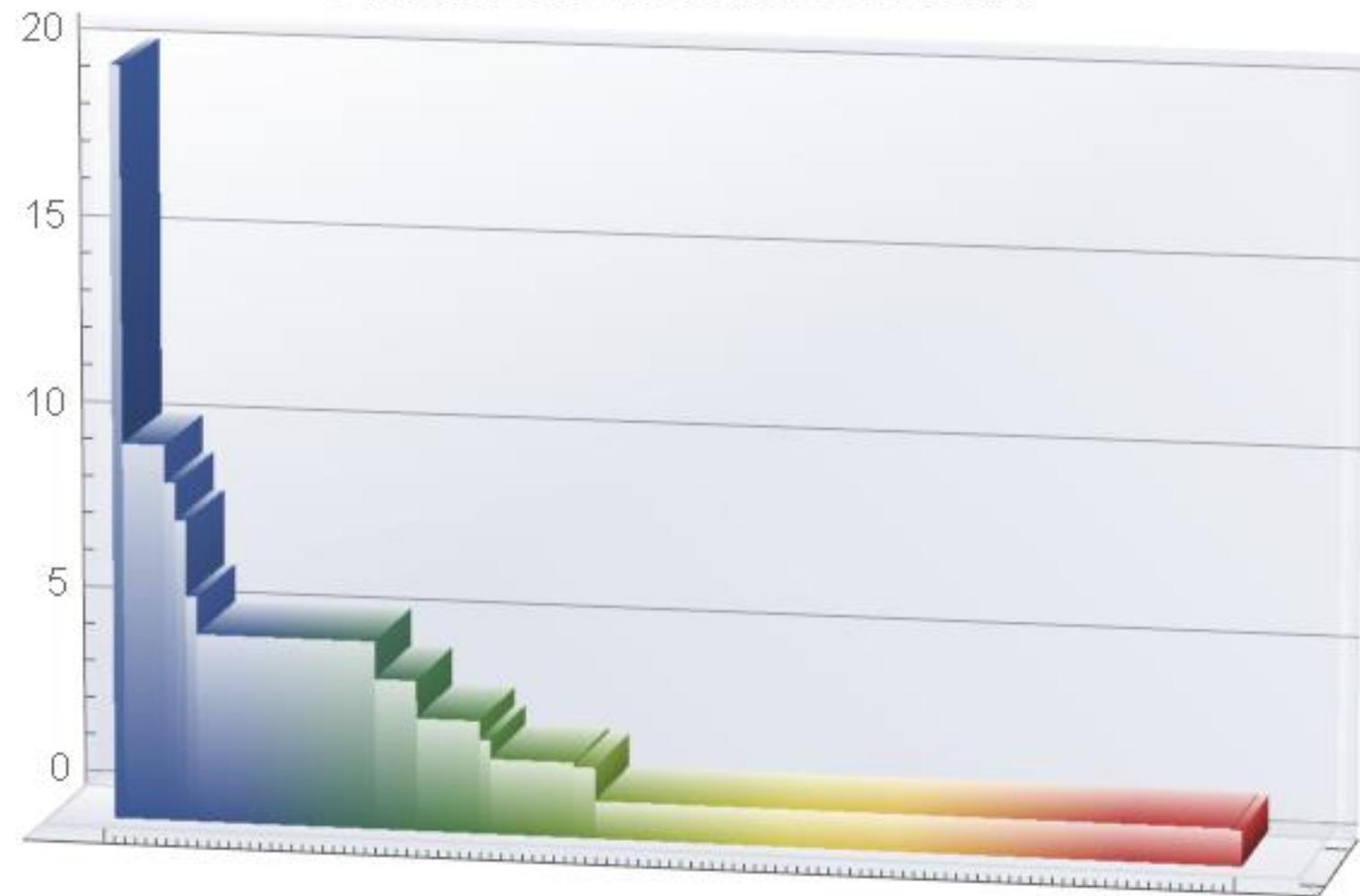
# QUELLE EST LA VITESSE DE PLANIFICATION ?



# LES DESIGNERS PEUVENT-ILS PERDRE LE CONTRÔLE ?

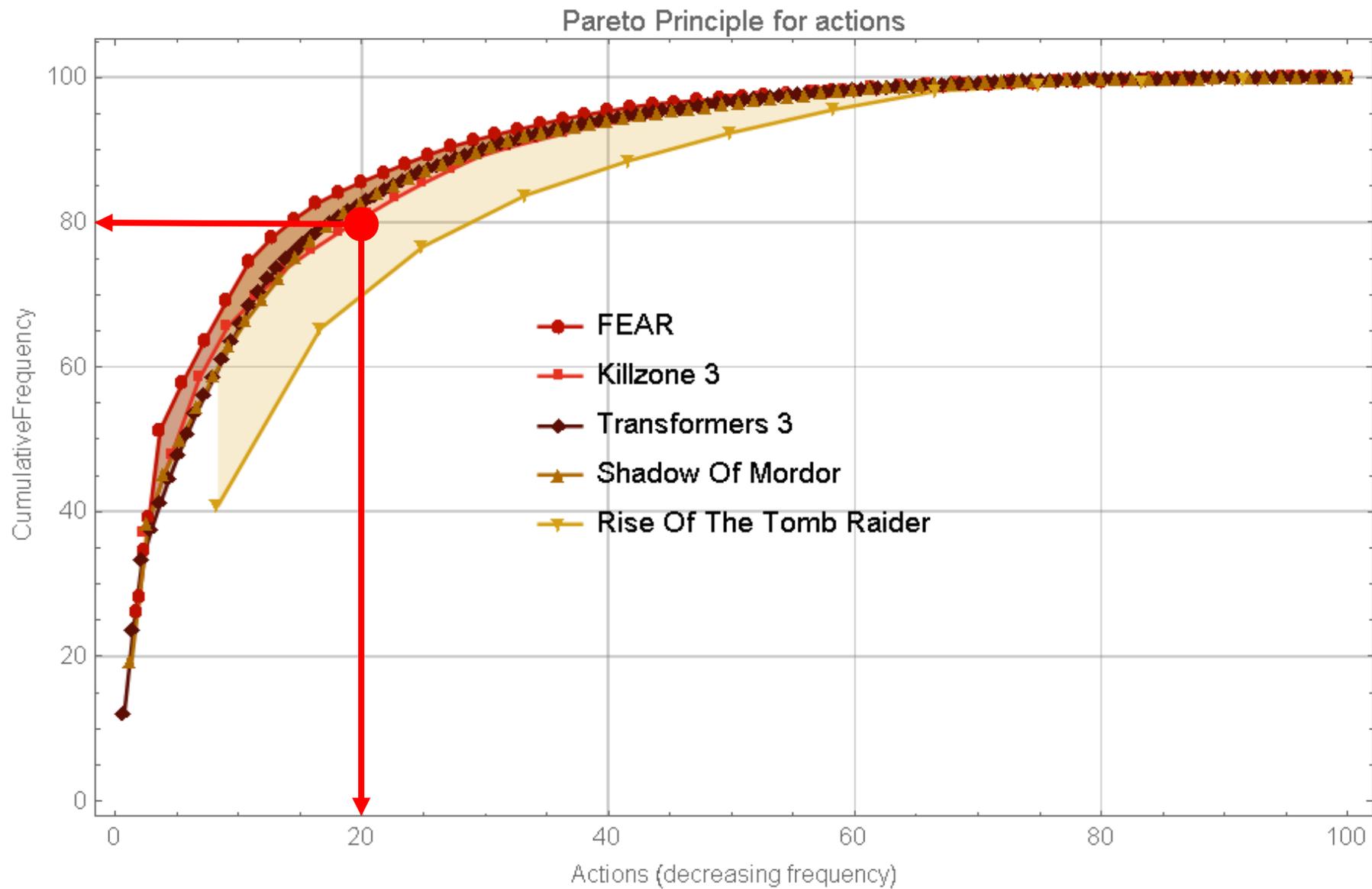


Action Costs in Shadow Of Mordor





# DISTRIBUTION CUMULÉE DES ACTIONS DANS LES PLANS



**LE PLANIFICATEUR TRAVAILLE-T-IL PLUS POUR CERTAINES ACTIONS ?**

**HOW MUCH GAME AI PLANNING DATA IS NEEDED?**

**WHAT KIND OF IN-GAME AI PLANNING DATA SHOULD WE EXTRACT?**

**HOW LONG ARE THE PLANS?**

**IS THERE A LOSS OF DESIGNER CONTROL?**

**HOW MANY PLANS PER NPC?**

**WHAT IS THE PLANNING SPEED? (#p/s)**

**MAXIMUM DURATION BETWEEN 2 PLANS? (ms)**

**WHEN IS A PLAN NEEDED?**

**HOW OFTEN IS A PLAN NEEDED?**

**HOW MANY NPC<sub>s</sub> ARE ACTIVE AT THE SAME TIME?**

**HOW MANY NPC<sub>s</sub> CALL FOR A PLAN?**

**DO WE NEED TO RAISE (PLANNING) PROCESSING RESOURCES?**

**DOES THE PLANNER WORK MORE FOR SOME ACTIONS THAN OTHERS?**

**IS A CHEAP ACTION MORE FREQUENT?**

**CAN THE ACTION COST INFLUENCE THE ACTION FREQUENCY?**

**WHY IS THE HYPERBOLIC SHAPE DISRUPTED?**

**IS IT CHEAPER TO ATTACK OR TO DEFEND?**

**DOES THE PLANNER WORKS MORE WHEN ATTACKING OR DEFENDING?**

**HOW FAR DOES DESPAWNING HAPPEN?**

**WHAT ABOUT BUGS?**

# QUELQUES RÉPONSES...

**A planning algorithm provides a plan to each NPC in order to achieve a goal**  
**A plan controls the behavior of each NPC**

**What can we learn about the plans and the planning component?**  
**How can we characterize the plans and the planning component?**

1. Plans are short and the planning component is a dragster
2. Planning is more often ambient planning than combat planning
3. Less planning to defend than to attack
4. Don't count on action costs to control what you see on screen
5. 80% of the planning effort (only) concerns 20% of the actions
6. Despawn NPCs as soon as possible to get back some of the planning effort

**Can we improve the plans controlling the behaviors?**

**Can we know enough about Game AI Planning so as to improve the gaming experience?**

1. Too many calls for planning can hurt the frame rate
2. Plans debugging (e.g. no unnecessary action)
3. Increase the number of plans achieving a given goal
4. Flatten the Pareto principle for actions (80-20 → 70-30 → 60-40 ...)
5. What are the-plans-with-a-very-low-frequency for?

# Planning Analytics

Vos données m'intéresse...

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