



# Les intros : des démos miniatures

Benjamin Lévi / Rouquemoute

May 15, 2009



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- 64K c'est quoi ?
  - ◆ Photo prise par un téléphone portable
  - ◆ 4 s de mp3 en qualité moyenne

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- ◆ Une icône sur le bureau
- ◆ Un petit mail

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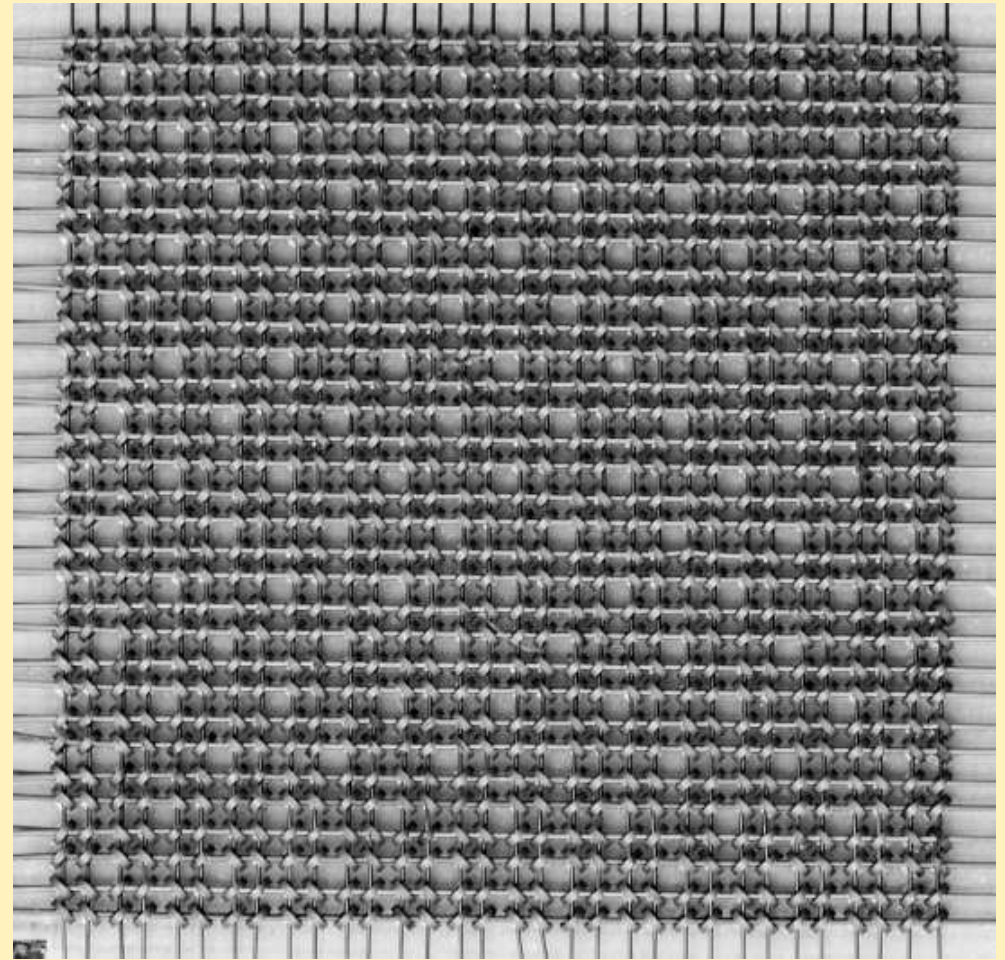
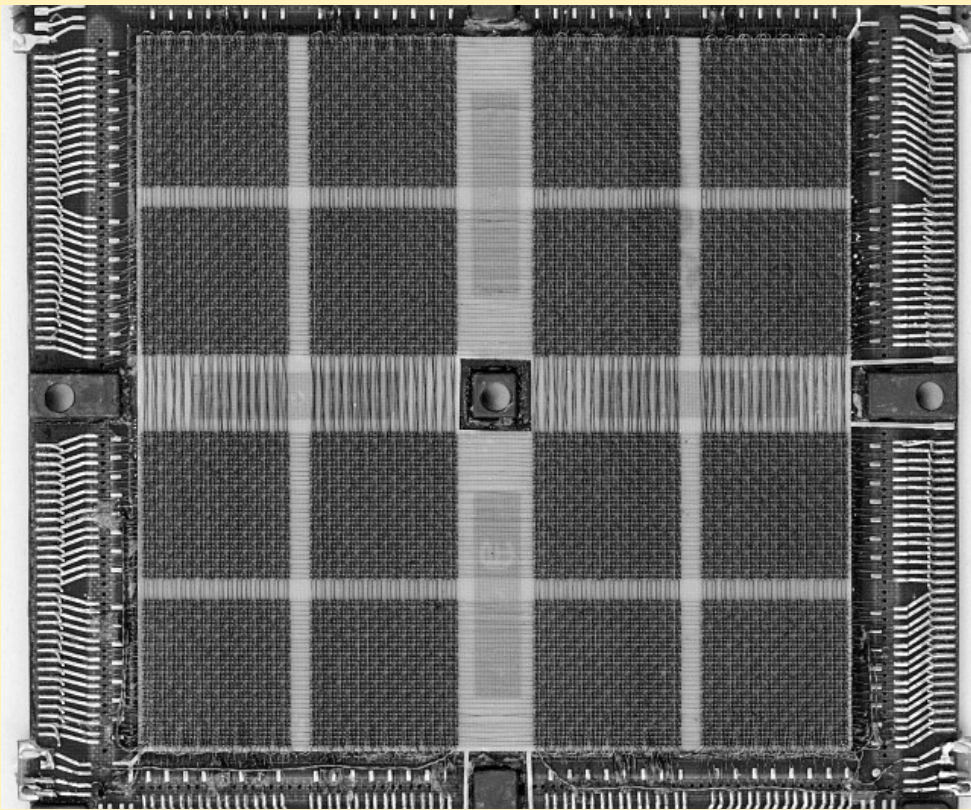
- et 4K ?

- ◆ Une icône sur le bureau
- ◆ Un petit mail

- Document word vide : 24 ko

4 kibiocets = 32768 bits

Mémoire à tores de ferrite ( $\sim 1960$ )



# État de l'art en 2008

64K :

■ Fairlight - Panic Room

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4K :

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- TBC - Receptor
- Freestyle - Stoerfall ost (2000)

Données précalculées (jpg, mp3, ...) trop gourmandes en taille  
→ il faut tout générer sur place

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Exemple : texture de bois (53 ko)



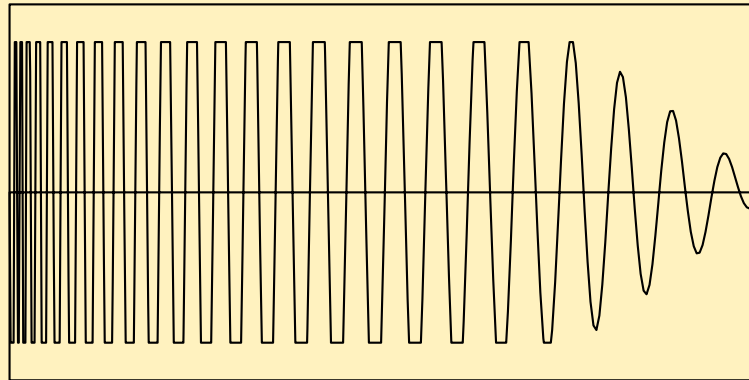
# Synthèse sonore

Première solution : générer les sons par des formules mathématiques

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Exemple : Kick

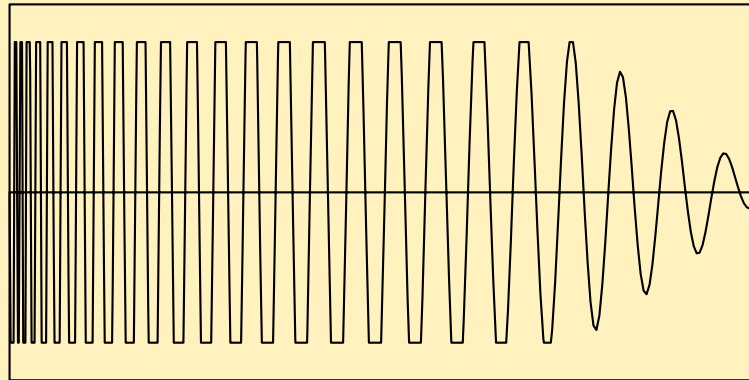
$$\text{clamp} \left[ 3 (1 - \tan(0.75\pi t)) \sin \left( 4.5\pi\sqrt{433t} \right), -1, 1 \right]$$



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Exemple : Kick

$$\text{clamp} \left[ 3 (1 - \tan(0.75\pi t)) \sin \left( 4.5\pi\sqrt{433t} \right), -1, 1 \right]$$



→ Compact, mais pas très pratique

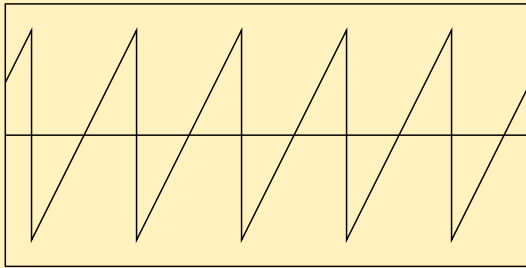
# Synthèse sonore

Deuxième solution : utiliser un synthétiseur (ici le V2 de Farbrausch)

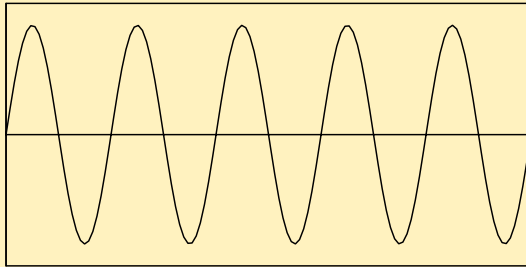
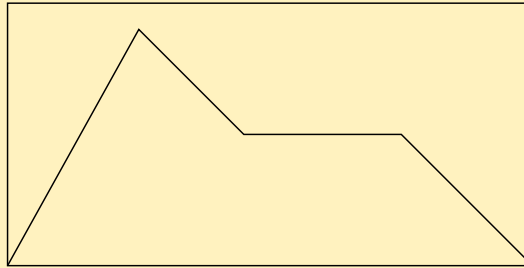




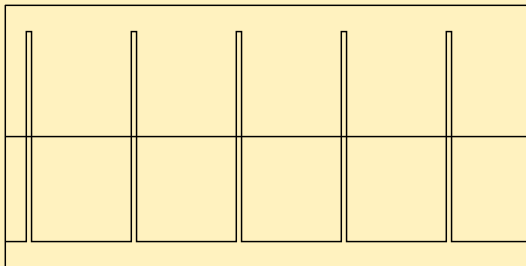
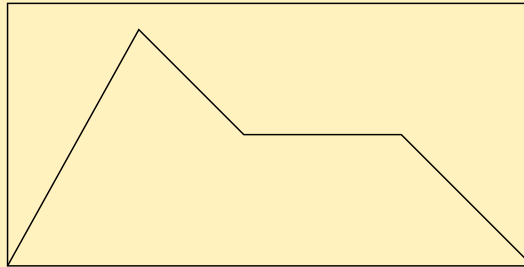
# Synthèse sonore



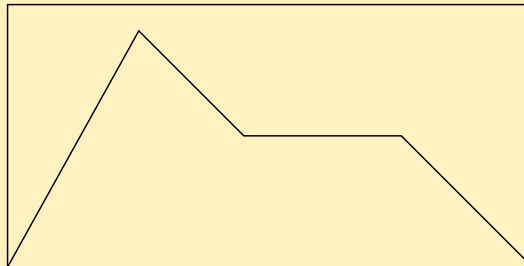
×



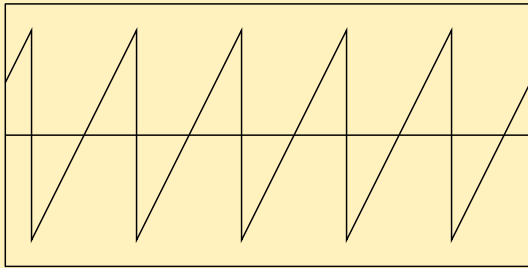
×



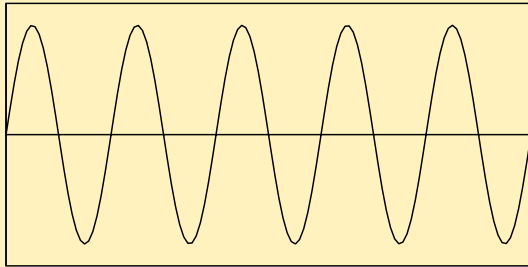
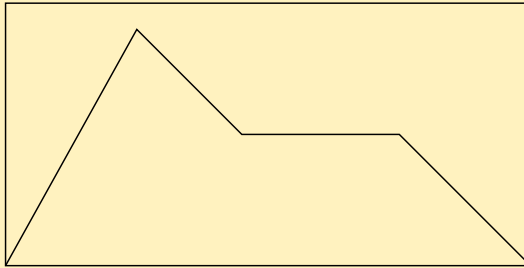
×



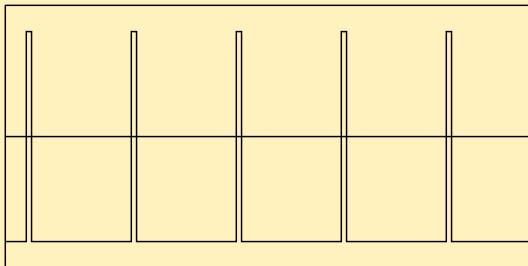
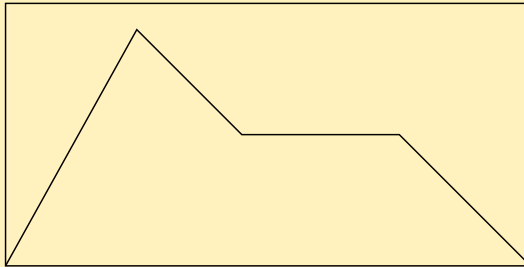
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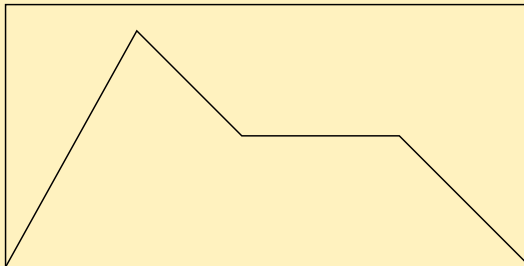
×



×



×



} +

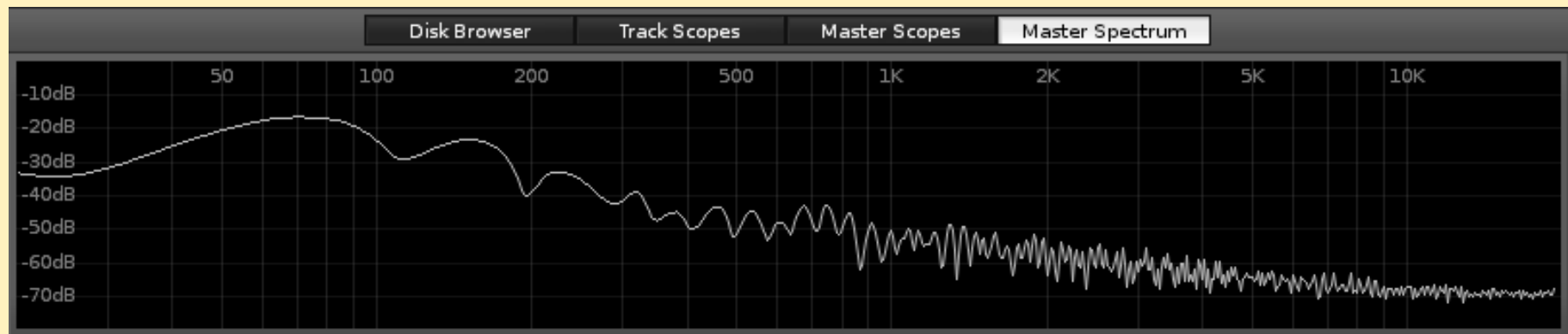
Synthèse FM :

$$\sin(2\pi f_1 t + A \times \sin(2\pi f_2 t))$$

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Génère des hautes fréquences



→ Filtre passe-bas pour atténuer



# Compresseurs



La génération procédurale ne suffit pas, il faut compresser l'exécutable.

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- UPX

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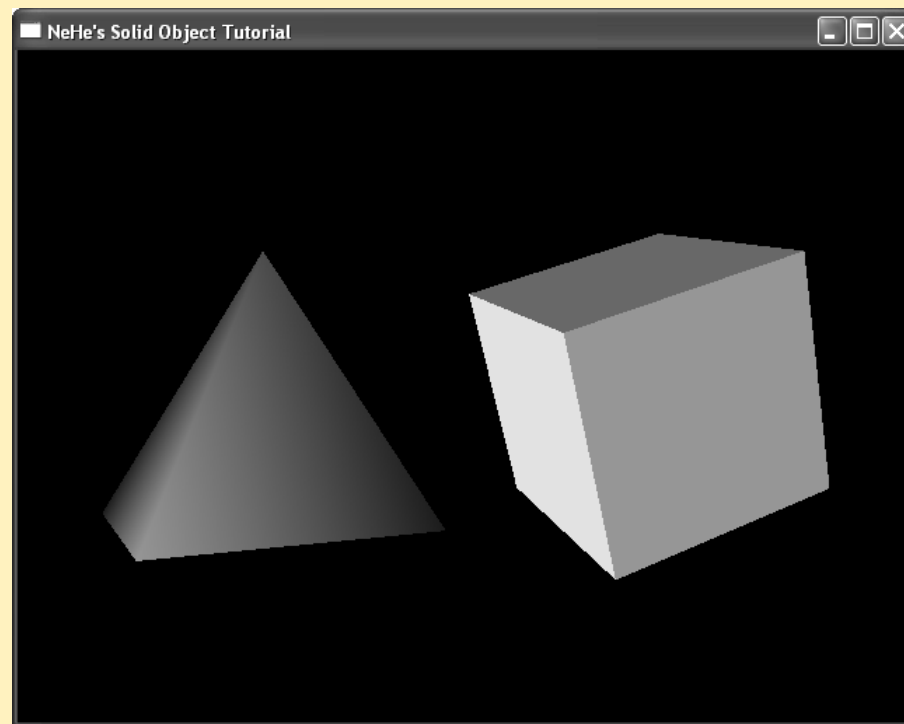
- Crinkler (TBC & Loonies)

- Données extraites du séminaire donné par Northern Dragons à Block Party 2007 (<http://in4k.undergrund.net/>)

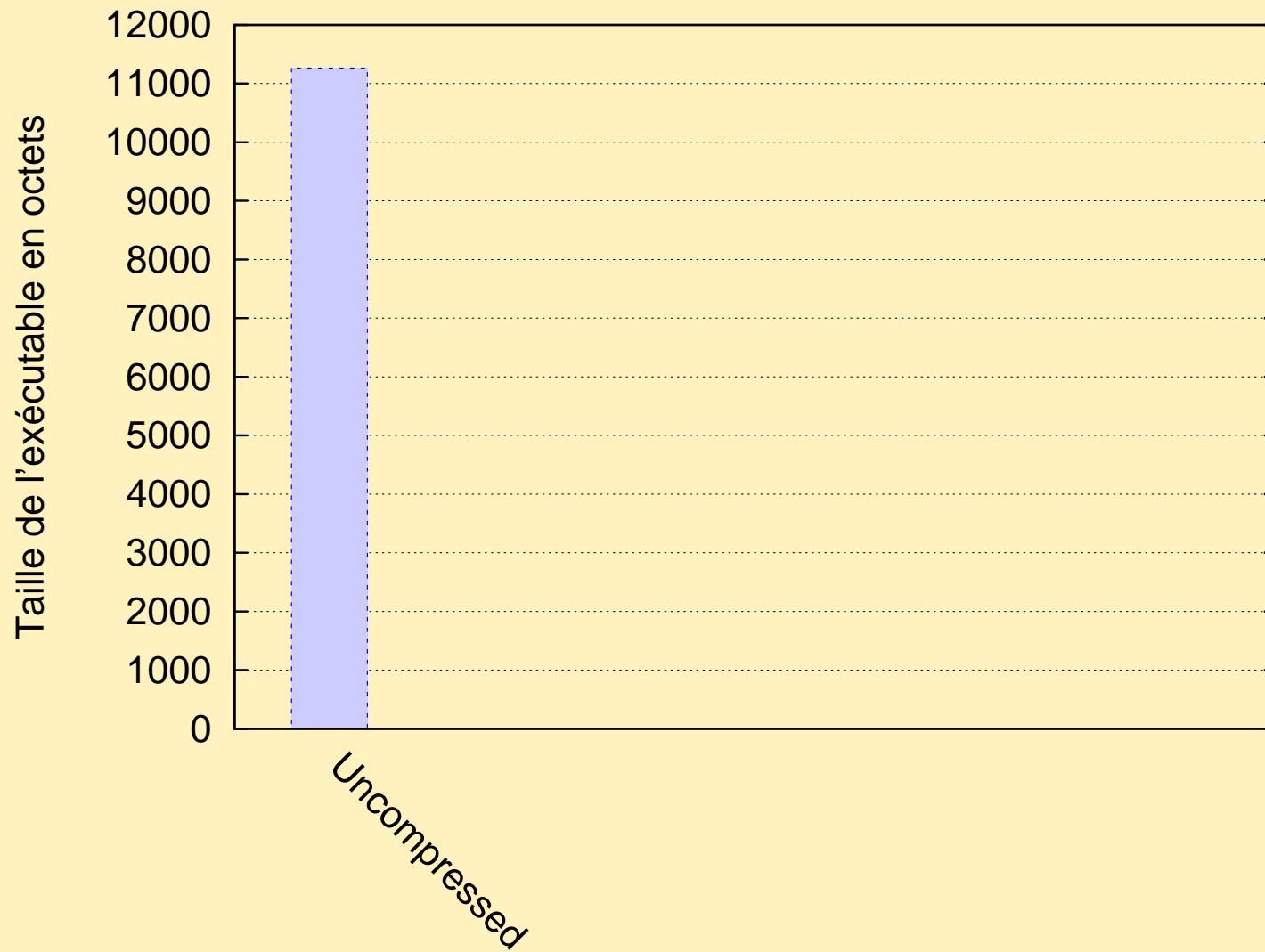


# Méthodes de compression

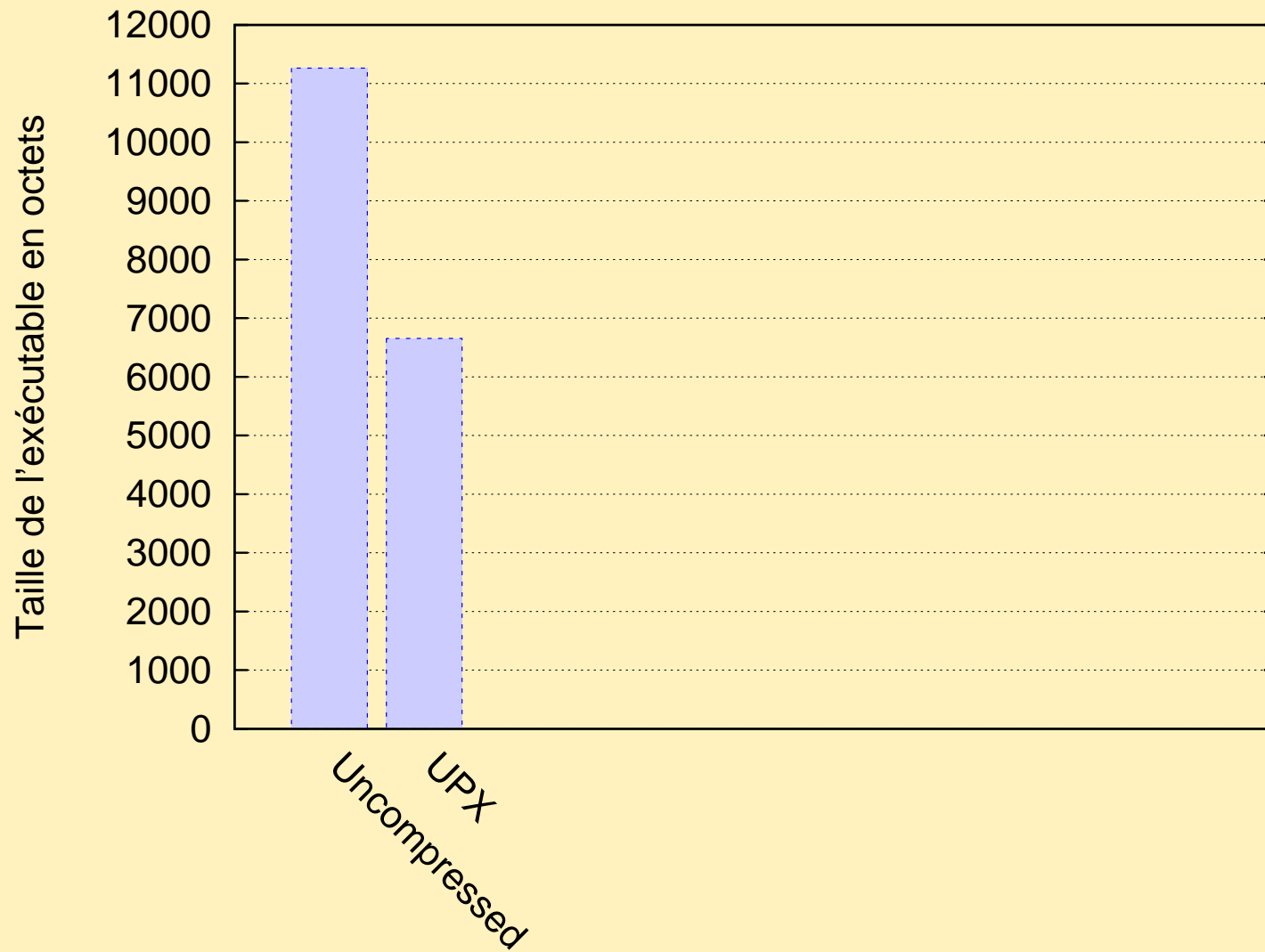
- Données extraites du séminaire donné par Northern Dragons à Block Party 2007 (<http://in4k.undergrund.net/>)
- Programme test : tutorial 5 de Nehe



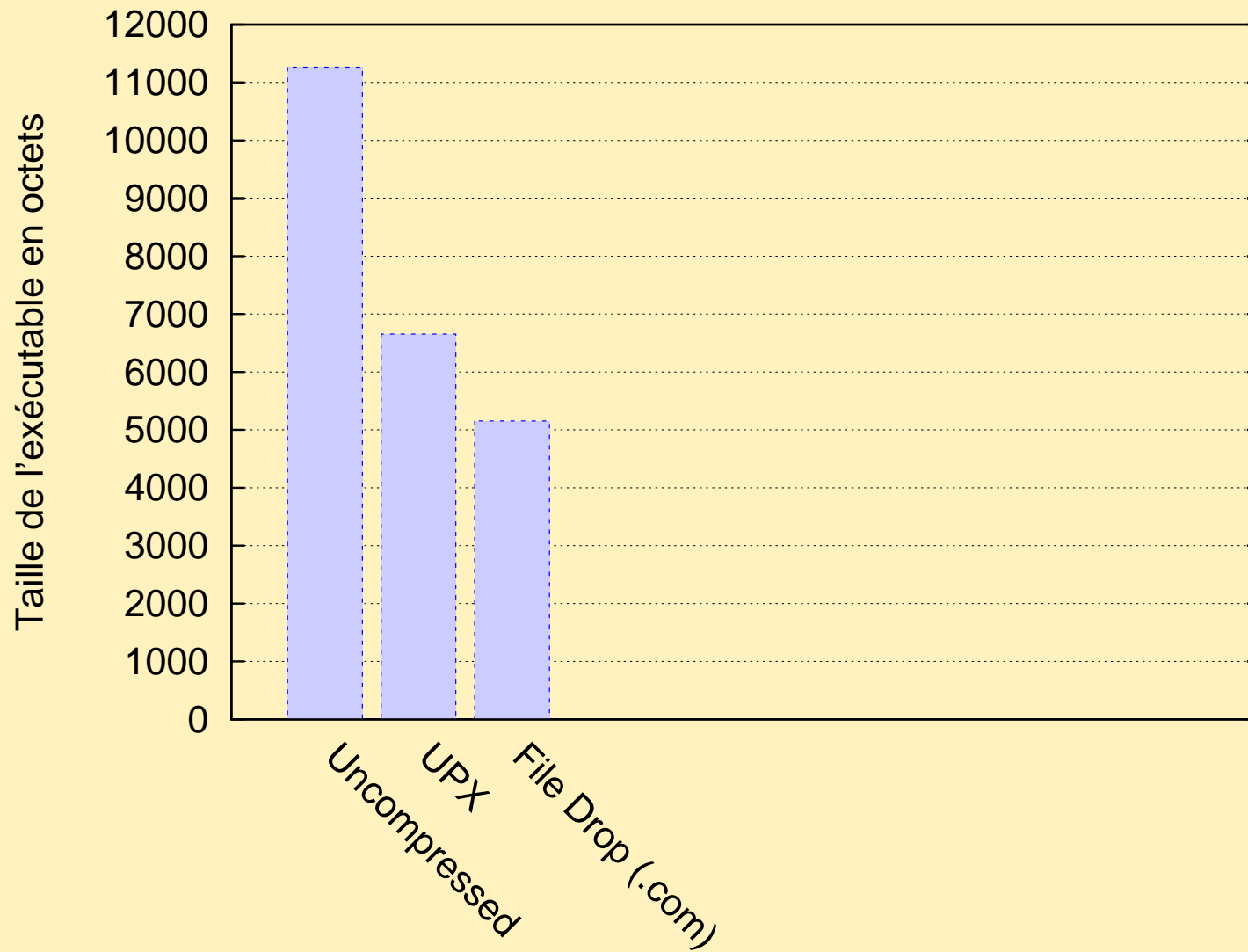
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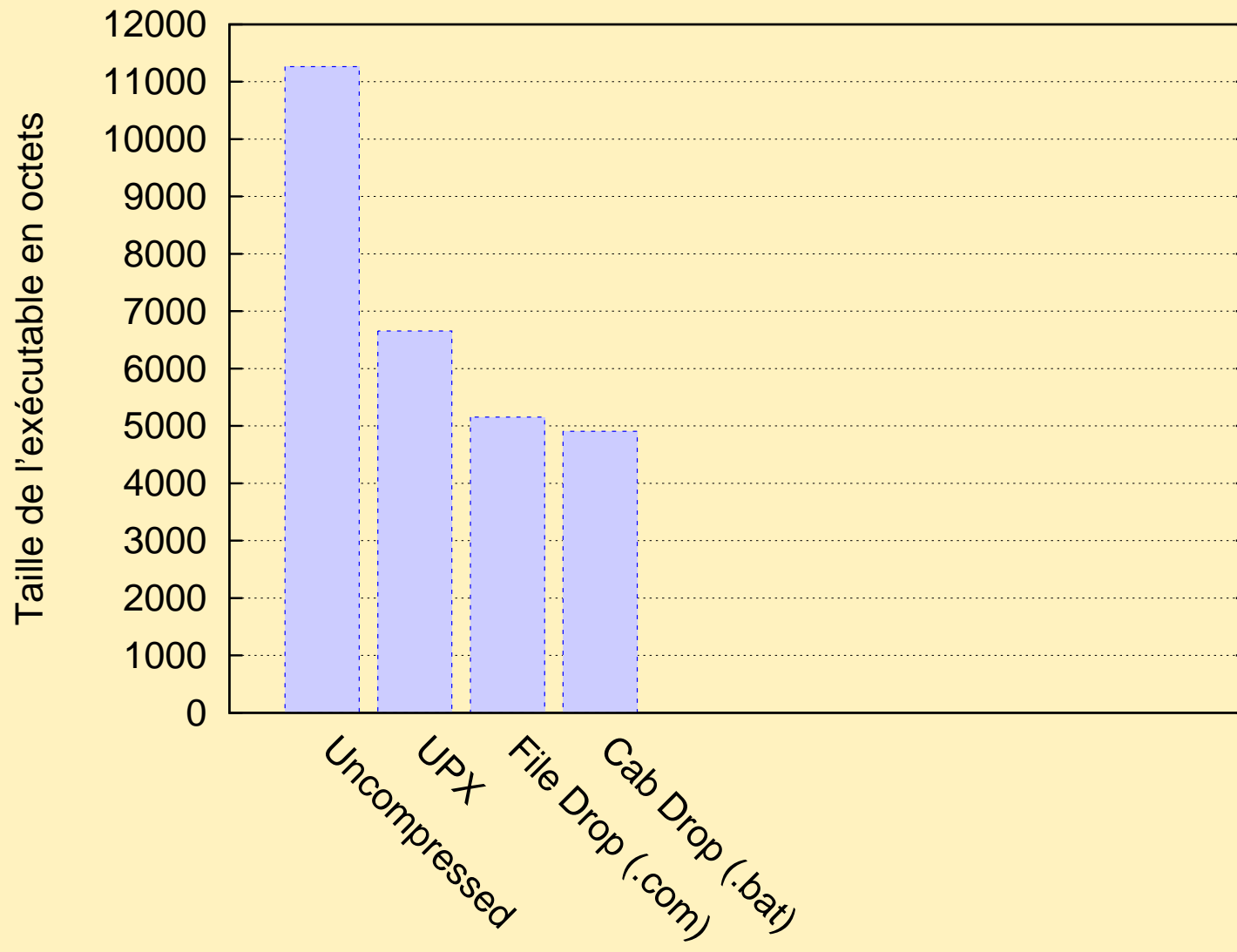
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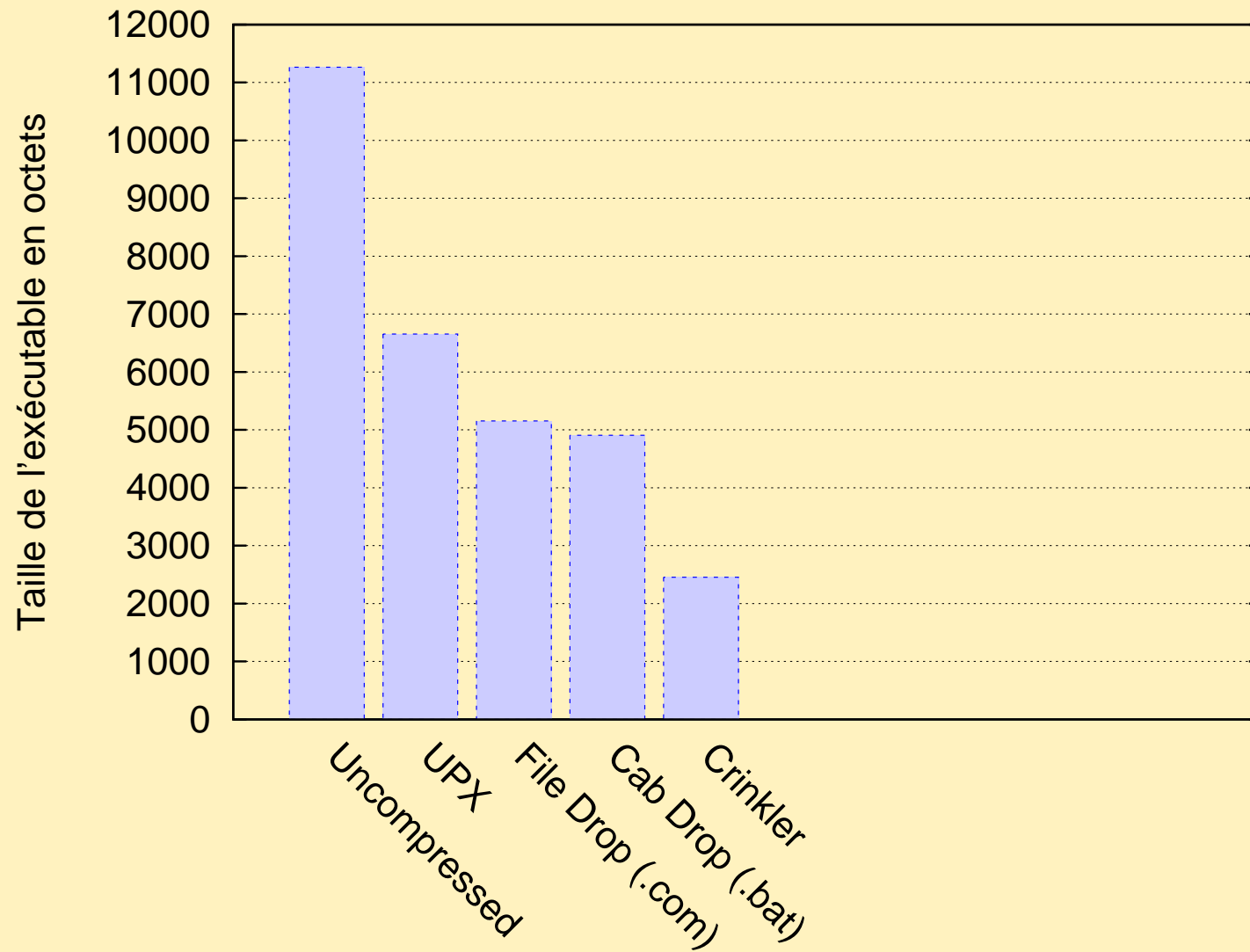
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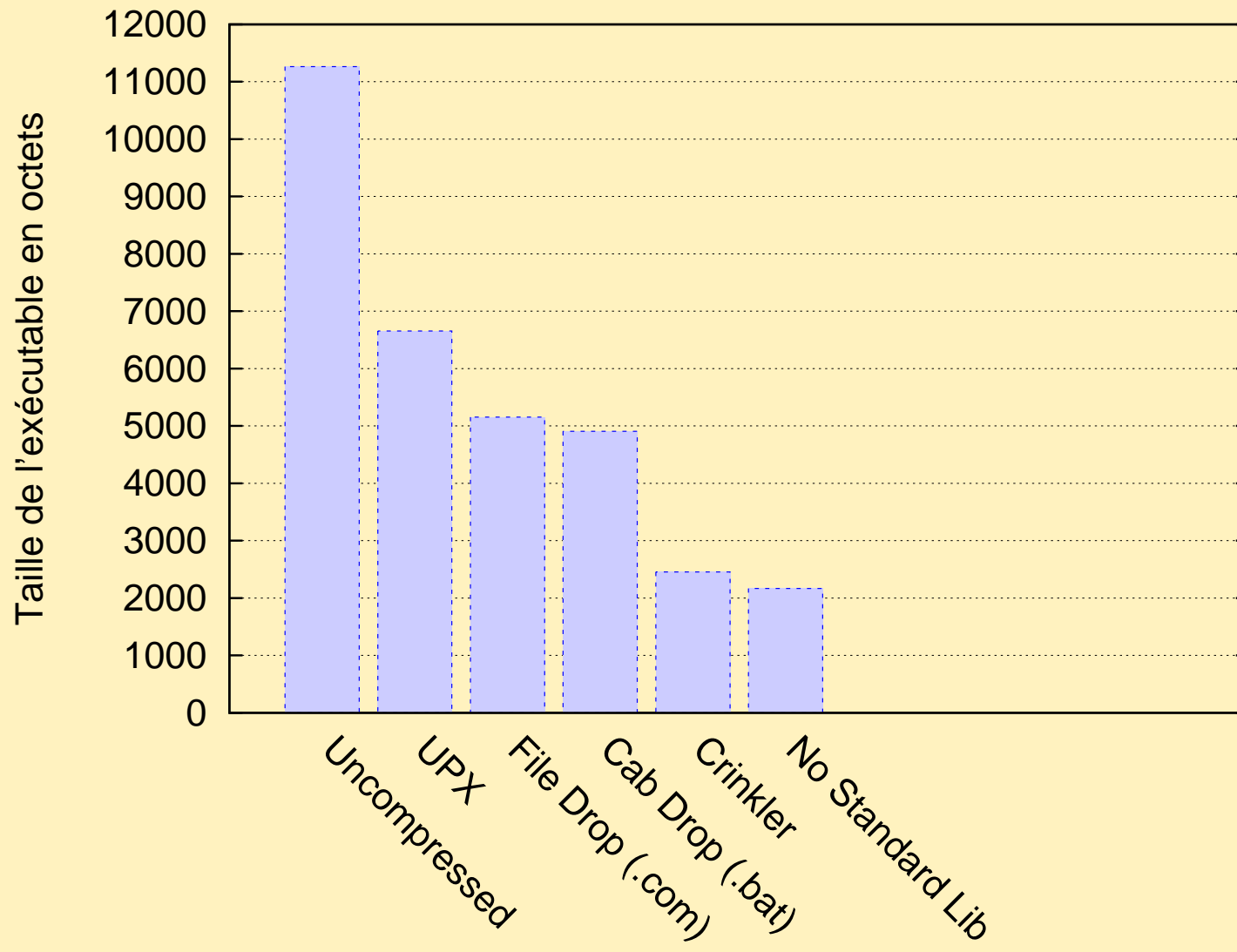
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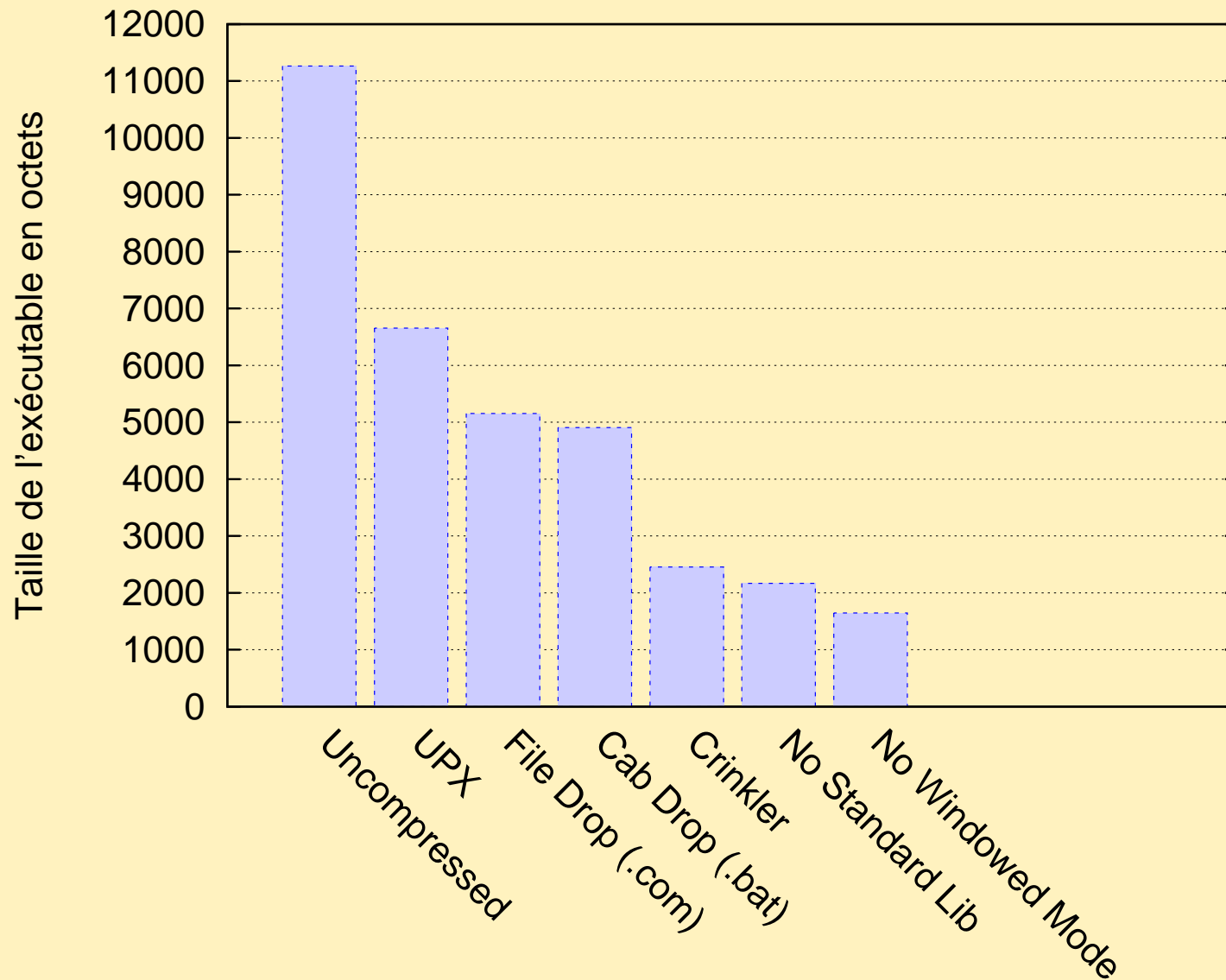
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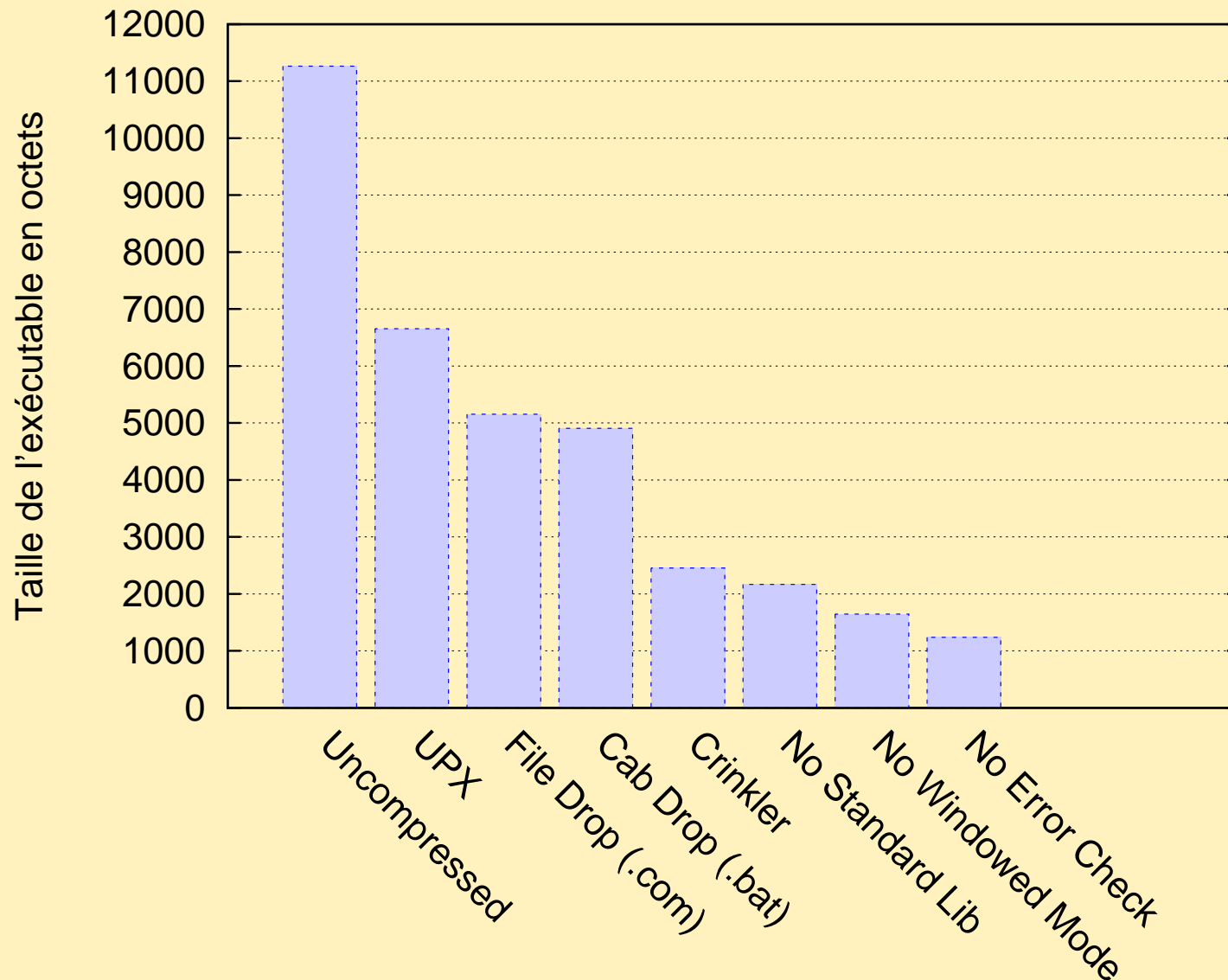


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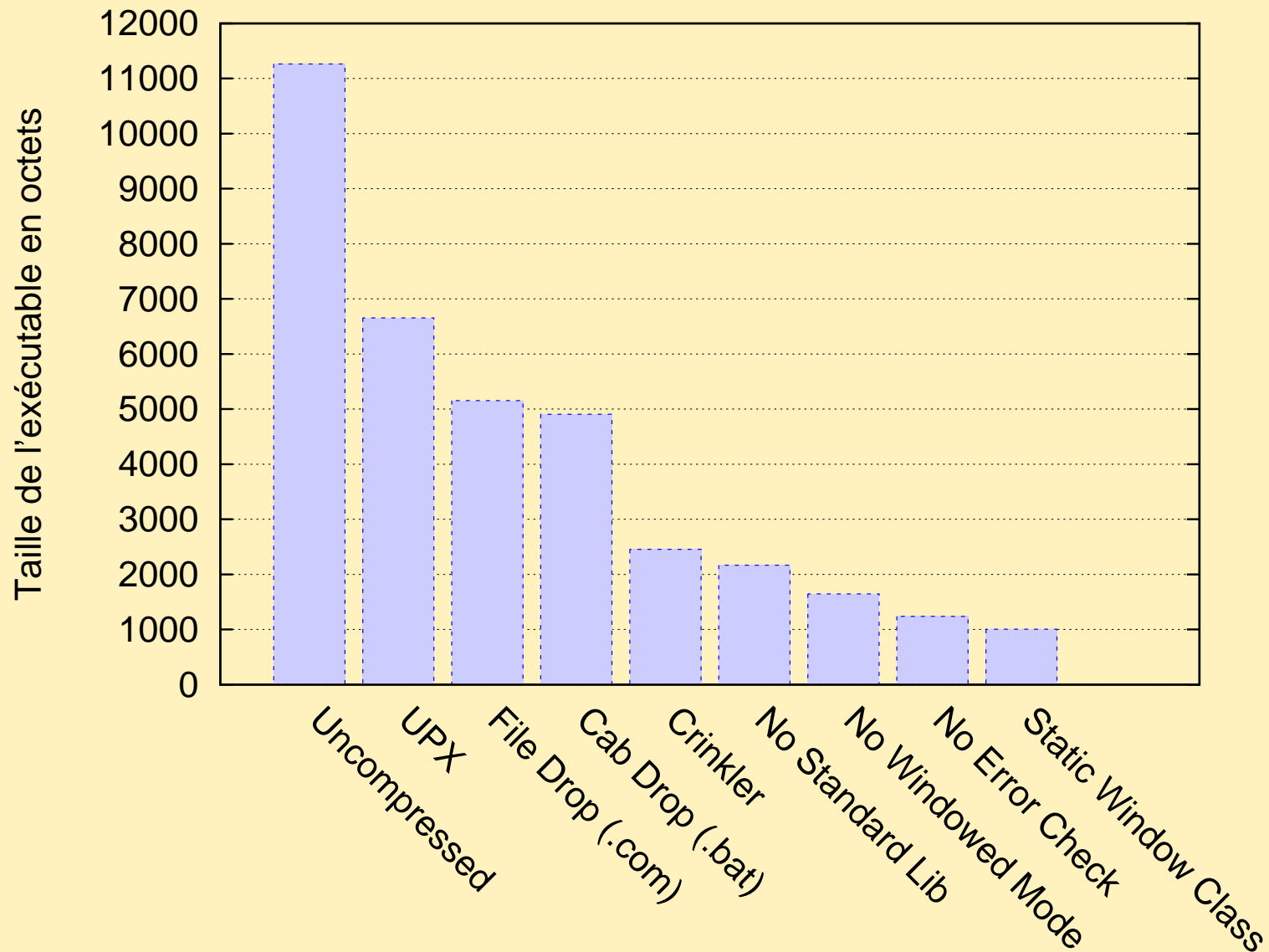




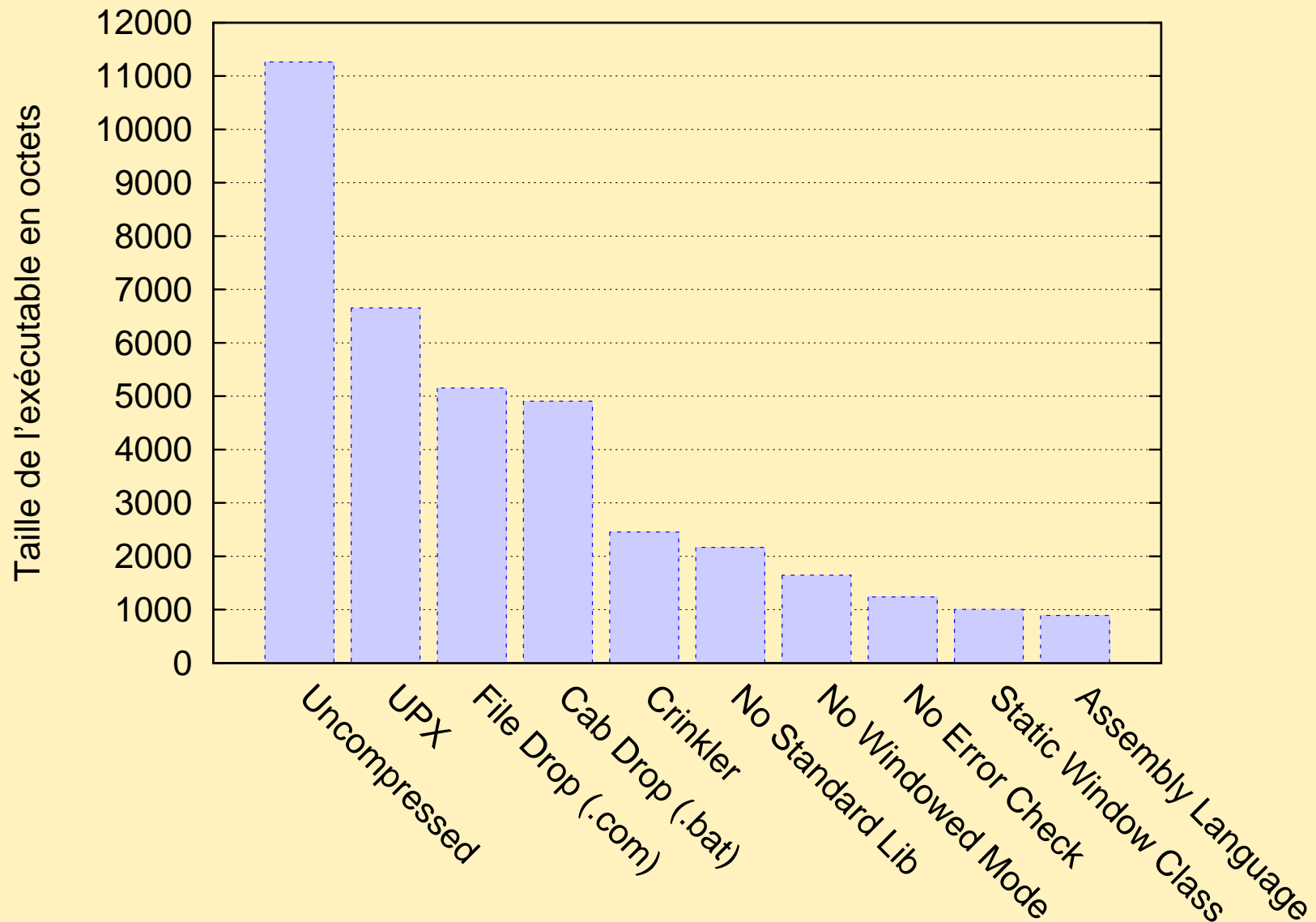
# Méthodes de compression

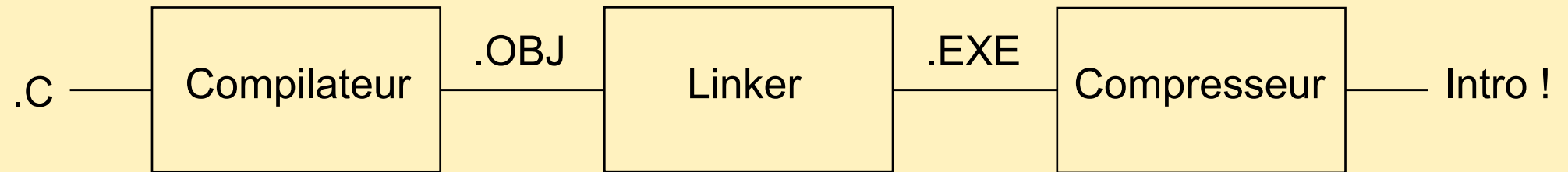


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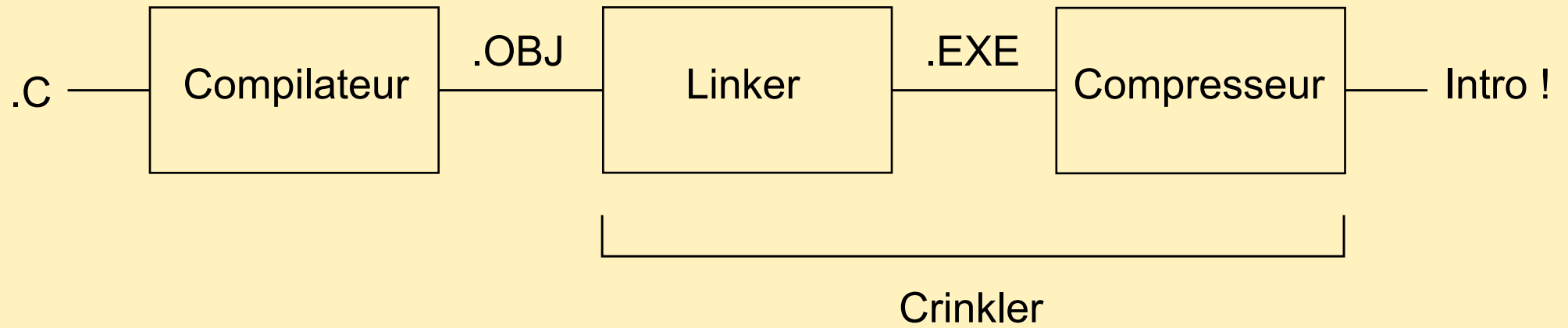


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# Crinkler



Linker :

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## Compresseur :

- Prédiction par reconnaissance partielle (contexte de 8 octets)
- Meilleure compression que LZX, au détriment de la vitesse
- Code de décompression minuscule ( $< 250$  octets)

# Crinkler

	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f		
00000000h:	4D	5A	50	00	02	00	00	00	04	00	0F	00	FF	FF	00	00	; MZP.....ýý..	DOS HEADER
00000010h:	B8	00	00	00	00	00	00	00	40	00	1A	00	00	00	00	00	; ,.....@.....	
00000020h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
00000030h:	00	00	00	00	00	00	00	00	00	00	00	00	00	01	00	00	; .....	
00000040h:	BA	10	00	0E	1F	B4	09	CD	21	B8	01	4C	CD	21	90	90	; °....'.í!.,Lí!□□	DOS STUB
00000050h:	54	68	69	73	20	70	72	6F	67	72	61	6D	20	6D	75	73	; This program mus	
00000060h:	74	20	62	65	20	72	75	6E	20	75	6E	64	65	72	20	57	; t be run under W	
00000070h:	69	6E	33	32	0D	0A	24	37	00	00	00	00	00	00	00	00	; in32..\$7.....	
00000080h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	PE HEADER
00000090h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000000a0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000000b0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000000c0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	Signature
000000d0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000000e0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000000f0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
00000100h:	50	45	00	00	4C	01	08	00	19	5E	42	2A	00	00	00	00	; PE..L....^B*....	FileHeader
00000110h:	00	00	00	00	EO	00	8E	81	0B	01	02	19	00	AO	02	00	; ....à,ž□.....	
00000120h:	00	DE	00	00	00	00	00	00	B4	AD	02	00	00	10	00	00	; .P.....'-.....	
00000130h:	00	B0	02	00	00	00	40	00	00	10	00	00	00	02	00	00	; .°.....@.....	
00000140h:	01	00	00	00	00	00	00	00	04	00	00	00	00	00	00	00	; .....	OptionalHeader
00000150h:	00	D0	03	00	00	04	00	00	00	00	00	00	02	00	00	00	; .D.....	
00000160h:	00	00	10	00	00	40	00	00	00	00	10	00	00	10	00	00	; ....@.....	
00000170h:	00	00	00	00	10	00	00	00	00	00	00	00	00	00	00	00	; .....	
00000180h:	00	D0	02	00	1E	18	00	00	00	40	03	00	00	8E	00	00	; .D.....@....ž..	DATA DIRECTORY
00000190h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000001a0h:	00	10	03	00	04	2B	00	00	00	00	00	00	00	00	00	00	; .....+.....	
000001b0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000001c0h:	00	00	03	00	18	00	00	00	00	00	00	00	00	00	00	00	; .....	SECTION TABLE
000001d0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000001e0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000001f0h:	00	00	00	00	00	00	00	00	43	4F	44	45	00	00	00	00	; .....CODE....	
00000200h:	88	9E	02	00	00	10	00	00	00	AO	02	00	00	04	00	00	; ^ž.....	
00000210h:	00	00	00	00	00	00	00	00	00	00	00	00	20	00	00	60	; .....	
00000220h:	44	41	54	41	00	00	00	00	D4	06	00	00	00	B0	02	00	; DATA....ô....°..	

En-tête PE : 544 octets

# Crinkler

	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f		
00000000h:	4D	5A	50	00	02	00	00	00	04	00	0F	00	FF	FF	00	00	; MZP.....ÿÿ..	DOS HEADER
00000010h:	B8	00	00	00	00	00	00	00	40	00	1A	00	00	00	00	00	; ,.....@.....	
00000020h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
00000030h:	00	00	00	00	00	00	00	00	00	00	00	00	00	01	00	00	; .....	
00000040h:	BA	10	00	0E	1F	B4	09	CD	21	B8	01	4C	CD	21	90	90	; °....'.í!.,Lí!□□	DOS STUB
00000050h:	54	68	69	73	20	70	72	6F	67	72	61	6D	20	6D	75	73	; This program mus	
00000060h:	74	20	62	65	20	72	75	6E	20	75	6E	64	65	72	20	57	; t be run under W	
00000070h:	69	6E	33	32	0D	0A	24	37	00	00	00	00	00	00	00	00	; in32..\$7.....	
00000080h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	PE HEADER
00000090h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000000a0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000000b0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000000c0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	Signature
000000d0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000000e0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000000f0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
00000100h:	50	45	00	00	4C	01	08	00	19	5E	42	2A	00	00	00	00	; PE..L....^B*....	FileHeader
00000110h:	00	00	00	00	E0	00	8E	81	0B	01	02	19	00	A0	02	00	; ....à,ž□.....	
00000120h:	00	DE	00	00	00	00	00	00	B4	AD	02	00	00	10	00	00	; .P.....'-.....	
00000130h:	00	B0	02	00	00	00	40	00	00	10	00	00	00	02	00	00	; .°.....@.....	
00000140h:	01	00	00	00	00	00	00	00	04	00	00	00	00	00	00	00	; .....	OptionalHeader
00000150h:	00	D0	03	00	00	04	00	00	00	00	00	00	02	00	00	00	; .D.....	
00000160h:	00	00	10	00	00	40	00	00	00	00	10	00	00	10	00	00	; .....@.....	
00000170h:	00	00	00	00	10	00	00	00	00	00	00	00	00	00	00	00	; .....	
00000180h:	00	D0	02	00	1E	18	00	00	00	40	03	00	00	8E	00	00	; .D.....@....ž..	DATA DIRECTORY
00000190h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000001a0h:	00	10	03	00	04	2B	00	00	00	00	00	00	00	00	00	00	; .....+.....	
000001b0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000001c0h:	00	00	03	00	18	00	00	00	00	00	00	00	00	00	00	00	; .....	SECTION TABLE
000001d0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000001e0h:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	; .....	
000001f0h:	00	00	00	00	00	00	00	00	43	4F	44	45	00	00	00	00	; .....CODE....	
00000200h:	88	9E	02	00	00	10	00	00	00	A0	02	00	00	04	00	00	; ^ž.....	
00000210h:	00	00	00	00	00	00	00	00	00	00	00	00	20	00	00	60	; .....	
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En-tête PE : 544 octets

→ 196 octets

- In4k : <http://in4k.untergrund.net/>
- Blog d'Auld : <http://sizecoding.blogspot.com/>
- Articles d'iq : <http://iquilezles.org/www/>
- Crinkler : <http://www.crinkler.net/>
- kkrunchy : [http://www.farbrausch.de/ fg/kkrunchy/](http://www.farbrausch.de/fg/kkrunchy/)



# Fin

Travaux pratiques !